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Unintended Consequences of China's New Labor Contract Law on Unemployment and Welfare Loss of the Workers*

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Abstract

China's new Labor Contract Law, which intended to strengthen the labor protection for workers, went into effect on January 1, 2008. The law stipulated that the maximum cumulative duration of successive fixed-term (temporary) labor contracts is 10 years, and employees working for the same employer for more than 10 consecutive years are able to secure an open-ended (permanent) labor contract under the new law, which is highly desirable to employees. However, in order to circumvent the new Labor Contract Law, some employers may have dismissed workers, after the passage of the new law, who had worked in the same firm for more than 10 years. Using data from the 2008 China General Social Survey, we find strong evidence that firms did in fact dismiss their formal-contract employees who have been employed for more than 10 years. Additionally, using a regression discontinuity design based on this exogenous change in unemployment status for this particular group of workers, we show that the dismissed workers suffered significant welfare loss in terms of happiness. Our results are robust to various specifications and placebo tests.

JEL Codes: J41, J64, I31
Keywords: Labor Contract Law; Unemployment; Happiness; Regression Discontinuity Design; China

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1. Introduction

The labor market in China has gone through drastic changes since the economic reform initiated in 1978. One of the most notable changes is the evolution of the industrial relations. Prior to the reform, the workers in China enjoyed life-time job security. In 1986, the socialist China introduced labor contracts for the first time, one of whose main objectives was to break the "iron rice bowl" system where a person was employed in a single firm for his/her entire lifetime. After the state-owned enterprise retrenchment in the late 1990s, the "iron rice bowl" system was broken for most workers in China. The job security in China had changed considerably from high to low, and most firms had not signed written labor contracts with their employees for a long period of time. As a result, a large number of workers were vulnerable to mistreatment by the firms.

In order to improve the labor contract coverage and to strengthen labor protection, the Chinese government passed a new Labor Contract Law on June 29, 2007, which went into effect on January 1, 2008. This new Labor Contract Law has been found to strengthen the labor protection in many aspects. For example, Li and Freeman (2015) find that the new law increased the percentage of migrant workers with written contracts, raised social insurance coverage, reduced the likelihood of wage arrears and raised the likelihood that firms became unionized. Gallagher et al. (2015) also find considerable evidence of progress in successful implementation of the new Law. Particularly, they show an increasing share of workers with labor contracts, however, more modest success in expanding social insurance coverage. Although the increase in labor costs induced by the new law may have had a negative impact on employment, Chen and Funke (2009) provide a theoretical framework to demonstrate that the new law will have only small impacts on employment given the

fast-growing Chinese economy. Gallagher et al. (2015) empirically show that the new Labor Contract Law has not led to an overall increase in aggregate unemployment.

However, more rigid employment protection provided by the new law may result in unemployment. The new Labor Contract Law stipulated that the maximum cumulative duration of successive fixed-term contracts is 10 years. If a formal-contract employee has been working for the same employer for more than 10 consecutive years, a permanent (open-ended) labor contract shall be awarded to the employee unless the employee requests a temporary (fixed-term) labor contract instead. Employees with open-ended contracts must be terminated for cause. Given that many employers in China use the fixed-term contract system as a way to terminate employment without cause, this restriction of labor contract types is significant (Gallagher et al., 2015). In order to circumvent the new Labor Contract Law, employers may have tended to dismiss workers with formal fixed-term (temporary) labor contracts, once the new law was approved, who have worked in the firms for more than 10 years.

In this paper, using the 2008 wave of the China General Social Survey, we first empirically investigate whether formal-contract workers with more than 10 years of tenure at the same firm are more likely to be dismissed as a result of the new Labor Contract Law. We find strong evidence of a significant increase in dismissal rates for workers with formal labor contracts and a tenure of more than 10 consecutive years with the same firm in 2008.[2] More specifically, formal-contract workers with more than 10 years of employment with the same firm are 7 to 9 percentage points more likely to be dismissed in 2008. The falsification test indicates that there is no similar jump in earlier years for formal-contract workers with more than 10-year tenure. One

[2] This is consistent with the findings that more rigid employment laws are associated with higher unemployment (Feldmann, 2009; Djankov and Ramalho, 2009).

main objective of this new Labor Contract Law was to balance labor market flexibility and labor protection. Our findings suggest that this new law may have an adverse effect on employment for this particular group of workers, at least in the short run. To the best of our knowledge, this adverse effect of the new law on job dismissal has not been formally quantified and tested in the literature. This alone is of substantial interest and is the first contribution of our paper.

Second, we examine the welfare consequences of the job dismissal, which is one of the first to attempt to identify the causal effect of unemployment on happiness. Using a regression discontinuity design, we exploit the exogenous change in unemployment status for formal-contract employees with more than 10 years of employment in the same firm to investigate how this dismissal affects the well-being of the workers. Our finding suggests that the dismissed workers suffered significant welfare loss in term of happiness. This is the second contribution of this study which we can establish the causal link between unemployment and happiness.

Quantifying the costs of unemployment on individuals and society has been an area of increasing interest by social scientists. Being unemployed is not just about the loss of income, yet it brings significant non-pecuniary impacts such as depression, anxiety, decreased self-esteem, uncertainty about the future, social isolation, stigmatization, health problems and mental disorder. A large number of studies have examined the relationship between unemployment and happiness. Using the British Household Panel data, Clark and Oswald (1996) find a strong negative correlation between unemployment and happiness. Blanchflower and Oswald (2000) examine microeconomic characteristics on unhappiness for the US and UK over several decades. They find that being unemployed is associated with decreased happiness for the US and UK. Examining results for twelve European countries, Di Tella et al.

(2001) investigate the country by year effect of inflation and unemployment on the country average life satisfaction measures. They find that the negative effect of unemployment is almost always double that of inflation on life satisfaction for European countries in the period 1975-1991. However, most of these studies fail to address the reverse causality from unhappiness to unemployment, and thus are unable to draw conclusions about causation.

In an attempt to identify the causal effect of unemployment on unhappiness, Winkelmann and Winkelmann (1998) examine six years of German Socio-Economic Panel Data. Their research focuses on individuals who switch employment status in this six-year time period. After controlling for various observed individual characteristics and individual specific fixed effects, they find that the job loss itself has larger happiness effects than the result of the actual income loss on happiness; household income would need to be increased by seven in order to compensate for lost satisfaction resulting from unemployment. Using the same dataset for the period 1991–2006, Kassenboehmer and Haisken-DeNew (2009) identify the causal effect of unemployment by examining the exogenous entry into unemployment due to company closures. They also find enormous negative non-pecuniary psychological costs to unemployed women. Finally, in Japan Ohtake (2012) looks at the resulting associations between happiness and unemployment. He finds that experiencing unemployment is associated with a large negative effect on happiness. He concludes that improving happiness is more easily achieved via spending money on employment programs as opposed to directly transferring the money to the unemployed population. Our study contributes to the literature by identifying the causal effects of unemployment on happiness exploiting the exogenous change in unemployment status induced by the new Labor Contract Law.

The rest of the paper is organized as follows. Section 2 briefly introduces the Chinese labor market since 1978, and the content of the China's new Labor Contract Law. Section 3 describes the dataset used in this paper. Section 4 outlines our empirical strategy. Section 5 examines the effect of the new Labor Contract Law on unemployment and checks the validity of our empirical strategy. Section 6 investigates the welfare loss from the unemployment caused by the new Labor Contract Law in term of happiness. Section 7 concludes.

2. China's New Labor Contract Law

The Chinese economic reform initiated in 1978 has brought about dramatic changes in the labor markets in China. Prior to the economic reforms, China was a planned economy where labor assignments were determined by central and local planning boards. From the mid-1980s to mid-1990s, the Chinese labor market gradually shifted away from this planned economy to one focused on improving managerial and worker incentives. One innovation over this time period was the introduction of a bonus system and piece-rate wages (Knight and Song, 2003; Dong and Xu, 2009). Another innovation was the introduction of labor contracts. However, these reforms were primarily intended to improve market efficiency and little attention was given to the issue of worker equity rights in the labor market. For example, one of the main objectives of the introduction of labor contracts in 1986 was to break the "iron rice bowl" system. This allowed individuals to potentially change their labor allocation across firms and facilitated China's transition from a planned economy to a market economy.

Large financial losses in the Chinese State-owned enterprises (SOEs) necessitated major reforms by the mid-1990s. The state-sector restructuring resulted in massive lay-offs for redundant state workers (Appleton et al., 2005). In 1995, the

first national labor law formally established labor contracts and regulated the labor market. This early labor law intended to promote the so called "socialist labor market", and at the same time tried to protect the labor rights. But in practice, the labor protection was not well enforced, partly due to the fact that the main focus at that time was on efficiency (Zheng, 2009) and partly due to the lack of enforcement of the law.

There were three types of labor contracts in China at the time. The first was a permanent or open-ended labor contract. This type of employment was primarily for individuals in government and state-owned enterprises. Second, there were fixed-term labor contracts or labor contracts for specific tasks, and these were for a limited duration (also known as temporary labor contracts). Finally, some firms hired individuals without any formal written contract. According to a study by Li and Zhao (2012), in 1988 in urban China, single firm employment for an employee's lifetime accounted for approximately 98% of all employment. As a result of changes in labor law and mobility, this type of employment decreased to 74%, 53% and 42% in 1995, 2002 and 2007, respectively. Over the same time period, employment with fixed term (temporary) contracts increased from virtually zero in 1988 to 26%, 38% and 49% of total employment in 1995, 2002 and 2007, respectively. The remainder of workers were those without a written labor contract. However, it is worth noting that most observations in Li and Zhao (2012) are those with local urban *Hukou*, i.e., urban resident permit. Their study does not include the rural-to-urban migrants, and the percentage of migrant workers without a labor contract is considerably higher than that of the local urban natives.

Prior to the passage of the labor laws, substantial firms did not have signed written labor contracts with their employees. As a result, these workers were vulnerable to mistreatment by the firms. For instance, workers without written

contracts were often dismissed by their employers when they suffered from occupational diseases or became pregnant. In order to address some of these issues, the China's New Labor Contract Law was passed in 2007 and went into effect on January 1, 2008.[3] The law was intended to balance labor market flexibility and labor protection. Under this new law, almost all firms are required to have signed written labor contracts for all new employees within a month after employment regardless of whether they have a local urban *Hukou* or not. Very few exceptions were allowed to this law and these exceptions have not been well documented. Additionally, those firms that fail to meet the requirements of the new Labor Contract Law are obligated to compensate the employees up to twice their wages for the previous 12 months. Ultimately, under the new Labor Contract Law, any employment without written labor contract that extends beyond a year will be automatically converted to a permanent (open-ended) labor contract.

Labor contracts are required to include the length of the employment (permanent vs. temporary), work content and location, working time, holidays, compensation package, social security contribution, work place conditions and labor protection for occupational hazards. Other optional articles could include probationary period, on-the-job training, and additional welfare benefit packages. The written contract details the rights of the workers and offers explicit legal protection for the workers. The law also forbids the firms from firing the employees at will. Firms are only allowed to terminate employment under the conditions stipulated in the law: employees violate existing national laws or firm regulations and rules; employees cause considerable damage and/or losses to the firm due to negligence or purposefully;

[3] The new labor contract Law has generated much confusion and controversy among employers since its adoption. Thus, China issued the regulations on the Implementation of the Labor Contract Law on September 18, 2008, which list 14 conditions under which an employer may terminate a labor contract, including an open-ended contract.

the employees are not adequately qualified for their job after the probationary period or after training; or employees cannot fulfill their job obligations due to health issues other than occupational injury.

A permanent labor contract entitles workers to significant benefits as compared to a temporary contract or no formal written contract. Protection from arbitrary dismissal is the most important benefit. Additionally, employees who have worked for at least a year with a firm are entitled to 5 days of paid annual leave. Employees who have worked with a firm for at least 10 years are entitled to 10 days of annual leave. These defined benefits are a significant improvement to labor conditions that existed prior to the implementation of the new Labor Contract Law in China.

The new law strengthens existing labor protection and adds new ones as compared to previous labor laws. For instance, when a firm is forced to lay off workers, the permanent workers and long-term labor contract workers should be the last to be laid off. The law also contains penalties for firms that do not offer permanent labor contracts to employees after 10 consecutive years of employment (Cooney, 2007). However, the law does not contain any penalties for firms that dismiss their workers with more than 10-year tenure in order to circumvent the new Labor Contract Law.

3. Data

In this paper, we use the China General Social Survey (CGSS), which has been collected since 2003 jointly by Hong Kong University of Science and Technology and Renmin University of China. The CGSS is a multistage stratified national probability survey of the Chinese population in mainland China and is designed to be representative for the Chinese population after weighting. It is a repeated cross-sectional data set. There are several survey waves which include the following

years: 2003, 2005, 2006, 2008, 2010, 2011, 2012, 2013, and 2015.

For our purposes, we use the 2008 wave of the CGSS, which was conducted in October-December, 2008. The 2008 wave covers 6,000 observations from all provinces except Hainan, Qinghai, and Tibet, 3,982 of which are from urban areas and 2,018 are from rural areas. In this study, we restrict the analysis to the urban sample aged 18 to 60 years old. The 2008 wave has comprehensive information on respondents' demographic characteristics, economic conditions, education level, social network, health status; moreover, it contains detailed retrospective work history of respondents, which enables us to construct the key variables in our study, i.e., years of tenure with the same employer and employment status.[4] In this analysis, qualified respondents include those who currently have a job or who become unemployed in 2008.[5] Due to the sample selection requirements, our final sample contains 1,486 observations.

Our measure of subjective well-being comes from responses to the following survey question: "Generally speaking, how do you feel about your life?". Potential responses occur on a five-point scale: 1=very unhappy; 2=unhappy; 3=fine; 4=happy, to 5=very happy. The reliability and validity of the subjective well-being have been extensively studied in the literature (see Diener, 1984; Veenhoven, 1993; Easterlin, 1974, 2001, among others). The general conclusion is that subjective indicators, though not perfect, do reflect respondents' substantive feelings of well-being. See Kahneman and Krueger (2006) for discussions on measurement of subjective well-being.

Fig. 1 illustrates the distribution of happiness for the employed and the

[4] As other waves of the CGSS do not contain the information on detailed retrospective work history of respondents, we are not able to use other waves of CGSS and thus cannot explore the long-run impacts of unemployment in this paper. This is one of the limitations of our study.

[5] An unemployed worker in this paper is defined as those who was fired in 2008. We exclude the unemployed workers who were re-employed again in 2008. Self-employed, agricultural workers and workers who became unemployed before 2008 are excluded.

unemployed workers, respectively. It shows that the employed workers are happier than the unemployed ones in general.

[Insert Figure 1 here]

Table 1 summarizes the main variables, such as age, gender, education level, status of labor contract, economic conditions, health variables and household size, used in our analysis. On average, unemployed workers have worse self-reported health status as well as economic condition, and less social contacts than employed workers. Table 1 also shows that employed workers tend to have labor contracts with employers. Workers who are party members are less likely to be dismissed.

[Insert Table 1 here]

4. Fuzzy Regression Discontinuity Design and IV Estimation

In order to test whether formal-contract workers with more than 10 years of tenure at the same firm are more likely to be dismissed as a result of the new Labor Contract Law and quantify the impact, and to investigate the causality from unemployment to the well-being of the workers, we rely on a regression discontinuity (RD) design.[6] The RD design serves our two objectives well: the first stage of the RD design estimates the increase in dismissal rate caused by the new Labor Contract Law, and the second stage shows the causal effect of unemployment on well-being of workers based on the exogenous increased unemployment rate.

In this paper, workers are assigned to treatment and control groups based on their years of tenure referred to as the assignment variable. Since unemployment is partly determined by whether the years of tenure cross the cutoff point, we have a "fuzzy"

6 The RD design was firstly introduced by Thistlethwaite and Campbell (1960) in order to analyze the impact of merit awards on future academic outcomes of students. However, it has only been since the late 1990s that RD designs have been applied to estimate program effects in a wider variety of economic contexts (see Lee and Lemieux, 2010, for a review). For examples, earlier studies in economics include an application of RD design by van der Klaauw (2002) and an econometric study on the property of RD design by Hahn et al. (2001).

RD design. A fuzzy regression discontinuity can be analyzed in an instrumental variable framework. Because only workers who have temporary contracts are eligible for a permanent contract under the new law, our comparison in this analysis is between formal-contract workers who have been working for the same employer for more than 10 years and formal-contract workers who have been working for the same employer for less than 10 years. Although the formal employment contract may be endogenously determined in earlier time periods, this does not affect the validity of our research design, as we are examining workers with a pre-existing labor contract whose years of tenure are near the 10-year threshold.

In order to estimate the impact of the new Labor Contract Law on unemployment, we specify the "first stage" regression of interest as in equation (1):

$$Unemployed_i = \alpha + \gamma_0 T_i + \gamma_1 T_i \times Contract_i + \gamma_2 Contract_i + \beta_1 x_i + \beta_2 x_i^2 + \cdots + \beta_p x_i^p + \sigma X_i + \theta + \eta_C + \varepsilon_i \quad (1)$$

where $T_i = 1[Tenure_i \geq 10]$ indicates whether the assignment variable (i.e., years of tenure) exceeds the eligibility threshold 10, and the years of tenure for observation i, are centered at the cut-point, $x_i = Tenure_i - 10$. Here we approximate the smooth function using *p-th* order polynomial function. The optimal order of the polynomial function is chosen by Akaike information criterion (AIC). The variable, $Contract_i$, is a binary variable that equals one if an individual has either a permanent or a temporary contract and zero if he/she has no employment contract.[7] X_i refers to a vector of individual and household characteristics, including gender, age, marital status, education, health status measured by the Body Mass Index, minority, party membership, state-owned enterprise (SOE) employment, *hukou* type, house

[7] As the data does not contain the information on specific types of contract, we define contract status based on whether an employee has a formal labor contract. Because whether a permanent-contract worker has more than 10 years of employment with the same firm does not affect his/her employment status, our definition of contract leads to a lower bound estimate of the true effect.

ownership, household size, and the number of kids under 18 years old.[8] θ denotes cohort-group fixed-effects, and η_C is county fixed-effects, capturing heterogeneous effects of global financial crisis in 2008 across counties.[9]

The coefficient, γ_1, in Eq. (1) captures whether formal-contract workers with more than 10 years of employment with the same firm are more likely to be dismissed than formal-contract workers with less than 10 years of tenure relative to workers without formal contracts. Thus, the estimation approach used in this paper is, essentially, a regression discontinuity design in a difference-in-differences (DD) framework.[10] We can eliminate the common changes in unemployment rate along tenure years by using a difference-in-differences (DD) framework. The key assumption for the DD strategy is the parallel trends assumption, i.e., formal contract workers and non-formal contract workers have common tenure trends in unemployment rates in the absence of the new labor contract law. We will test the assumption in the placebo test in Section 5.2. Moreover, we can generalize the smooth function by allowing the relationship to differ on both sides of threshold by including *p-th* order polynomial terms both individually and interacting them with T_i as in equation (2):[11]

$$Unemployed_i = \alpha + \gamma_0 T_i + \gamma_1 T_i \times Contract_i + \gamma_2 Contract_i + \beta_1 x_i + \beta_2 x_i^2 + \cdots + \beta_p x_i^p +$$

$$\beta_{1T} x_i T_i + \beta_{2T} x_i^2 T_i + \cdots + \beta_{pT} x_i^p T_i + \sigma X_i + \theta + \eta_C + \varepsilon_i \qquad (2)$$

Eq. (1) constrains the slope of the outcome/rating relationship to be identical on both sides of the cut-point, while Eq. (2) specifies a different polynomial function of rating

[8] Marital status equals one if an individual is married, zero otherwise (including single, cohabitation, separated but not divorced, divorced, and widowed).

[9] Specifically, individuals are divided into five birth cohort groups: born before 1950, 1950–1959, 1960–1969, 1970–1979, after 1979.

[10] We also restrict the analysis to the formal-contract workers using a RD design. The results are presented in Table A1 in Appendix A, implying that the magnitude of the effects are comparable to the estimates relying on a RD design in a DD framework.

[11] As noted by Lee and Lemieux (2010), allowing different functions on both sides of the discontinuity is preferable and should be reported as the main results.

on either side of the cutoff point.

Then we use the quasi-experiment provided by the introduction of the new Labor Contract Law to investigate the causal effect of unemployment on the well-being of workers proxied by happiness.[12] Our regression of interest is given by the following equation:

$$Happiness_i = \alpha_0 + \alpha_1 unemployed_i + \delta X_i + \theta + \eta_C + \mu_i \quad (3)$$

where $Happiness_i$ is a worker's self-reported happiness, $unemployed_i$ is the unemployment status of a worker, X_i referes to individual and household characteristics, θ denotes cohort fixed-effects, and η_C is county fixed-effects. The unemployment status is instrumented with the eligibility requirement for a permanent contract and its interaction with the indicator for whether a worker has a formal labor contract. The happiness variable is coded into five categories, so we analyze the effect of unemployment on happiness with an ordered probit model.

As in a standard IV framework, the estimated treatment effect can be interpreted as a local average treatment effect (LATE), i.e., the average treatment effect of the compliers, and the results can only be applied to individuals who comply with the new Labor Contract Law.[13] In our context, low-skilled or less productive workers with tenure of more than 10 years may be more likely to be dismissed after the implementation of the law, whereas long-term highly productive workers may not be affected by the law. By using a fuzzy RDD, we may estimate the average treatment effect of the compliers, i.e., low-skilled or less productive formal contract workers, but it is also worth noting that the possibility of selective dismissal due to productivity will not bias our results since the fuzzy RDD will correct for such selection-bias.

[12] As CGSS 2008 does not provide the information on other welfare measures as well as other outcome variables, we cannot explore the impact of unemployment on other welfare measures and other outcomes, which is one of the limitations of the dataset.

13 In the survey of Angrist and Krueger (1999), RD design is viewed as an IV estimator, thus having essentially the same potential drawbacks and pitfalls.

5. The New Labor Contract Law and Its Unemployment Effect

5.1 Baseline Results

The new Labor Contract Law in China, which went into effect on January 1, 2008, stipulated that the maximum cumulative duration of successive temporary contracts is 10 years. If a worker has worked for the same employer continuously for the past 10 years, then the worker will automatically be granted a permanent contract.[14] In order to circumvent the new Labor Contract Law, some employers may have dismissed workers who had worked in the firm for more than 10 years. Thus, workers with tenure of more than 10 years are more likely to be dismissed after 2008.

Fig. 2 plots the average probability of being unemployed by year of tenure for our data using quadratic regression models. The unemployment probability gradually decreases along the years of tenure until the 10-year threshold. After the 10-year threshold there is a noticeable jump in unemployment probability.[15] The substantial increase in unemployment rate shown in Fig. 2 provides initial evidence that the new Labor Contract Law increased the dismissal rate for the workers with more than 10-year tenure in our data in 2008.

[Insert Figure 2 here]

We present the estimation of the effect of the new Labor Contract Law on unemployment using Eq. (1) and (2) in Table 2. In columns (1) to (5), we include polynomial function of tenure relative to 10. The specifications of the polynomial functions are chosen by AIC. The coefficient of interest is the interaction term of having tenure of more than 10 years and having a formal labor contract. This term indicates the change in dismissal rates which firms may have used to circumvent the

[14] If a worker requests to have another fixed-term contract, then the employer does not have to offer the permanent contract.

[15] The unemployment probability increases dramatically for workers with more than 15-year tenure, partly due to the fact that those workers are usually old and less educated and thus face higher unemployment risks.

legal provisions of the new Labor Contract Law. The estimates range from 0.072 to 0.089 and are statistically significant at 1% level. These results suggest that workers with tenure of more than 10-year who have a labor contract are 7 to 9 percentage points more likely to be dismissed than formal-contract workers with less than 10-year tenure after the passage of the new Labor Contract Law. The results are robust to the inclusion of additional controls and allowing the functional form of the assignment variable to be different on both sides of the cutoff point, see column (3) and (5) in Table 2.

[Insert Table 2 here]

5.2 *Validity of the RD Design Strategy*

In this section, we conduct several tests of the assumptions underlying the RD design strategy. As noted by Hahn et al. (2001), the key identification assumption of a RD design is that all other determinants of unemployment are "continuous" with respect to the years of tenure. If the other variables jump at the threshold, then the estimated causal effect from unemployment to happiness may potentially be biased since the discontinuity of other variables may indicate that other channels other than unemployment affect the workers' well-being. A direct test of the continuity assumption is to check whether discontinuities occur in the relationship between the treatment effect and other observable characteristics Z_i, for example, age, marital status, party membership, working in a SOE or not, home ownership and spouse's unemployment status. We apply the RD design to these variables. The specification for this test is given in Eq. (4) below:

$$Z_i = \alpha + \gamma_0 T_i + \gamma_1 T_i \times Contract_i + \gamma_2 Contract_i + \beta_1 x_i + \beta_2 x_i^2 + \cdots + \beta_p x_i^p + \sigma X_i + \theta + \eta_C + \varepsilon_i. \quad (4)$$

More specifically, if γ_0 and γ_1 in Eq. (4) are statistically insignificant, then the data

fails to reject the continuity assumption. In other words, if we find that there are discontinuities for other variables at the 10-year tenure threshold, our discontinuity regression design may be invalid.

[Insert Figure 3 here]

Fig. 3 indicates that these other variables do not exhibit a similar discontinuous jump at the 10-year tenure threshold as we found in the unemployment variable. These non-parametric results in Fig. 3 are confirmed by the regression results reported in Table 3. We apply the discontinuity regression design approach and replace the dependent variable with the various covariates. The coefficients on the interaction term are statistically insignificant. These results indicate that there is continuity of predetermined characteristics across tenure implying that the regression discontinuity design approach should be unbiased in this context.

[Insert Table 3 here]

The RD designs can be invalid if individuals can precisely manipulate the assignment variable near the cutoff**.** First, although we cannot formally test for this, we argue that the years of tenure are unlikely to be manipulated after the implementation of the new Labor Contract Law. It would require responses to survey questions that either strategically under or over reported their tenure with an employer. There is no incentive for reporting an incorrect tenure status for any of the survey participants. Second, an intuitive test of this assumption is to check whether there is discontinuity in the distribution of the assignment variable at the threshold as suggested by McCrary (2008). We are able to directly test this possibility with our data. Fig. 4 shows graphs of the raw densities computed over each year of tenure, along with a smooth function comprised of kernel density estimates before (2006) and after (2008) the implementation of the new Labor Contract Law. The graphs indicate

that the density of years of tenure is comparable before and after the implementation of the new Labor Contract Law and show no evidence of discontinuity at the cutoff.

[Insert Figure 4 here]

Another concern of the RD design is that our sample size is not very large and the resulting bandwidth may be too large to identify the treatment effect.[16] First of all, as in Angrist and Lavy (1999), a fuzzy regression discontinuity analyzed in an instrumental variable framework is applied in this paper, which does not require a large sample size. For example, a number of studies applying the fuzzy RD design (Angrist and Lavy, 1999; Gong et al., 2015) rely on approximately 2,000 observations (a similar sample size as our study). Moreover, in order to ensure that the appropriate bandwidth is used in an RD design, we use various orders of polynomials in the analysis. As a robustness check, we explore how sensitive our RD estimates are to the inclusion of higher order polynomial terms. The results in Table 4 suggest that adding higher order polynomial terms to the regression function has little effect on the magnitude of the estimates. The RD estimates are robust to the inclusion of higher order polynomial terms.

[Insert Table 4 here]

Additionally, the RD identification relies on the sample of workers around the 10-year tenure mark. However, in practice with finite data we are compelled to use data that ranges further away from the discontinuity. To check the robustness of our main results, we restrict our sample to a smaller range of observations around the 10-year tenure mark and test whether the RD estimates are sensitive to changes in the window around the cutoff point. The various ranges used in the analysis are indicated

[16] Correct specification of functional form is essential for the RD analysis, especially when the sample size is not large. Misspecification of the functional form may generate a false discontinuity jump. For example, if the functional form is non-linear but we use a linear specification, the misspecification will cause a false discontinuity jump.

in the second row of Table 5. The coefficient on the interaction term continues to be statistically significant even with different ranges in years of tenure except the coefficient in the last column which barely misses statistical significance at the 10% level (p-value of 0.185). The results suggest that the estimates are robust to using different ranges around the 10-year tenure mark.

[Insert Table 5 here]

Finally, we test the validity of the RD design with two placebo tests. In the first placebo test, we apply the same regression design as in Table 2 to analyze the unemployment in 2006, 2005 and 2004, which is two, three and four years prior to the implementation of the new Labor Contract Law.[17] The unemployment status and years of tenure in 2006, 2005 and 2004 are constructed based on the retrospective work history of respondents in the CGSS 2008. There should be no effects in that data at the 10-year tenure threshold if the unemployment rate jump was caused by the passage of the new Labor Contract Law but not by other factors such as the length of the labor contract (e.g., many workers have a 5-year or 10-year labor contract). Table 6 summarizes the estimates from the placebo test. For all specifications, the coefficients of the interaction term of having tenure of more than 10 years with having a labor contract are statistically insignificant. The results reveal no evidence of notable increase in dismissal rate for workers with tenure of more than 10-year and with a labor contract before the implementation of the new Labor Contract Law.

The first placebo test also verifies the parallel trends assumption, which is the key assumption for the DD strategy. The coefficients of the interaction term of having

[17] The unemployment status of workers in 2007 could be affected by the New Labor Contract Law. Because the new Labor Contract Law was adopted at the 28th Session of the Standing Committee of the 10th National People's Congress of the People's Republic of China on June 29, 2007. Firms may have responded to the new regulations by dismissing workers who will be eligible for permanent labor contracts before the law took effect (1st January, 2008). We find that workers with tenure of more than 9 years and with a formal labor contract are about 9 percentage points more likely to be dismissed in 2007.

tenure of more than 10 years with having a labor contract in 2006, 2005 and 2004 are statistically insignificant, implying that the unemployment probability in formal-contract workers and non-formal-contract workers would follow the same tenure trends in the absence of new Labor Contract Law.

[Insert Table 6 here]

The 2008 financial crisis may be an important determinant of the increase in unemployment observed in our data. If unemployment was increased in general due to the financial crises, there should be evidence of discontinuities at other levels of employee tenure. Therefore, in the second placebo test, we examine whether there are discontinuities at other values of the assignment variable. More specifically, we test whether there are jumps at 5-year or 15-year tenure amounts.

In column (1) of Table 7, we test whether there is a discontinuity jump at 5-year tenure. We use the workers with less than 5-year tenure as the reference group. The coefficient of the interaction term of having tenure of more than 5 years with having a labor contract is insignificant. In column (2), we test whether there is a discontinuity jump at 15-year tenure and for this purpose we use the workers with tenure between 10 and 15 years as the reference group. Again the coefficient of the interaction term of having tenure of more than 15 years with having a labor contract is insignificant. These results show that there are no jumps at other points other than 10-year tenure, which strongly supports the claim that the observed unemployment jump at 10 years of tenure was indeed caused by the new Labor Contract Law.

[Insert Table 7 here]

Overall, we have found that the dismissal rate for the workers with more than 10-year tenure has increased in 2008, but we have not observed such increase in dismissal rate in 2006, 2005 and 2004. These findings strongly support that the new

Labor Contract Law increased the dismissal rate for the workers who would receive permanent labor contract under the new law.

5.3 Robustness of the baseline results

Some occupations may have lower job security and higher turnover rate either because of technological change or overseas outsourcing. Thus, types of occupation tend to be correlated both with years of tenure and with unemployment probability, which may bias our estimates. As a robustness check, we include two-digit occupation fixed effects in the baseline regression. The results in Table 8 show that the inclusion of occupation fixed effects in our specifications has little impacts on the coefficient of interest.

[Insert Table 8 here]

6. Unemployment and Happiness

In section 5, we show that the new Labor Contract Law has increased the unemployment rate for a sub-group of workers. Additionally, unemployment may impose considerable costs on workers both monetarily and psychologically, and thus leads to significant welfare loss for the unemployed workers. In this section, we assess the impact of unemployment caused by the new Labor Contract Law on the welfare loss in term of happiness for workers.

6.1 Results from the RD Design

Table 9 presents our estimation of the relationship between unemployment and happiness. The four columns provide four different estimation methods of our basic Eq. (3). To make the happiness variable more easily interpretable we create a normalized happiness variable with a mean of zero and a standard deviation of one in the first two columns. In column (1) we provide the results using a simple ordinary

least squares analysis. The coefficient on unemployment is negative and statistically significant at the 10% level. The coefficient on unemployment indicates that going from employed to unemployed reduces a person's happiness by about 0.26 standard deviations. In column (2), we employ an instrumental variables regression model and find that after addressing the potential endogeneity issue the magnitude of the coefficient on unemployment increases. The results indicate that the estimated coefficient of unemployment is both statistically and economically significant and being unemployed reduces an individual's happiness by almost 2 standard deviations. The last two columns provide ordered probit and instrumental variable ordered probit regression results. In both cases, the sign of the coefficients on unemployed are negative and statistically significant at the 10% level. In column (4) we find that controlling for the potential endogeneity also increases the magnitude of the estimated coefficient on unemployment. Overall, the results indicate that unemployment has a significantly negative effect on individual happiness.

[Insert Table 9 here]

In Table 10, we focus on the marginal loss of happiness caused by unemployment using the instrumental variable ordered probit model. The results differ from column (4) of Table 8 in which we estimate the change from each potential value of happiness as a result of being unemployed. The coefficients on unemployment in columns (2) and (3) are positive and statistically significant indicating that those who are unemployed are more likely to report being unhappy and just fine. Finally, the coefficient on unemployment is negative and statistically significant in column (5) which indicates that individuals who are unemployed are less likely than the employed to report being very happy.

[Insert Table 10 here]

6.2 Heterogeneous Effects

In Table 10, we further investigate whether the effect of unemployment differs across sub-groups in our data using IV ordered probit regressions. The four columns in Table 11 divide our data by gender and by educational level. The effect of unemployment on men provides a larger negative effect on happiness than for women. However, the coefficients are not statistically significant in either regression (columns (1) and (2)).

[Insert Table 11 here]

We divide the data by education level as well. Individuals with education levels of college education or more are categorized as "Educated" and those with educational attainment below this level are categorized as "Less Educated" and the results are represented in columns (3) and (4) respectively. We find that the educated group has a larger negative and statistically significant reduction in happiness as a result of unemployment. The coefficient is -4.87 and is larger in magnitude than the coefficient for the full sample (-2.46). The relationship between unemployment and happiness for the less educated group is insignificant and small in magnitude. These results are consistent with the findings in the literature, for example, Clark and Oswald (1994). One possible reason why highly educated individuals show more distress than others is that the opportunity cost of unemployment may be larger for the highly educated because of the greater forgone wage.

6.3 Potential Mechanisms

Previous research has found that there is a negative relationship between happiness and unemployment. Some potential mechanisms responsible for this relationship are economic conditions, health status and social contacts. In this paper, economic condition is measured by family's economic condition in the local area. More specifically, 1 denotes much lower than the average standard, and 5 refers to much

higher than the average standard. Health status is measured by respondents' self-reported health condition. Specifically, 1 denotes very unhealthy and 5 refers to very healthy. Social contacts are captured by the number of persons who are not the respondent's relatives a respondent contact within a common day; we have five categories: 0, 1 to 4, 5 to 9, 10 to 19 and 20 and above persons.[18] In Table 12 we investigate these potential mechanisms using an IV ordered probit model and report the marginal effects. We find that unemployment increases the likelihood of a person reporting to have lower than average income and social contacts. No results are observed for health outcomes. The results reveal that unemployment significantly increases the probability of having family economic conditions in the two lowest economic categories by 28 and 53 percentage points respectively. Additionally, being unemployed decreases the probability of having family economic conditions in the middle and next highest economic categories by 43 and 34 percentage points respectively. The effect of unemployment on health status appears not be statistically significant. One possible explanation for the insignificant result is that it may take longer for a change in employment status to affect one's health. In this data, there is less than one year between when the new law was announced and the collection of the survey data. The effect on social contacts is large in magnitude and statistically significant. The results in the table indicate that being unemployed increases the likelihood that a person has fewer than 5 social contacts on average. It reduces the likelihood that a person has 5 or more social contacts by large effects and is always statistically significant at the 5% level. This reduction in social contacts maybe due to the fact that the unemployed have fewer job-related friends or social contacts. On the other hand, the unemployed may be reluctant to contact friends because of the loss of

[18] Approximately half of the sample in CGSS 2008 were randomly required to report their social contacts.

self-esteem and identity in society due to their unemployment status.

[Insert Table 12 here]

In Table 13 we conduct an IV ordered probit analysis and include separately the following explanatory variables: economic condition, health status and social contacts into our analysis of the effect of unemployment on happiness. In the final column we include all three variables together in the regression. The baseline estimate is given in column (1) of Table 12,[19] where we do not control for these additional variables. The coefficient of unemployment is -2.40. In column (2), we add economic condition to our baseline model, and the coefficient of the unemployment has decreased from -2.40 to -1.98 suggesting that economic conditions are explaining a significant proportion of the reduction in happiness. We add health status in column (3) and find that there is a positive relationship between health and happiness as expected and the coefficient on unemployment remains approximately the same as in our baseline specification. In column (4), we add social contacts and the estimated coefficient on unemployment has decreased slightly to -2.34. Finally, in column (5), we add all three variables at the same time: economic condition, health status and social contract. We find that the coefficient on unemployment has decreased from -2.40 to -2.07. These results suggest that both economic condition and social contacts play important roles in explaining the negative relationship between unemployment and happiness; economic conditions appear to play a bigger role, however.

[Insert Table 13 here]

Unemployed workers are unhappier even after controlling for the respondents' family economic condition, health status and social contacts, suggesting that

[19] This baseline specification is the same as column (4) in Table 9. We lose some observations once we include the three additional variables: economic condition, health status and social contacts. This reduces our sample size, but otherwise the specification is similar to that in Table 9, and the main coefficient is -2.40 here, and is close to the -2.46 in Table 9.

unemployment not only causes financial hardship, but also adds considerable psychological stress to the displaced workers. Others, such as Linn et al. (1985), examine this question explicitly and find that unemployment produces depression and anxiety. Goldsmith et al. (1996) find that unemployment results in a loss of self-esteem while Price et al (2002) show that there is a loss of personal control. Overall household income may not decline substantially if a spouse is present and can increase their labor supply as a result of the unemployment. However, this potential change in spousal labor supply (and family bargaining power) may in turn add stress to unemployed workers, especially to the unemployed males. The stress associated with unemployment (and potentially lower incomes) may also increase the likelihood of divorce which in turn could reduce happiness.

7. Conclusions

Using a change in China's new Labor Contract Law implemented at the beginning of 2008, we examine the consequence of the new law on a group of workers who had been employed by the same firm for about 10 years. The new Labor Contract Law stipulated that formal-contract workers with at least 10 years of tenure with a single firm would be legally eligible for a permanent labor contract with the firm. These permanent labor contracts provide significant benefits and protection to employees and are highly desirable. As a result, employers may have an incentive to dismiss formal-contract workers whose years of tenure are near the 10-year threshold. Our finding suggests that this new law indeed had an unintended adverse effect; more specifically, formal-contract workers with more than 10 years of employment with the same firm are 7 to 9 percentage points more likely to be dismissed in 2008.

Furthermore, our analysis exploits this exogenous increase in unemployment induced by the new law to investigate the impact of unemployment on workers'

self-reported happiness. Specifically, we apply regression discontinuity designs to overcome the endogenous nature of employment status by comparing the employment status for formal-contract workers with at least 10 years of employment with a single firm to those with slightly lower amounts of tenure. Our study shows that dismissed workers suffered significant welfare loss in term of happiness. The results are robust to alternative specifications and placebo tests. Our analysis further suggests that the unhappiness caused by dismissal can result from financial hardship and psychological stress.

Our study only captures the short-term effects of the new Labor Contract Law on unemployment and its impacts on happiness due to data limitations. Further research could investigate the long-term effects of the new law and its welfare effects. Additional research may also focus on the effect of happiness on future employment probabilities as well.

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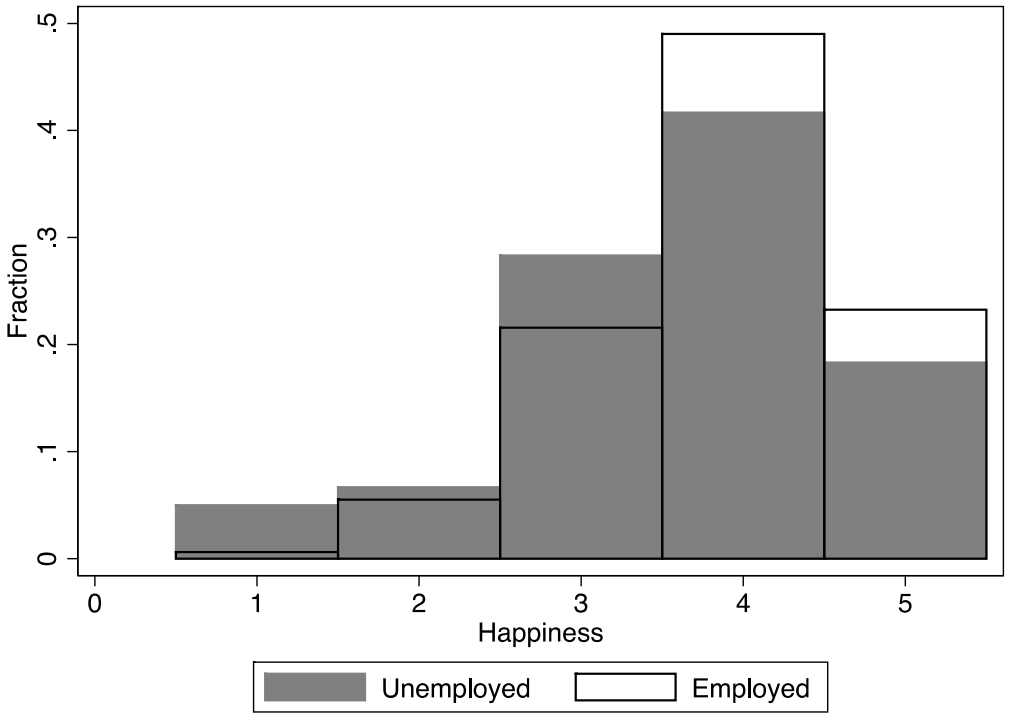


Fig. 1. Distribution of Well-Being of the Employed and Unemployed

Source: Authors' calculation based on 2008 wave of CGSS.

Notes: 1=very unhappy; 5=very happy.

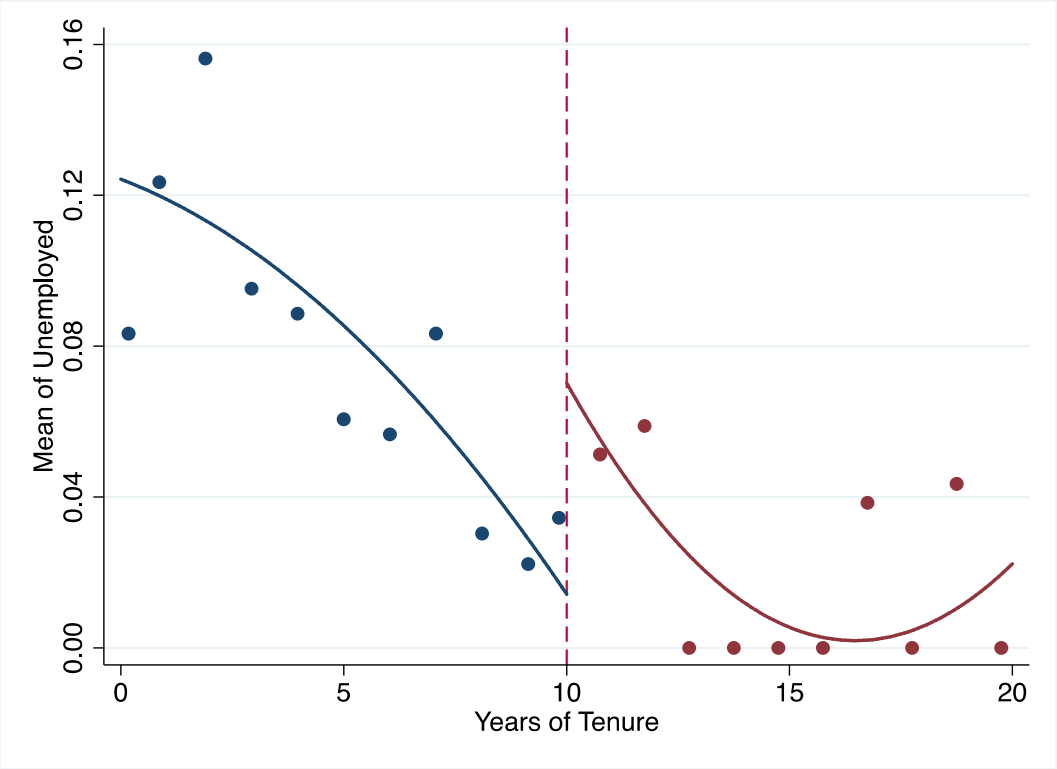
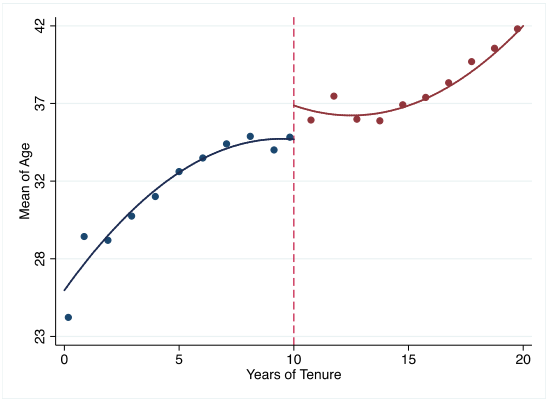


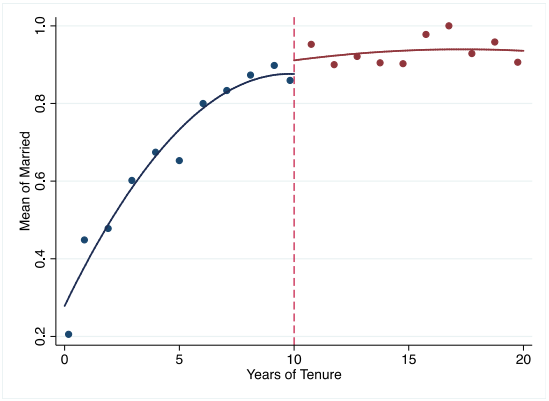
Fig. 2. Impact of Having Tenure of More Than 10 Years on Unemployment

Source: Based on 2008 wave of CGSS.

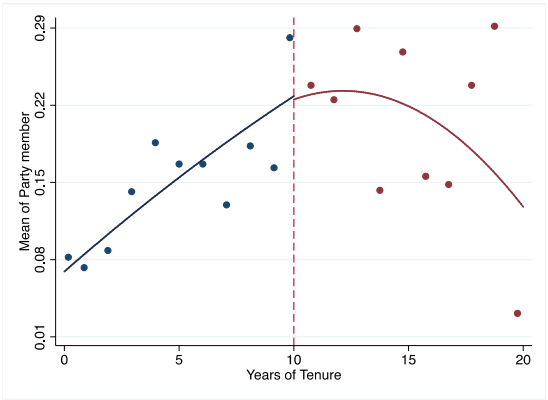
Notes: The points are average unemployment rates of each year of tenure. The curves are fitted by the quadratic regression models on each side of 10.



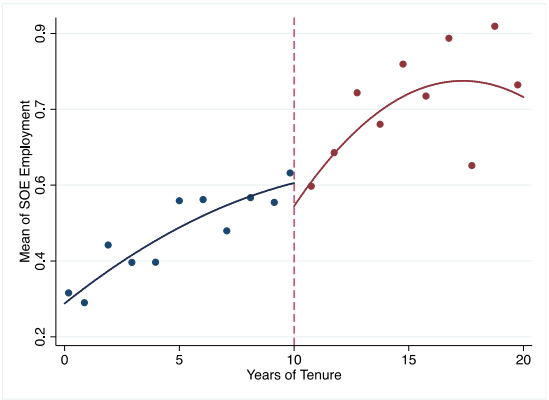
(a) Age



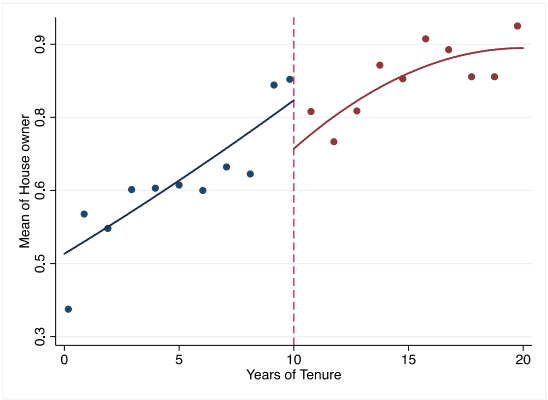
(b) Marital status



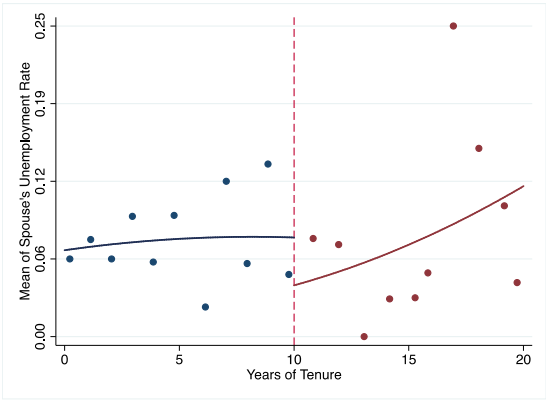
(c) Party member



(d) SOE employment



(e) Home ownership

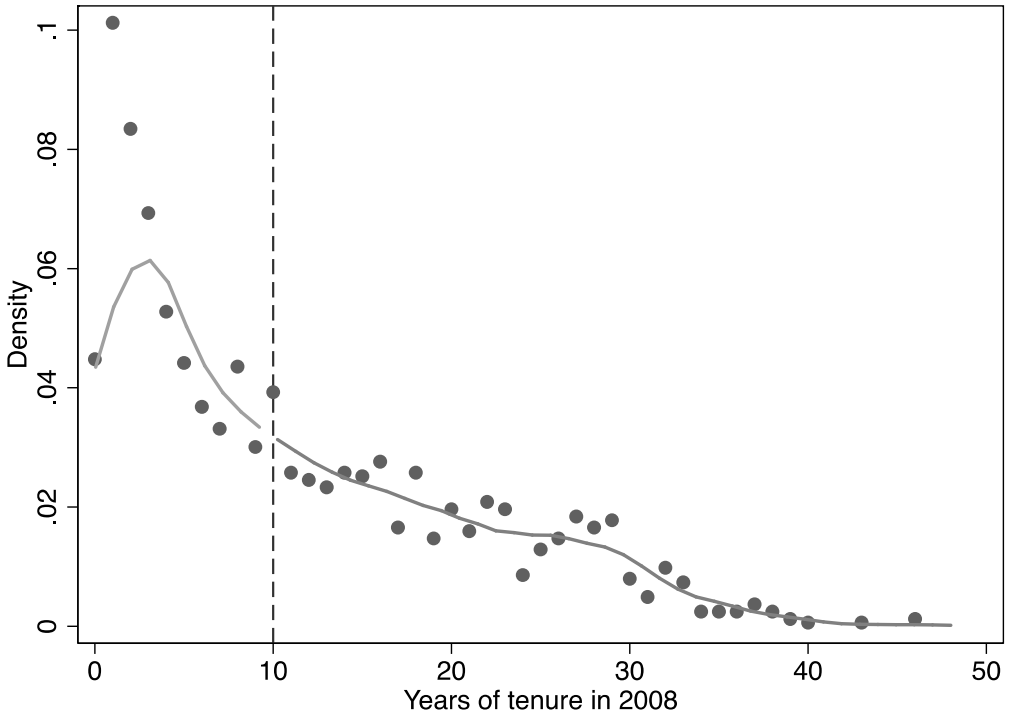


(f) Spouse's Unemployment Status

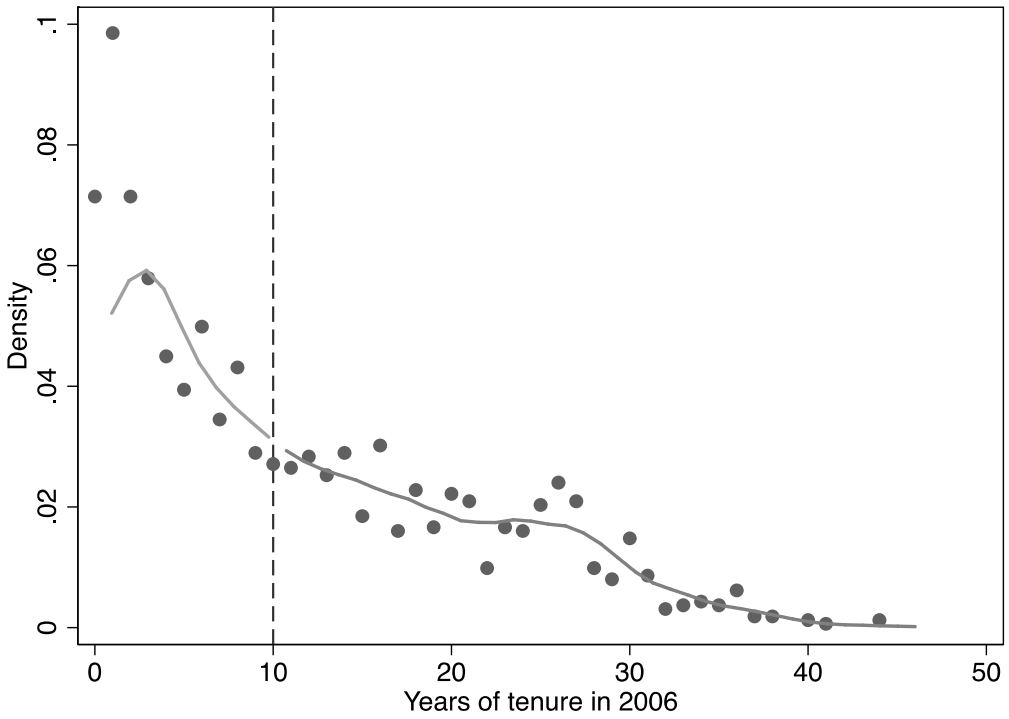
Fig. 3. Years of Tenure and Characteristics

Source: Based on 2008 wave of CGSS.

Notes: The points are average values of variables in each year of tenure. The curves are fitted by the quadratic regression models on each side of 10.



(a) Density of the Assignment Variable in 2008



(b) Density of the Assignment Variable in 2006

Fig. 4. Density of the Assignment Variable (Years of Tenure)

Source: Based on 2008 wave of CGSS.

Table 1. Summary Statistics

	Employed			Unemployed		
	(1)	(2)	(3)	(4)	(5)	(6)
Variables	Mean	Std. Dev.	N	Mean	Std. Dev.	N
Happiness	3.888	0.845	1,432	3.617	1.027	60
Economic condition	2.711	0.666	1,432	2.667	0.681	60
Health	4.072	0.840	1,432	3.933	0.880	60
Social contacts	3.075	1.321	691	2.714	1.182	28
Male	0.569	0.495	1,432	0.433	0.500	60
Age	35.81	9.735	1,432	31.12	9.810	60
Married	0.761	0.427	1,432	0.567	0.500	60
Primary school	0.0455	0.209	1,428	0.0500	0.220	60
Junior high school	0.201	0.401	1,428	0.317	0.469	60
Senior high school	0.207	0.405	1,428	0.183	0.390	60
Technical school	0.153	0.360	1,428	0.200	0.403	60
College and above	0.389	0.488	1,428	0.250	0.437	60
Body mass index	22.62	3.721	1,432	21.05	3.262	60
Minority	0.0545	0.227	1,432	0.117	0.324	60
Party member	0.199	0.399	1,432	0.0833	0.279	60
Contract	0.689	0.463	1,432	0.467	0.503	60
SOE	0.609	0.488	1,431	0.200	0.403	60
Urban *Hukou*	0.861	0.346	1,431	0.733	0.446	60
House owner	0.703	0.457	1,432	0.700	0.462	60
Household size	2.917	1.204	1,432	3.300	1.357	60
# of kids under 18	0.515	0.579	1,432	0.500	0.597	60
Years of tenure with the current employer	11.32	9.604	1,432	5.700	8.472	60

Notes: Variables are summarized using the data of 2008 wave of CGSS. An unemployed worker is defined as those who was fired in 2008 and had not found a job till the survey was conducted. Self-employed, agricultural workers and workers who become unemployed before 2008 are excluded.

Table 2. Effect of Having Tenure of More than 10 Years on Unemployment in 2008

	(1)	(2)	(3)	(4)	(5)
Variables	Dependent variable: Unemployed				
Having tenure of more than 10 years	-0.052**	-0.019	-0.0064	-0.014	-0.012
	(0.025)	(0.033)	(0.031)	(0.037)	(0.033)
Having tenure of more than 10 years *	0.072***	0.072***	0.076***	0.083***	0.089***
Contract	(0.021)	(0.023)	(0.023)	(0.024)	(0.024)
Contract	-0.060***	-0.056**	-0.053**	-0.062***	-0.060***
	(0.020)	(0.022)	(0.022)	(0.023)	(0.023)
Male		-0.0063	-0.0052	-0.0054	-0.0051
		(0.011)	(0.011)	(0.011)	(0.011)
Age		0.000060	0.000066	0.0059	0.0074
		(0.0062)	(0.0061)	(0.010)	(0.0100)
Age squared / 100		-0.00060	-0.00053	-0.0054	-0.0078
		(0.0077)	(0.0076)	(0.013)	(0.013)
Married		-0.029	-0.028	-0.031	-0.031
		(0.020)	(0.020)	(0.021)	(0.021)
Primary school		0.0081	0.022	0.018	0.033
		(0.039)	(0.038)	(0.060)	(0.059)
Junior high school		0.048	0.051	0.063	0.064
		(0.036)	(0.033)	(0.058)	(0.055)
Senior high school		0.041	0.043	0.062	0.062
		(0.036)	(0.033)	(0.058)	(0.056)
Technical school		0.051	0.053	0.064	0.064
		(0.038)	(0.035)	(0.059)	(0.057)
College and above		0.030	0.033	0.052	0.053
		(0.038)	(0.035)	(0.060)	(0.057)
Body mass index		-0.0022*	-0.0024*	-0.0019	-0.0022
		(0.0013)	(0.0013)	(0.0013)	(0.0013)
Minority		0.047	0.045	0.046	0.045
		(0.029)	(0.029)	(0.033)	(0.033)
Party member		0.0050	0.0025	-0.0065	-0.0089
		(0.012)	(0.011)	(0.012)	(0.012)
SOE Employment		-0.046***	-0.045***	-0.041***	-0.041***
		(0.011)	(0.011)	(0.013)	(0.013)
Urban *Hukou*		-0.0092	-0.0072	-0.0064	-0.0040
		(0.021)	(0.021)	(0.022)	(0.022)
House owner		0.030**	0.026**	0.038***	0.034**
		(0.012)	(0.013)	(0.015)	(0.015)
log (household size)		0.033**	0.034**	0.039**	0.040**
		(0.015)	(0.015)	(0.017)	(0.017)
# of kids under 18		0.00028	0.0016	0.0016	0.0013
		(0.012)	(0.012)	(0.012)	(0.012)
Polynomial function of tenure relative to	Yes	Yes	Yes	Yes	Yes

10					
Cohort FE	No	No	No	Yes	Yes
County FE	No	No	No	Yes	Yes
Observations	1,492	1,486	1,486	1,486	1,486
R-squared	0.036	0.088	0.069	0.178	0.159

Notes: Robust standard errors are in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%. The specifications of the polynomial functions are chosen by AIC. Column (2) and (4) assume the identical slope of the outcome/rating relationship on both sides of the cut-point, column (3) and (5) specify a different polynomial function of rating on either side of the cut-point.

Table 3. Validity of the RD Design
Effect of Having Tenure of More than 10 Years on Other Variables

Variables	(1) Age	(2) Marital status	(3) Party member	(4) Home ownership	(5) SOE Employment	(6) Spouse's unemployment Status
Having tenure of more than 10 years	40.6	-0.069	0.16	-0.37	5.08	0.14
	(31.9)	(0.060)	(4.09)	(5.02)	(5.79)	(3.85)
Having tenure of more than 10 years * Contract	-0.056	0.049	-0.028	0.0074	0.054	-0.011
	(0.31)	(0.035)	(0.043)	(0.044)	(0.049)	(0.045)
Polynomial function of tenure relative to 10	Yes	Yes	Yes	Yes	Yes	Yes
Control variables	Yes	Yes	Yes	Yes	Yes	Yes
Cohort FE	Yes	Yes	Yes	Yes	Yes	Yes
County FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,486	1,486	1,486	1,486	1,486	947
R-squared	0.941	0.560	0.297	0.428	0.391	0.230

Notes: Robust standard errors are in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%. All variables controlled in Table 2 are included here. The specifications of the polynomial functions are chosen by AIC. All columns specify a different polynomial function of rating on either side of the cut-point

Table 4. Validity of the RD Design
Higher Order Polynomial Terms

	(1)	(2)	(3)	(4)
Variables	Dependent variable: Unemployed			
Having tenure of more than 10 years	-0.023	-0.085	0.74	-1.58
	(0.14)	(0.31)	(0.80)	(2.60)
Having tenure of more than 10 years * Contract	0.089***	0.088***	0.086***	0.090***
	(0.024)	(0.024)	(0.024)	(0.024)
Polynomial function of tenure relative to 10	5th order	6th order	7th order	8th order
Controls	Yes	Yes	Yes	Yes
Cohort FE	Yes	Yes	Yes	Yes
County FE	Yes	Yes	Yes	Yes
Observations	1,486	1,486	1,486	1,486
R-squared	0.163	0.165	0.169	0.176

Notes: Robust standard errors are in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%. All columns specify a different polynomial function of rating on either side of the cut-point. All variables controlled in Table 2 are included here.

Table 5. Validity of the RD Design
Different Bandwidths

Variables	(1) [0, 20]	(2) [1, 19]	(3) [2, 18]	(4) [3, 17]
Having tenure of more than 10 years	0.049	0.020	-0.016	0.11
	(0.078)	(0.090)	(0.11)	(0.14)
Having tenure of more than 10 years * Contract	0.086***	0.087***	0.072**	0.041
	(0.027)	(0.029)	(0.031)	(0.031)
Polynomial function of tenure relative to 10	Yes	Yes	Yes	Yes
Cohort FE	Yes	Yes	Yes	Yes
County FE	Yes	Yes	Yes	Yes
Observations	1,201	1,100	921	766
R-squared	0.175	0.185	0.247	0.254

Notes: Robust standard errors are in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%. From Columns (1) to (4), we use sample within the smaller neighborhood around 10. For example, [0, 20] means individuals with tenure between 0 and 20 are included in the sample. All other specifications and control variables are the same as in Table 2.

Table 6. Validity of the RD Design - Placebo Test
Effect of Having Tenure of More than 10 Years on Unemployment in 2006, 2005, 2004

	(1)	(2)	(3)	(4)	(5)
Variables	Dependent variable: Unemployed				
2006					
Having tenure of more than 10 years (2006)	0.0085	0.023	0.11	0.075	0.18
	(0.040)	(0.042)	(0.16)	(0.054)	(0.18)
Having tenure of more than 10 years in 2006 *	0.014	0.0027	0.0067	-0.0061	-0.0045
Contract in 2006	(0.038)	(0.039)	(0.039)	(0.041)	(0.041)
Observations	1,252	1,172	1,172	1,172	1,172
R-squared	0.032	0.072	0.083	0.178	0.185
2005					
Having tenure of more than 10 years (2005)	-0.037	-0.039	0.23	0.056	0.20
	(0.045)	(0.048)	(0.24)	(0.059)	(0.25)
Having tenure of more than 10 years in 2005 *	0.042	0.052	0.050	0.047	0.045
Contract in 2005	(0.039)	(0.040)	(0.041)	(0.041)	(0.041)
Observations	1,232	1,161	1,161	1,161	1,161
R-squared	0.030	0.063	0.080	0.192	0.199
2004					
Having tenure of more than 10 years (2004)	-0.010	-0.011	-0.18	-0.0035	0.041
	(0.046)	(0.048)	(0.23)	(0.051)	(0.17)
Having tenure of more than 10 years in 2004 *	0.042	0.021	0.013	0.017	0.0092
Contract in 2004	(0.037)	(0.039)	(0.039)	(0.042)	(0.027)
Observations	1,210	1,142	1,142	1,142	1,085
R-squared	0.028	0.078	0.105	0.169	0.260
Polynomial function of tenure relative to 10	Yes	Yes	Yes	Yes	Yes
Controls	No	Yes	Yes	Yes	Yes
Cohort FE	No	No	No	Yes	Yes
County FE	No	No	No	Yes	Yes

Notes: Workers with tenure between 0 and 20 are included. Robust standard errors are in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%. The specifications of the polynomial functions are chosen by AIC. Column (2) and (4) assume the identical slope of the outcome/rating relationship on both sides of the cut-point, column (3) and (5) specify a different polynomial function of rating on either side of the cut-point. All other specifications and control variables are the same as in Table 2.

Table 7. Validity of the RD Design - Placebo Test
2008 financial crisis and continuity at other values of the assignment variable

	(1)	(2)
Variables	5 years	15 years
Having tenure of more than 5 years	0.026	
	(0.048)	
Having tenure of more than 10 years	-0.040	
	(0.031)	
Having tenure of more than 5 years * Contract	0.045	
	(0.043)	
Having tenure of more than 10 years * Contract	0.10***	
	(0.027)	
Having tenure of less than 10 years		0.015
		(0.042)
Having tenure of more than 15 years		0.0033
		(0.036)
Having tenure of less than 10 years * Contract		-0.088***
		(0.033)
Having tenure of more than 15 years * Contract		0.0010
		(0.028)
Polynomial function of tenure relative to 10	Yes	Yes
Control variables	Yes	Yes
Cohort FE	Yes	Yes
County FE	Yes	Yes
Observations	1,487	1,487
R-squared	0.161	0.160

Notes: Robust standard errors are in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%. The specifications of the polynomial functions are chosen by AIC. All columns specify a different polynomial function of rating on either side of the cut-point. All variables controlled in Table 2 are included here. The reference group in column (1) is workers having tenure of less than 5. The reference group in column (2) is workers having tenure of more than 10 and less than 15.

Table 8. Robustness check - Additional Control Variables

Variables	(1) Unemployed	(2) Unemployed
Having tenure of more than 10 years	-0.0084	-0.0019
	(0.039)	(0.032)
Having tenure of more than 10 years * Contract	0.078***	0.083***
	(0.024)	(0.024)
Polynomial function of tenure relative to 10	Yes	Yes
Cohort FE	Yes	Yes
County FE	Yes	Yes
Occupation FE	Yes	Yes
Observations	1,480	1,480
R-squared	0.190	0.171

Notes: Robust standard errors are in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%. All variables controlled in Table 2 are included here. The specifications of the polynomial functions are chosen by AIC. Column (1) assumes the identical slope of the outcome/rating relationship on both sides of the cut-point, column (2) specifies a different polynomial function of rating on either side of the cut-point.

Table 9. Effects of Unemployment on Happiness

	(1)	(2)	(3)	(4)
	Dependent variable: Happiness			
Variables	OLS	IV	Ordered probit	IV Ordered probit
Unemployed	-0.26*	-1.97*	-0.29*	-2.46*
	(0.15)	(1.21)	(0.17)	(1.32)
Contract	0.046	0.0094	0.047	-0.0040
	(0.062)	(0.068)	(0.074)	(0.080)
Male	-0.20***	-0.21***	-0.26***	-0.25***
	(0.052)	(0.055)	(0.063)	(0.064)
Age	-0.054	-0.043	-0.063	-0.044
	(0.040)	(0.044)	(0.049)	(0.054)
Age squared / 100	0.053	0.042	0.060	0.041
	(0.053)	(0.058)	(0.065)	(0.070)
Married	0.26***	0.21**	0.31***	0.22*
	(0.085)	(0.097)	(0.10)	(0.13)
Primary school	-0.056	-0.0093	0.023	0.083
	(0.30)	(0.31)	(0.33)	(0.34)
Junior high school	0.39	0.50*	0.52*	0.62*
	(0.28)	(0.30)	(0.31)	(0.32)
Senior high school	0.51*	0.62**	0.67**	0.75**
	(0.28)	(0.30)	(0.31)	(0.32)
Technical school	0.57**	0.67**	0.75**	0.82**
	(0.29)	(0.30)	(0.32)	(0.32)
College and above	0.67**	0.75**	0.88***	0.91***
	(0.29)	(0.30)	(0.32)	(0.32)
Body mass index	0.0026	-0.0014	0.0050	-0.00053
	(0.0070)	(0.0076)	(0.0086)	(0.0091)
Minority	0.11	0.18	0.14	0.22
	(0.13)	(0.15)	(0.16)	(0.17)
Party member	0.062	0.047	0.098	0.071
	(0.074)	(0.072)	(0.089)	(0.086)
SOE Employment	0.13**	0.062	0.17**	0.067
	(0.064)	(0.081)	(0.076)	(0.10)
Urban Hukou	-0.057	-0.071	-0.093	-0.10
	(0.086)	(0.090)	(0.10)	(0.10)
House owner	0.10	0.16*	0.12	0.19**
	(0.069)	(0.083)	(0.081)	(0.089)
log (household size)	0.036	0.11	0.047	0.13
	(0.073)	(0.089)	(0.088)	(0.10)
# of kids under 18	-0.065	-0.065	-0.066	-0.061
	(0.061)	(0.061)	(0.073)	(0.072)
Polynomial function of tenure relative to 10	Yes	Yes	Yes	Yes

Cohort FE	Yes	Yes	Yes	Yes
County FE	Yes	Yes	Yes	Yes
Observations	1,486	1,486	1,486	1,486
R-squared	0.199	0.097	-	-
Log likelihood	-	-	-1644.38	-1205.41

Notes: Happiness variable in columns (1) and (2) is normalized. The specifications of the polynomial functions are chosen by AIC. All columns specify a different polynomial function of rating on either side of the cut-point. Robust standard errors are in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 10. Marginal Effect of Unemployment on Happiness (IV Ordered Probit)

Variables	(1) Pr(Happiness=1)	(2) Pr(Happiness=2)	(3) Pr(Happiness=3)	(4) Pr(Happiness=4)	(5) Pr(Happiness=5)
Unemployed	0.088	0.21*	0.41**	-0.011	-0.70*
	(0.085)	(0.11)	(0.19)	(0.055)	(0.43)
Contract	0.00014	0.00034	0.00066	-0.000018	-0.0011
	(0.0029)	(0.0068)	(0.013)	(0.00034)	(0.023)
Male	0.0090**	0.022***	0.042***	-0.0011	-0.072***
	(0.0042)	(0.0060)	(0.012)	(0.0062)	(0.018)
Age	0.0016	0.0037	0.0073	-0.00020	-0.012
	(0.0019)	(0.0046)	(0.0092)	(0.0012)	(0.015)
Age squared / 100	-0.0015	-0.0035	-0.0068	0.00018	0.012
	(0.0025)	(0.0060)	(0.012)	(0.0011)	(0.020)
Married	-0.0077**	-0.018	-0.036	0.00098	0.061*
	(0.0039)	(0.011)	(0.023)	(0.0056)	(0.034)
Primary school	-0.0030	-0.0070	-0.014	0.00037	0.024
	(0.012)	(0.029)	(0.056)	(0.0024)	(0.096)
Junior high school	-0.022	-0.053**	-0.10*	0.0028	0.18*
	(0.016)	(0.027)	(0.053)	(0.015)	(0.093)
Senior high school	-0.027	-0.064**	-0.13**	0.0034	0.21**
	(0.017)	(0.027)	(0.054)	(0.018)	(0.092)
Technical school	-0.029*	-0.070**	-0.14**	0.0037	0.23**
	(0.018)	(0.027)	(0.055)	(0.020)	(0.094)
College and above	-0.033*	-0.078***	-0.15***	0.0041	0.26***
	(0.018)	(0.028)	(0.056)	(0.022)	(0.092)
Body mass index	0.000019	0.000045	0.000088	-2.4e-06	-0.00015
	(0.00033)	(0.00078)	(0.0015)	(0.000039)	(0.0026)
Minority	-0.0079	-0.019	-0.037	0.00099	0.063
	(0.0074)	(0.014)	(0.028)	(0.0053)	(0.049)
Party member	-0.0026	-0.0061	-0.012	0.00032	0.020
	(0.0030)	(0.0074)	(0.015)	(0.0019)	(0.024)
SOE Employment	-0.0024	-0.0057	-0.011	0.00030	0.019
	(0.0031)	(0.0089)	(0.018)	(0.0020)	(0.028)
Urban Hukou	0.0037	0.0088	0.017	-0.00047	-0.029
	(0.0042)	(0.0088)	(0.017)	(0.0025)	(0.030)
House owner	-0.0068	-0.016**	-0.032**	0.00085	0.054**
	(0.0052)	(0.0075)	(0.014)	(0.0045)	(0.027)
log (household size)	-0.0048	-0.011	-0.022	0.00060	0.038
	(0.0050)	(0.0085)	(0.016)	(0.0031)	(0.030)
# of kids under 18	0.0022	0.0052	0.010	-0.00028	-0.017
	(0.0026)	(0.0061)	(0.012)	(0.0016)	(0.020)
Polynomial function of	Yes	Yes	Yes	Yes	Yes
Cohort FE	Yes	Yes	Yes	Yes	Yes
County FE	Yes	Yes	Yes	Yes	Yes
Observations	1,486	1,486	1,486	1,486	1,486

Notes: Robust standard errors are in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%. The specifications of the polynomial functions are chosen by AIC. All columns specify a different polynomial function of rating on either side of the cut-point. In the second row, 1=very unhappy and 5=very happy.

Table 11. Heterogeneous Effect of Unemployment on Happiness

Variables	(1) Male	(2) Female	(3) Educated	(4) Less educated
Unemployed	-2.44	-1.52	-4.87***	0.72
	(1.63)	(2.39)	(1.47)	(3.74)
Contract	-0.075	0.19	-0.13	-0.020
	(0.11)	(0.14)	(0.17)	(0.089)
Age	-0.052	-0.046	-0.080	-0.045
	(0.077)	(0.084)	(0.11)	(0.065)
Age squared / 100	0.062	0.019	0.090	0.040
	(0.099)	(0.12)	(0.14)	(0.084)
Male			-0.13	-0.19
			(0.12)	(0.17)
Married	0.12	0.40**	0.18	0.47***
	(0.18)	(0.18)	(0.17)	(0.17)
Primary school	-0.088	-0.18		0.13
	(0.45)	(0.60)		(0.40)
Junior high school	0.48	0.34		0.57
	(0.40)	(0.61)		(0.43)
Senior high school	0.59	0.56		0.75*
	(0.39)	(0.55)		(0.42)
Technical school	0.48	0.79		0.85**
	(0.41)	(0.56)		(0.43)
College and above	0.78*	0.72		
	(0.41)	(0.54)		
Body mass index	0.0038	-0.013	-0.023*	0.0061
	(0.017)	(0.013)	(0.013)	(0.013)
Minority	-0.055	0.32	0.59*	-0.20
	(0.23)	(0.31)	(0.33)	(0.35)
Party member	0.10	0.11	0.18	-0.069
	(0.11)	(0.19)	(0.14)	(0.15)
SOE Employment	0.20*	-0.053	-0.060	0.17
	(0.12)	(0.16)	(0.15)	(0.12)
Urban *Hukou*	-0.41***	0.29*	-0.43	-0.19
	(0.15)	(0.16)	(0.36)	(0.12)
House owner	0.21*	0.095	0.24*	0.078
	(0.11)	(0.20)	(0.14)	(0.22)
log (household size)	0.17	0.035	0.074	0.037
	(0.14)	(0.20)	(0.17)	(0.26)
# of kids under 18	-0.033	-0.10	0.081	-0.14
	(0.098)	(0.13)	(0.14)	(0.097)
Unemployed	-2.44	-1.52	-4.87***	0.72
	(1.63)	(2.39)	(1.47)	(3.74)
Observations	836	650	571	915
Polynomial function of tenure	Yes	Yes	Yes	Yes
Cohort FE	Yes	Yes	Yes	Yes
County FE	Yes	Yes	Yes	Yes

Notes: Robust standard errors are in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%. The specifications of the polynomial functions are chosen by AIC. All columns specify a different polynomial function of rating on either side of the cut-point. The unemployment status is instrumented with eligibility requirement for an open-ended contract and its interaction with the indicator for whether a worker has a contract.

Table 12. Marginal Effect of Unemployment on Income, Health and Social Contacts (IV Ordered Probit)

	(1)	(2)	(3)	(4)	(5)
Panel 1: Economic condition	Much lower than the average standard	Lower than the average standard	Average standard	Higher than the average standard	Much higher than the average standard
Unemployed	0.28*	0.53***	-0.43***	-0.34*	-0.039
	(0.15)	(0.20)	(0.12)	(0.19)	(0.049)
Panel 2: Health Status	Very unhealthy	Relatively unhealthy	Normal	Relatively healthy	Very healthy
Unemployed	-0.0031	-0.030	-0.078	-0.017	0.13
	(0.011)	(0.098)	(0.24)	(0.051)	(0.40)
Panel 3: Social contacts	0 person	1-4 persons	5-9 persons	10-19 persons	≥ 20 persons
Unemployed	0.25*	0.55***	-0.041**	-0.25***	-0.50*
	(0.14)	(0.21)	(0.019)	(0.081)	(0.27)
Polynomial function of tenure relative to 10	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes
Cohort FE	Yes	Yes	Yes	Yes	Yes
County FE	Yes	Yes	Yes	Yes	Yes
Observations	715	715	715	715	715

Notes: Robust standard errors are in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%. The specifications of the polynomial functions are chosen by AIC. All columns specify a different polynomial function of rating on either side of the cut-point.

Table 13. Effect of Income, Health and Social Contacts on Happiness

Variables	(1)	(2)	(3)	(4)	(5)
Unemployed	-2.40**	-1.98*	-2.49**	-2.34**	-2.07*
	(1.11)	(1.17)	(1.11)	(1.16)	(1.20)
Economic condition		0.32***			0.31***
		(0.096)			(0.097)
Health			0.33***		0.34***
			(0.064)		(0.062)
Social contacts				0.035	0.017
				(0.049)	(0.046)
Contract	-0.021	-0.050	-0.017	-0.021	-0.044
	(0.12)	(0.12)	(0.12)	(0.12)	(0.12)
Age	-0.23***	-0.20**	-0.23***	-0.23***	-0.20**
	(0.081)	(0.080)	(0.082)	(0.081)	(0.081)
Age squared / 100	0.30***	0.27**	0.31***	0.30***	0.28***
	(0.11)	(0.11)	(0.11)	(0.11)	(0.11)
Male	-0.25***	-0.24**	-0.28***	-0.26***	-0.27***
	(0.094)	(0.094)	(0.095)	(0.094)	(0.095)
Married	0.36**	0.33**	0.38**	0.37**	0.35**
	(0.15)	(0.14)	(0.15)	(0.15)	(0.14)
Primary school	-0.33	-0.19	-0.18	-0.35	-0.049
	(0.51)	(0.46)	(0.49)	(0.51)	(0.45)
Junior high school	0.38	0.46	0.51	0.35	0.58
	(0.49)	(0.44)	(0.48)	(0.50)	(0.44)
Senior high school	0.43	0.43	0.57	0.40	0.56
	(0.49)	(0.45)	(0.47)	(0.50)	(0.44)
Technical school	0.76	0.72	0.92*	0.73	0.87*
	(0.51)	(0.47)	(0.49)	(0.52)	(0.47)
College and above	0.59	0.53	0.77	0.56	0.69
	(0.49)	(0.46)	(0.48)	(0.50)	(0.45)
Body mass index	-0.0015	0.0013	0.0022	-0.0010	0.0051
	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)
Minority	0.0097	-0.013	0.013	-0.0084	-0.017
	(0.28)	(0.27)	(0.29)	(0.28)	(0.28)
Party member	-0.19	-0.17	-0.18	-0.19	-0.17
	(0.14)	(0.14)	(0.14)	(0.14)	(0.14)
SOE Employment	0.12	0.14	0.14	0.12	0.16
	(0.13)	(0.13)	(0.13)	(0.13)	(0.13)
Urban Hukou	0.081	0.082	0.0094	0.087	0.012
	(0.17)	(0.17)	(0.17)	(0.17)	(0.17)
House owner	0.25**	0.22*	0.26**	0.25*	0.22*
	(0.13)	(0.13)	(0.12)	(0.13)	(0.13)
log (household size)	0.041	0.0050	0.058	0.042	0.025
	(0.14)	(0.14)	(0.14)	(0.14)	(0.14)

# of kids under 18	-0.096	-0.056	-0.065	-0.099	-0.028
	(0.11)	(0.11)	(0.11)	(0.11)	(0.11)
Polynomial function of tenure relative to 10	Yes	Yes	Yes	Yes	Yes
Cohort FE	Yes	Yes	Yes	Yes	Yes
County FE	Yes	Yes	Yes	Yes	Yes
Observations	715	715	715	715	715
Log likelihood	-511.81	-500.97	-490.81	-508.84	-478.72

Notes: IV ordered probit model is applied here. Robust standard errors are in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%. The unemployment status is instrumented with eligibility requirement for an open-ended contract and its interaction with the indicator for whether a worker has a contract.

Appendix A

Table A1. Effect of Having Tenure of More than 10 Years on Unemployment: Formal-contract workers

Variables	(1) Full sample	(2) [2,18]	(3) [4,16]
Having tenure of more than 10 years	0.054*	0.075	0.062*
	(0.029)	(0.056)	(0.038)
Constant	0.013	-0.12	-0.31
	(0.18)	(0.21)	(0.24)
Polynomial function of tenure relative to 10	Yes	Yes	Yes
Cohort FE	Yes	Yes	Yes
County FE	Yes	Yes	Yes
Observations	1,014	644	452
R-squared	0.213	0.356	0.457

Notes: Robust standard errors are in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%. The specifications of the polynomial functions are chosen by AIC. All columns specify a different polynomial function of rating on either side of the cut-point. All variables controlled in Table 2 are included here.