

Does Economic Development Affect Life Satisfaction? A Spatial–Temporal Contextual Analysis in China

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Abstract Social context affects people’s life satisfaction because it provides a natural reference for evaluating their own socioeconomic standing. Given their reference role, social contexts operationalized by space versus time may have very different implications. Our hypothesis is that spatial variation in economic development has little impact on life satisfaction as individuals living in different locales are unlikely to experience this variation personally, but that short-term temporal changes in economic development, on the other hand, do have an impact, as individuals in a given locale experience these changes directly. These two very different implications of spatial versus temporal social contexts are tested with an analysis of repeated survey data in 60 counties of China from 2005 to 2010. The results show that life satisfaction does not vary much with regional differences in economic development but responds positively to the local level of economic development over time. That is, the contextual effects of economic development vary greatly depending on how social context is operationalized. Temporal context matters far more than regional context where individuals’ life satisfaction is concerned.

Keywords Life satisfaction · Economic development · Contextual effects · Multi-level analysis

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1 Introduction

In a given society, it has been well established that personal-level socio-demographic and socio-economic attributes such as age, education and income are associated with life satisfaction (Di Tella et al. 2003; Easterlin 1995; Jongudomkarn and Camfield 2006; Kahneman and Deaton 2010; Sacks et al. 2012; Schyns 2001; Stevenson and Wolfers 2013). However, whether or not contextual level of economic development affects life satisfaction—with contexts defined as macro-level conditions in terms of either region or time—remains controversial. Although many researchers have attempted to address this question over the past six decades, the answer is still elusive.

Two viewpoints have emerged. One viewpoint originates from Easterlin's happiness–income paradox stating that economic development does not influence life satisfaction over the long term (Easterlin 1973; Easterlin et al. 2010). A series of studies have reported empirical findings in support of this viewpoint, showing a nil correlation between life satisfaction and gross domestic product (GDP) both cross-sectionally (Deaton 2008) and over time (Diener and Biswas-Diener 2002; Easterlin et al. 2010; Kenny 2005). Let us call this viewpoint the “context-neutral” thesis. Researchers have developed several theoretical explanations for the context-neutral thesis, including raised aspirations (Knight 2012), relative income (Clark et al. 2008), adaptation to increased life satisfaction in the long run (Tsutsui and Ohtake 2012), deterioration in social relationships reducing life satisfaction (Pugno 2009), subjective well-being homeostasis (Cummins 2011), and the measurement limitations of life satisfaction (Torras 2008).

However, the context-neutral thesis is not accepted by all researchers. An alternative viewpoint asserts that the contextual level of economic development is significantly associated with life satisfaction. For simplicity, let us call this viewpoint the “context-sensitive” thesis. Cross-nationally, researchers advocating the context-sensitive thesis have reported large correlations between per-capita GDPs of nations and mean reports of life satisfaction, at least in the early stages of economic development (Diener and Seligman 2004; Veenhoven 1991). In addition, there is research in support of the context-sensitive thesis based on time series data at the state level in the U.S. and Europe, showing a robust positive relationship between economic development and life satisfaction over time (Bjørnskov et al. 2008; Di Tella et al. 2003; Di Tella and MacCulloch 2008; Madden 2011; Sacks et al. 2012; Stevenson and Wolfers 2013).

Both the context-neutral thesis and the context-sensitive thesis focus on the crucial roles of social contexts. However, both perspectives treat context operationalized by space (across nations or sub-national units) as being the same as context operationalized by time (over years). This article hypothesizes that social contexts operationalized by space versus those operationalized by time have very different implications, with regionally-based social contexts mattering far less for life satisfaction than temporally-based social contexts. To test this hypothesis, the spatial–temporal contextual effects of economic development on life satisfaction in China are examined, since context variations in China are very large, by both region and time. These variations provide great opportunities for empirical evaluations regarding the theoretical debate between the context-neutral thesis and the context-sensitive thesis.

Some researchers have reported a decline in life satisfaction in China in recent decades (Brockmann et al. 2009). One common explanation for this decline is a rapid rise in distribution inequality (Brockmann et al. 2009; Wu et al. 2013), along with other social issues such as high unemployment and dissolution of the welfare state (Easterlin et al. 2012). However, mixed patterns in life satisfaction trends in China have been reported,

from “falling” (Pan and Huang 2012) to “constant” (Knight and Gunatilaka 2011), to “a U-shaped swing” (Easterlin et al. 2012). One main reason for the inconclusiveness is data quality. Most studies to date have been based on either cross-sectional samples (Knight and Gunatilaka 2011) or limited or truncated longitudinal data (Easterlin et al. 2012; Pan and Huang 2012). Comparable time-series data have not been available. As a result, while China stands out as an ideal location in which to study the effects of social context, especially economic growth, on life satisfaction (Knight 2012), there is no consensus yet concerning how social context affects life satisfaction in China, due to the lack of real time-series data.

Social context affects people’s life satisfaction because it provides a natural reference for evaluating their own socioeconomic standing. It seems likely that this reference role should vary depending on how social context is operationalized. It is well known that regional variations in economic development and in personal income are very large in China (Xie and Hannum 1996). However, most individuals do not experience this large regional inequality personally. Even people who are knowledgeable about the extent of this region-based inequality are not sensitive to it because it is a structural inequality imposed by the state (Wang 2008; Xie 2010). As Whyte (2010) argued, ordinary Chinese people are not emotionally upset by region-based structural inequality because it does not feel personal. That is to say, their expectations for personal income are already adjusted for overall regional level of economic development. Hence, the context-neutral thesis may work relatively well for regional variation in China.

In contrast, short-term temporal changes in economic development, which individuals experience directly, should affect their life satisfaction. Recall Easterlin’s original explanation for the context-neutral thesis: when overall economic conditions improve, individuals gradually adapt to, or get used to, better overall economic conditions, and thus only relative income matters for life satisfaction. This line of reasoning suggests that it is not one’s absolute income but one’s income level relative to his/her expectation that affects his/her life satisfaction. In China’s recent past, economic growth has been rapid in much of the country. In such circumstances, personal expectations may not be quickly saturated by actual economic growth within a time window. That is, when growth is rapid, a large proportion of individuals may experience better than expected income increases, which, in turn increases life satisfaction.

This paper shows how the contextual level of economic development, measured by either space or time, affects life satisfaction, using a full set of time series survey data in China. The data allow us to examine spatial and temporal patterns in the relationship between contextual level of economic development and life satisfaction while controlling for the individual-level factors. Through hierarchical linear modeling (HLM), the influences of contextual-level determinants versus individual-level determinants on life satisfaction are properly partialled out (Tsutsui and Ohtake 2012). Our research objective is to empirically evaluate the context-neutral thesis versus the context-sensitive thesis. What is novel about this research is our effort to evaluate the validity of the two theses with two different operationalizations of social context. Specifically, the following two hypotheses are proposed:

Hypothesis 1 *At a given point in time, regional variation in economic development across counties does not have a significant effect on people’s life satisfaction.*

Hypothesis 2 *For a given locale, economic development has a positive effect on people’s life satisfaction over time.*

2 Data

The data were derived from a repeated cross-sectional survey entitled ‘Social Attitude Questionnaire of Urban and Rural Residents’, which we conducted nationwide in China from 2005 to 2010. The survey used stratified, multi-stage, random sampling. First, the provinces were stratified according to three levels of economic development by using the

Table 1 Economic development level and GDP per capita of the sampled 60 counties

Province	County	GDP per capita	Economic development level within Province	Province	County	GDP per capita	Economic development level within Province
Hubei	Caidian	36,715	High	Shaanxi	Hu	17,630	High
	Jiangxia	38,734	High		Zhouzhi	7,934	Low
	Xinzhou	24,231	High		Fuping	7,649	Low
	Xiaonan	11,246	Low		Xingping	17,858	High
	Anlu	14,456	Medium		Qian	12,453	Medium
	Qianjiang	28,458	High		Bin	22,906	High
	Honghu	11,001	Low		Sanyuan	21,495	High
	Gong'an	10,323	Low		Dali	8,860	Low
	Chongyang	12,270	Medium		Chengcheng	12,540	Medium
	Xishui	10,353	Low		Pucheng	10,751	Low
	Yicheng	19,474	Medium		Baishui	12,617	Medium
	Zhijiang	32,211	High		Yanchang	15,925	High
	Yidu	46,687	High		Suide	9,181	Low
Gansu	Lichuan	6,080	Low	Hengshan	22,778	High	
	Lintao	5,480	Low	Jia	8,742	Low	
	Liangzhou	14,671	High	Fengxiang	19,769	High	
	Gulang	5,785	Low	Linyou	14,767	Medium	
	Minqin	12,167	Medium	Fufeng	13,034	Medium	
	Shandan	13,540	High	Mei	16,656	High	
	Suzhou	31,584	High	Qishan	20,583	High	
	Dunhuang	28,260	High	Nanzheng	12,933	Medium	
	Qin'an	4,897	Low	Xixiang	8,159	Low	
	Tongwei	3,149	Low	Hanyin	9,177	Low	
	Jingning	4,298	Low	Shiquan	15,000	Medium	
	Kongtong	14,053	High	Xunyang	12,320	Medium	
	Jingchuan	8,800	Medium	Baihe	9,543	Low	
	Zhenyuan	5,837	Medium	Danfeng	11,110	Medium	
	Xifeng	22,411	High	Yijun	13,580	Medium	
	Ning	5,600	Low	Huangling	53,769	High	
	Wen	5,450	Low				
Longxi	6,308	Medium					

Based on data in 2010. Data from 2005 to 2009 is quite similar to that in this table

high-to-low ranking of GDP per capita (i.e., the first one-third is labelled as high level, ranging in GDP per capita from 28,668 to 52,840 RMB yuan in 2010; the middle one-third as medium level, ranging in GDP per capita from 24,115 to 27,906 RMB yuan in 2010; and the last one-third as low level, ranging in GDP per capita from 13,119 to 23,831 RMB yuan in 2010), with several provinces being randomly selected within each of these strata. Second, in each province, the counties were also stratified according to three levels of economic development as above, with approximately fifteen counties being randomly selected within each stratum. Third, forty or sixty households were selected randomly within each county. Finally, one household member aged 18 years or older was interviewed in each selected household. The total numbers of respondents from 2005 to 2010 were 9,566, 4,800, 6,628, 6,329, 3,319 and 8,249, respectively.

In the national samples for 6 years, the survey was implemented every year in 60 counties. The sixty counties belonged to three provinces (Hubei, with a high level of economic development, Shaanxi, with a medium level of economic development, and Gansu, with a low level of economic development), and economic development varied widely within each province (see Table 1). Our analyses, then, were based on the samples from these 60 counties from 2005 to 2010.

Our data improve significantly upon data used in previous studies in two main ways. First, the sampling design of our study was strict. Although neither the household unit nor the individuals were traced, the data is longitudinal on the county level, with six time points (i.e., 6 years) and 60 observations (i.e., 60 counties) at each time point. Second, the contextual level in our data refers to counties instead of countries at a given period. Because differences in geographical location, climate, environment, and culture across distinct counties within a country are much smaller and can be measured more comparably than those across countries, a county-level analysis is thus less likely to suffer from unobserved heterogeneity biases than the country-level analyses commonly seen in the literature.

Concerning measures of life satisfaction, our respondents were asked, “On the whole, how satisfied are you with your life?” The answers were given on a Likert scale from one to five, possible responses being: 1-not at all satisfied; 2-not very satisfied; 3-neutral; 4-fairly satisfied; and 5-very satisfied. In addition, our analysis included individual socio-demographic and socio-economic control variables: registered residence (called hukou in China), gender, age, education, occupation, household size, and family income. Registered residence (rural = 0, urban = 1) and gender (male = 0, female = 1) are coded as dummy variables, whereas age, years of schooling, household size, and family income are continuous variables. Family income refers to yearly absolute income obtained by all household members from both employment and non-employment sources and was adjusted for temporal-regional differences in purchasing power using the county-level Consumer Price Index (CPI), which often reflects the inflation rate.¹ Moreover, occupation is classified into 10 categories: 1 = farmer, 2 = enterprise worker, 3 = institution staff, 4 = government official, 5 = individual business, 6 = migrant worker, 7 = retiree, 8 = unemployed, 9 = self-employed, and 10 = other occupation.

To measure the level of economic development, the real GDP per capita of each county in every year was used and again adjusted for county-level CPI.² The county-level data of nominal GDP per capita and CPI in 2005 to 2010 were collected from the Hubei Province Statistical Yearbook (National Bureau of Statistics 2006b, 2007b, 2008b, 2009b, 2010b, 2011b), the Shaanxi Province Statistical Yearbook (National Bureau of Statistics, 2006c,

¹ Real family income = (Measured family income)/(CPI of the county)%.

² Real GDP per capita = (Nominal GDP per capita)/CPI%.

2007c, 2008c, 2009c, 2010c, 2011c), and the Gansu Province Statistical Yearbook (National Bureau of Statistics, 2006a, 2007a, 2008a, 2009a, 2010a, 2011a).

3 Results

Our results are reported in three steps. First, the data and the observed associations in the data between life satisfaction and economic development as well as individual-level socio-demographic and socio-economic covariates are described. Second, the effects of regional variation in economic development on life satisfaction are modeled while controlling for individual-level characteristics. Third, regional variation is replaced by temporal variation in conceptualizing social context so that the effects of varying rates of local economic development on life satisfaction are modeled. For the second and third parts, the HLM is used.

3.1 Descriptive Findings

In Fig. 1a, b, the county-level annual growth rate of GDP per capita³ and the annual change in life satisfaction⁴ from 2005 to 2010 in our data are mapped out respectively. A darker dot means the county has a higher rate of economic growth or a greater change in life satisfaction. The annual GDP growth rate of these 60 counties ranged from 4.59 to 35.79 %, averaging 16.16 %. The map shows that our sample of counties indeed covered a wide range of counties with different rates of economic development (i.e., high, medium and low levels) in three different provinces. The annual change in life satisfaction at the county level ranged from -0.12 to 0.24 with an average of 0.03 . Comparing Fig. 1a, b, the results show that the spatial distribution of the annual change in life satisfaction tracks closely that of the annual GDP growth rate. The correlation analysis also indicates a significant positive relationship between the annual GDP growth rate and the annual change in life satisfaction ($r = 0.22, p < .10$). This means that life satisfaction increased more in counties that experienced faster economic growth.

In addition, the descriptive statistics of basic individual-level covariates are reported in Table 2. For convenience, all the descriptive statistics are reported in categorical form. Column 3 gives the percentage for each category. Column 4 gives the mean value of life satisfaction for each category. In continuous scales, the average age is 39.42; the average years of schooling are 10.49; the average household size is 4.15; and the average household income is 22,318 RMB *yuan* per year. As Table 2 shows, life satisfaction varies greatly by family income, education, age, and occupation, but not much by registered residence, gender and household size. Family income and education may well be confounded with macro-level measures of economic development. Thus, it is necessary to control for individual socio-demographic and socio-economic variables in the following HLM to examine the effects of social contexts on life satisfaction.

3.2 Effect of Regional Variation in Economic Development on Life Satisfaction

The effect of regional variation in economic development across counties on life satisfaction at a particular survey point is examined by using both the county-level ordinary

³ Annual growth rate of GDP per capita = $\sqrt[5]{(\text{GDP per capita in 2010})/(\text{GDP per capita in 2005})} - 1$

⁴ Annual change in life satisfaction = $(\text{mean life satisfaction in 2010} - \text{mean life satisfaction in 2005})/5$.

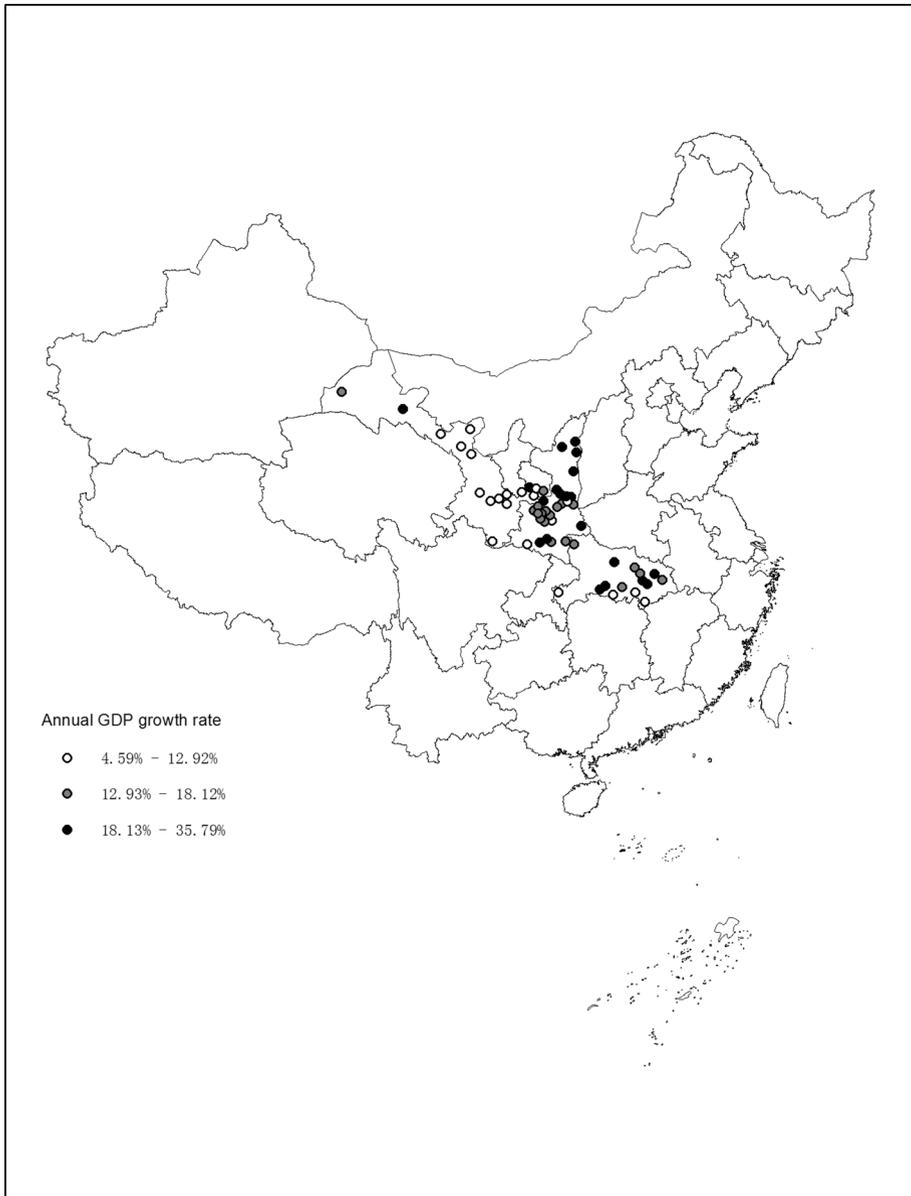


Fig. 1 Comparing annual growth rate of GDP per capita with annual change in life satisfaction. The correlation between them is 0.22 ($p = 0.09$). **a** Annual growth rate of GDP per capita in 60 counties of China, 2005–2010. **b** Annual change in life satisfaction in 60 counties of China, 2005–2010

least squares (OLS) regression and the HLM. The fitted OLS regressions showing the relationship between GDP per capita (x) and mean life satisfaction (y) at the county level for each of the survey years are listed as following: in 2005, $y = 0.236x + 2.286$ ($R^2 = 0.034$; $\text{adj } R^2 = 0.018$; $t = 1.44$, $p = 0.156$); in 2006, $y = -0.002x + 3.196$ ($R^2 < 0.001$; $\text{adj } R^2 = -0.017$; $t = -0.02$, $p = 0.986$); in 2007, $y = 0.17x + 2.568$

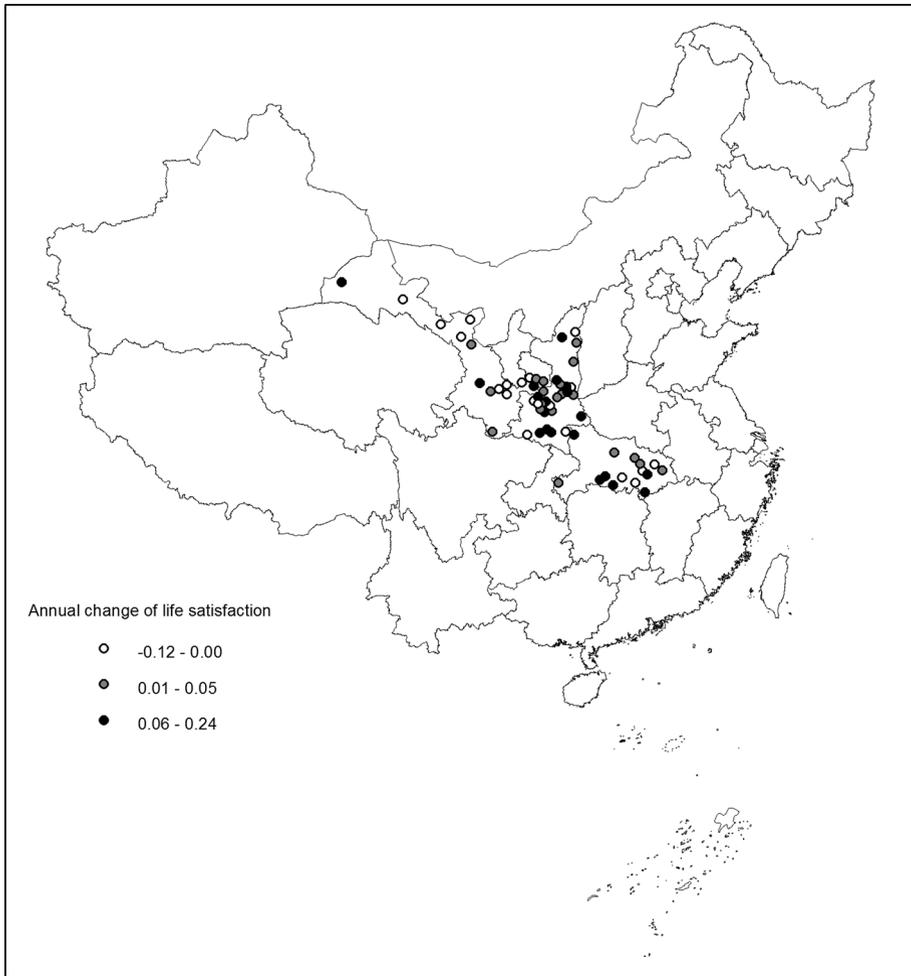


Fig. 1 continued

($R^2 = 0.013$; $\text{adj } R^2 = -0.004$; $t = 0.86$, $p = 0.393$); in 2008, $y = -0.059x + 3.564$ ($R^2 = 0.002$; $\text{adj } R^2 = -0.015$; $t = -0.37$, $p = 0.710$); in 2009, $y = 0.167x + 2.678$ ($R^2 = 0.025$; $\text{adj } R^2 = 0.009$; $t = 1.23$, $p = 0.224$); in 2010, $y = 0.071x + 3.05$ ($R^2 = 0.006$; $\text{adj } R^2 = -0.012$; $t = 0.57$, $p = 0.573$). These OLS results reveal that there is a nil correlation between the level of economic development and life satisfaction across counties. Respondents living in richer counties do not report higher levels of life satisfaction than those living in poorer counties.

To control for the individual-level characteristics, the relationship between regional variation in economic development and life satisfaction is further studied with the HLM. The HLM summary results are presented in Table 3. Model 1 is a baseline model, with only the county-level GDP per capita and the fixed effects of years included, essentially replicating the OLS regression results on the county level reported earlier. Model 2 includes all the variables described in Table 2 at the individual level and the county-level GDP per capita and the fixed effects of years at the contextual level to jointly consider the

Table 2 Comparing life satisfaction among different groups at the individual level in 60 counties of China, 2005–2010

Demographic characteristics		Percentage (%)	Mean of life satisfaction
Registered residence	Urban	24.19	3.38
	Rural	75.81	3.22
Gender	Female	41.68	3.25
	Male	58.32	3.27
Age	18–29	23.26	3.25
	30–39	24.00	3.22
	40–49	33.91	3.24
	50+	18.83	3.35
Education	≤6 years	17.32	3.12
	7–9 years	33.76	3.20
	10–12 years	28.06	3.32
	≥13 years	20.86	3.39
Household size	1–3 persons	30.29	3.28
	4 persons	35.94	3.24
	≥5 persons	33.77	3.26
Income quartiles	1st (lowest)	25.04	3.05
	2nd	25.00	3.14
	3rd	24.98	3.32
	4th (highest)	24.98	3.51
Occupation	Farmer	33.03	3.16
	Enterprise worker	7.13	3.27
	Institution staff	10.48	3.42
	Government official	3.64	3.45
	Individual business	12.74	3.37
	Migrant worker	12.62	3.15
	Retiree	2.68	3.66
	Unemployed	3.90	3.02
	Self-employed	5.12	3.25
	Other	8.66	3.32

Based on 16,672 observations

influences of regional variation in economic development and the individual-level characteristics. The HLM results show that while several individual socio-demographic and socio-economic variables have significant effects on life satisfaction, county-level GDP does not affect respondents' life satisfaction.

Specifically, at the individual level, older and more educated respondents report higher levels of life satisfaction than younger and less educated respondents. Family income is positively associated with life satisfaction. Retirees, government officials, individual business owners, and institution staff members tend to have higher levels of life satisfaction than farmers, with migrant workers and the unemployed trailing further behind farmers. Registered residence, gender, and household size are not significantly related to reported life satisfaction.

Table 3 HLM results: effect of economic development on life satisfaction across counties at a time point

Parameter	Model 1		Model 2	
	Coefficient	SE	Coefficient	SE
<i>Fixed effect parameters</i>				
Individual level (level 1)				
Registered residence (1 = urban, 0 = rural)			0.009	0.031
Gender (1 = female, 0 = male)			0.001	0.017
Age			0.005***	0.001
Household size			-0.002	0.007
Education			0.014***	0.003
Family income (log scale)			0.314***	0.040
Occupation (reference group: farmer)				
Enterprise worker			0.055	0.038
Institution staff			0.106**	0.032
Government official			0.131**	0.050
Individual business			0.113***	0.028
Migrant worker			-0.061*	0.030
Retiree			0.316***	0.052
Unemployed			-0.137**	0.047
Self-employed			0.037	0.043
Other			0.082*	0.042
County level (level 2; empirical bayes estimations)				
Intercept (γ_{00})	2.808***	0.192	1.608***	0.191
GDP per capita (log scale)	0.094	0.051	-0.022	0.051
Year dummies	Yes		Yes	
<i>Random effect parameters</i>				
County level intercept error (u_{0j})		0.790***		0.793***

Level-1 sample size is 15,958

Level-2 sample size is 360

Model 1: within-unit $R^2 = 0.01$, between-unit $R^2 = 0.07$

Model 2: within-unit $R^2 = 0.04$, between-unit $R^2 = 0.09$

The dependent variable is life satisfaction. * $p < .05$, ** $p < .01$, *** $p < .001$

However, at the county level, regardless of whether individual characteristics are controlled for, the effects of economic levels across counties on life satisfaction are not significant. That is, at any particular time point, a respondent's life satisfaction does not vary with the county's level of economic development. To check the robustness of this conclusion directly, the same HLM (Model 2) is further estimated separately for each survey year. The results remain the same, showing an insignificant effect of a county's GDP on life satisfaction for all survey years: *coefficient* = 0.061, *se* = 0.227, $p = 0.788$ in 2005; *coefficient* = -0.232, *se* = 0.163, $p = 0.161$ in 2006; *coefficient* = -0.102, *se* = 0.249, $p = 0.683$ in 2007; *coefficient* = -0.096, *se* = 0.152, $p = 0.532$ in 2008; *coefficient* = 0.076, *se* = 0.123, $p = 0.539$ in 2009; and *coefficient* = 0.030, *se* = 0.111, $p = 0.789$ in 2010. Thus, at a particular time point, regional variation in economic development across counties does not have a significant effect on life satisfaction. Hypothesis 1 is supported.

3.3 Effect of Time Trend in Economic Development on Life Satisfaction

Separate analyses conceptualizing social context as temporal variation are then conducted. To this end, the role of economic development in life satisfaction over time for a given locale is examined. As in Sect. 3.2, these analyses require two steps. First, the county-level OLS regression is estimated to understand the effect of economic growth on changes in life satisfaction. Second, the HML is estimated, jointly considering the influences of individual socio-demographic and socio-economic variables and county-level changes in economic development on respondents' life satisfaction.

The county-level OLS regression (see Fig. 2), showing a relationship between changes in GDP per capita and changes in life satisfaction, indicates that this relation is positive and significant. Using R-square as a criterion, GDP growth accounts for almost 5 % of the variation in changes in life satisfaction. It appears that greater economic growth in a given county is associated with a faster increase in respondents' life satisfaction over time.

Results from the HLM are presented in Table 4. As with the HLM analysis in Table 3, two models are reported: a baseline model (Model 1) with only the county-level GDP per capita and the fixed effects of counties included, and a full model (Model 2) with observed characteristics at the individual level and the county-level GDP per capita and the fixed effects of counties at the contextual level.

The HLM results show that county's GDP per capita as well as several individual socio-demographic and socio-economic variables have significant effects on life satisfaction. At the individual level, the findings are similar to those in Model 2 of Table 3 and will not be repeated here. At the county level, a significant and positive effect of a county's GDP per capita on life satisfaction is observed over time, whether or not individuals' characteristics are controlled for (i.e., in both Models 1 and 2). In other words, respondents' life satisfaction rises as the county's economy improves over time. Comparing these two models in Table 4, the results indicate that about half of the overall (i.e., crude) effect of GDP per capita on life satisfaction can be explained by changes in individual-level socio-demographic and socio-economic variables. This is not surprising, because family income tends to rise when a county's economy improves rapidly. What is important, however, is that the contextual effect of GDP per capita remains significant after controlling for relevant individual-level predictors. To appropriately estimate this effect size, the GDP effect is compared to that of family income (Di Tella and MacCulloch 2008). This exercise reveals

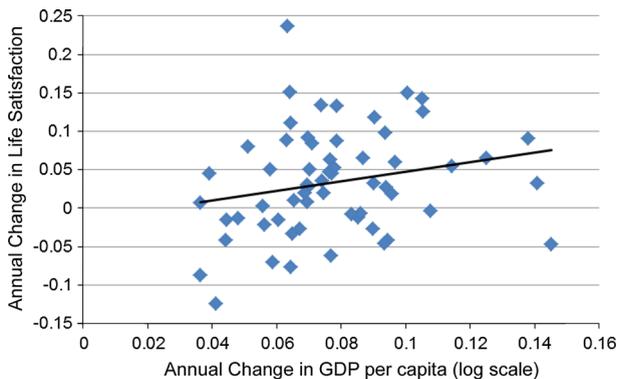


Fig. 2 Average annual change in life satisfaction and in GDP per capita, 60 counties of China, 2005–2010. The fitted OLS regression is: $y = 0.625x - 0.015$ ($R^2 = 0.049$; $\text{adj } R^2 = 0.033$; $t = 1.74$, $p = 0.088$)

Table 4 HLM results: effect of economic development on life satisfaction over time

Parameter	Model 1		Model 2	
	Coefficient	SE	Coefficient	SE
<i>Fixed effect parameters</i>				
Individual level (level 1)				
Registered residence (1 = urban, 0 = rural)			0.012	0.030
Gender (1 = female, 0 = male)			0.002	0.017
Age			0.005***	0.001
Household size			-0.001	0.008
Education			0.014***	0.003
Family income (log scale)			0.311***	0.041
Occupation (reference group: farmer)				
Enterprise worker			0.058	0.038
Institution staff			0.110**	0.032
Government official			0.138**	0.049
Individual business			0.114***	0.028
Migrant worker			-0.062*	0.030
Retiree			0.317***	0.052
Unemployed			-0.137**	0.047
Self-employed			0.037	0.044
Other			0.083*	0.042
County level (level 2; empirical bayes estimations)				
Intercept (γ_{00})	0.908*	0.375	0.513	0.371
GDP per capita (log scale)	0.542***	0.085	0.221**	0.084
County dummies	Yes		Yes	
<i>Random effect parameters</i>				
County level intercept error (u_{0j})			0.784***	

Level-1 sample size is 15,958

Level-2 sample size is 360

Model 1: within-unit $R^2 = 0.01$, between-unit $R^2 = 0.12$

Model 2: within-unit $R^2 = 0.05$, between-unit $R^2 = 0.14$

The dependent variable is life satisfaction. * $p < .05$, ** $p < .01$, *** $p < .001$

that a 1-percentage point increase in GDP per capita is equivalent to increasing the individual family income by 0.7 % in affecting respondents' reported life satisfaction. Therefore, local economic development does have a significant and positive effect on life satisfaction over time. Hypothesis 2 is supported too.

In summary, our results reveal that life satisfaction does not vary much with the regional variation in economic development but responds positively to the local level of economic development over time.

4 Discussion and Summary

In the present study, social contexts were operationalized by space versus by time to evaluate the context-neutral versus context-sensitive theses, concerning the potential role

of contextual level of economic development in people's life satisfaction. Drawing on past literature, two specific hypotheses were proposed regarding different ways in which social context affects life satisfaction: (1) regional variation in economic development should have no-to-little effect, and (2) temporal changes in economic development should affect individuals' life satisfaction. Data from repeated surveys in 60 counties of China in 2005 to 2010 were analyzed with multi-level models so as to evaluate the two hypotheses concerning contextual effects while controlling for individual characteristics.

The empirical findings are consistent with our expectation that the contextual effect of economic development will vary greatly depending on how social context is operationalized. If context is operationalized regionally, our results support the context-neutral thesis in showing that the level of economic development across counties does not affect life satisfaction at a particular time point. However, if context is operationalized temporally, findings from this study support the context-sensitive thesis, revealing a positive impact of economic development on the trend of individuals' life satisfaction over time in a given locale. These results depart from earlier research suggesting that cross-sectional life satisfaction is related to GDP per capita at the country level (Diener and Seligman 2004; Veenhoven 1991), but that over-time life satisfaction does not rise as GDP per capita increases (Diener and Biswas-Diener 2002; Easterlin et al. 2010; Kenny 2005). According to the findings from our work, temporal context and, to a lesser extent, regional context affect individuals' life satisfaction.

There are two possible explanations for our findings. One explanation relates to the important role of expectations (Knight 2012). Regional variation in economic development does not have a significant effect on life satisfaction, because people's expectations regarding personal income are already adjusted for overall regional level of economic development (Whyte 2010), but economic development over time does affect life satisfaction because people's expectations concerning income lag behind real changes when economic growth is rapid. A second explanation relates to the process of social comparison. The theory of social comparison suggests that people evaluate their life situations by assessing their incomes and achievements with a reference (Clark, and Oswald 1996). In forming individuals' life satisfaction, past condition is used as the reference, such that life satisfaction is affected by comparing the current level of economic development with the past level rather than by comparing local economic development with that in other counties. Therefore, temporal context matters far more than regional context in determining life satisfaction.

This work suggests four lines of future research. First, Easterlin et al. (2010) study shows that over the long term (usually a period of 10 years or more), life satisfaction does not increase as a country's GDP rises, but that in the short term, life satisfaction and GDP go together. Our study is limited by data from 6 years and thus cannot be generalized to shed light on the relationship between life satisfaction and economic development over a long period of time. A long-term and complete set of time series data is needed to fully understand whether or not temporal changes in economic development exert an influence on life satisfaction over longer periods. Second, a common assertion based on cross-sectional comparisons of nations is that at low levels of GDP per capita, economic growth increases life satisfaction, but this effect diminishes beyond some threshold (Diener et al. 1993; Veenhoven 1991). Usually, this threshold is around 8,000 U.S. dollars (Stevenson and Wolfers 2013). However, because the GDP per capita does not exceed 8,000 U.S. dollars in any of the counties in our sample, our work cannot contribute to this debate. More research should evaluate the contextual effects of economic development over a larger range of variation in it. Third, if both counties and household units or individuals

within each county can be traced in longitudinal data, it is possible to estimate the effect of the increase in county-level GDP relative to that of the increase in personal income. Fourth, different aspects of happiness should be encompassed by distinguishing life satisfaction from emotional well-being, as Kahneman and Deaton (2010) suggest that emotional well-being and life satisfaction have distinct relationships with individual economic conditions.

To summarize, the current study provides new insight into the influence of contextual economic development on individuals' life satisfaction. A central finding is that temporal changes, but not regional differences, in local economic development contribute to individuals' life satisfaction. This finding attests to the important role of economic development in individuals' life satisfaction, confirming the Chinese government's assumption that economic development helps maintain political stability when there are very high levels of social inequality (Xie 2010). Future work is welcomed to evaluate our main thesis—that temporal context matters far more than regional context—with data covering longer time spans and more regions in the world.

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