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by

Inna Petrunyk and Christian Pfeifer

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Life satisfaction in Germany after reunification: Additional insights on the pattern of convergence

Inna Petrunyk and Christian Pfeifer

Inna Petrunyk, M. Sc., Institute of Economics, Leuphana University Lueneburg, Scharnhorststr. 1, 21335 Lüneburg, Germany. E-mail: petrunyk@leuphana.de.

Corresponding author: Prof. Dr. Christian Pfeifer, Institute of Economics, Leuphana University Lueneburg, Scharnhorststr. 1, 21335 Lüneburg, Germany. E-mail: pfeifer@leuphana.de.

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Summary

The authors update previous findings on the total East-West gap in overall life satisfaction and its trend by using data from the German Socio-Economic Panel (SOEP) for the years 1992 to 2013. Additionally, the East-West gap and its trend are separately analyzed for men and women as well as for four birth cohorts. The results indicate that reported life satisfaction is on average significantly lower in East than in West German federal states and that part of the raw East-West gap is due to differences in household income and unemployment status. The conditional East-West gap decreased in the first years after the German reunification and remained quite stable and sizeable since the mid-nineties. The results further indicate that gender differences are small. But the East-West gap is significantly smaller and shows a trend towards convergence for younger birth cohorts.

JEL classification: D63, I31, P36, P46

Keywords: Germany, Happiness, Life satisfaction, Reunification, Trends

1. Introduction

Twenty-five years after the German reunification in the year 1990, convergence between the Eastern (new) and Western (old) German federal states has not been achieved completely. For example, employment levels, wages, and productivity are still significantly lower in East than in West Germany (e.g., Uhlig 2008; Smolny 2009; Smolny/Kirbach 2011; Smolny 2012; Burda 2013). In addition to such standard economic variables, researchers have also looked at the East-West gap in overall life satisfaction, happiness or well-being, respectively.[1] The reported persistent lower levels of life satisfaction for people living in East Germany give rise to the question if equal living conditions can be achieved. We add to this stream of the literature by analyzing data from the German Socio-Economic Panel (SOEP) for the years 1992 to 2013 in order to update previous research and to get additional new insights. At first, we use pooled and individual specific fixed effects OLS (ordinary least squares) models to estimate the East-West gap in overall life satisfaction. By using different specifications, we explore in how far the raw gap is reduced by the inclusion of important covariates that control for differences in household income, unemployment status, retirement, schooling, age, gender etc. In the next step, we add interaction terms between living in East Germany and the survey years, which allows us to analyze the conditional trends in life satisfaction and in the East-West gap. Additionally, we analyze the East-West gaps and their trends separately for men and women as well as for four birth cohorts.

The remainder of this paper is structured as followed. In the next section, we summarize the relevant literature. The data set, variables, and econometric approach are described in section 3. In section 4, we present and discuss the results from our regression analyses. The paper concludes with a short summary and discussion in section 5.

2. Literature review

In the growing literature on subjective well-being, more commonly identified with life satisfaction or happiness, researchers have paid particular attention to its determinants, investigating factors able to enhance social welfare (Gerlach/Stephan 1996;

[1] In our empirical analysis, we focus on life satisfaction. Whereas happiness relates more strongly to emotional states, life satisfaction aims to measure more strongly permanent states and is a better proxy for the economic utility concept.

Winkelmann/Winkelmann 1998). The collapse of socialism in East Germany and the concomitant German reunification in 1990 have encouraged economists for empirical studies in this field of literature (Frijters et al. 2004a; Frijters et al. 2004b; van Hoorn/Maseland 2010). Thereby, the variables of main interest refer to life satisfaction, used as a well-established proxy measure for utility and economic conditions in Germany following reunification (Easterlin/Plagnol 2008). In particular, more recent studies have addressed the issue of both the determinants of life satisfaction in East and West Germany and its convergence over the course of time, focusing on implications for policy.

Frijters et al. (2004a) using the SOEP consider the years 1985 to 1999 for West Germans and 1991 to 1999 for East Germans. Contrary to the authors' expectation of respondents living on the border between East and West German states being affected by reunification to the largest extent, the data point to no significant difference with respect to the residence place within the two previously separated parts of the country in terms of life satisfaction immediately after reunification. However, movers from the East to the West of Germany following reunification reveal a higher life satisfaction level with respect to the stayers in the East. Despite the fact, that the average life satisfaction for East Germans after 1990 is characterized by a steady increase, there is evidence of a significantly lower level of life satisfaction in the East compared to the West in the studied period. On the contrary, West Germans experienced a slight downward trend in life satisfaction in the years directly after reunification, but on average little change can be registered over the years (Easterlin/Plagnol 2008; Noll/Weick 2010). As a matter of fact, the most remarkable convergence in East-West levels occurred immediately after reunification, followed by a rather stable life satisfaction differential. According to Easterlin and Plagnol (2008), the convergence is concentrated in the years between 1991 and 1997. This evidence is confirmed in the analysis of Noll and Weick (2010), which updates the existing findings and is based on the SOEP from 1990 up to 2007 and the European Social Survey. The authors provide an additional insight into the reaction of East Germans in the crucial 1990, which can be identified with a decline in subjective well-being by 0.6 on a scale of zero to ten. This observation, confirmed also in Frijters et al. (2004a), captures inevitable adjustments and echoes initial difficulties connected with the transition, e.g., from the labor market perspective. In fact, a rapid increase in unemployment among East Germans seems to have largely contributed to this decline. However, this initial discomfort appears to have promptly dissolved. Indeed, life satisfaction among East Germans continuously improved in the subsequent years. Nevertheless, the average life satisfaction in

East Germany was significantly below that of the West and has never reached the West German level in the considered period.

The gap in life satisfaction levels between East and West Germany has stimulated economists to investigate the factors this gap can be attributed to. In order to understand why convergence in life satisfaction scores might have occurred only in the first years after reunification, it is necessary to look into the determinants of life satisfaction. In fact, different developments of income and unemployment of people living in different regions could partly explain the evolution of the gaps in unconditional life satisfaction between regions. A recent study of Vatter (2012) has concentrated on the drivers of regional variation in subjective well-being within Germany. According to his analysis based on the SOEP data from 1995 to 2009, about half of the gap is due to discrepant macroeconomic conditions, such as the GDP per capita or unemployment rate, which reflect objective living conditions. The focus lies on the regional heterogeneity within Germany in terms of subjective well-being in nineteen regions, according to which smaller federal states are included in other regions, while states with the largest population are split up. In 2009, the spread in the overall life satisfaction scores is equal to approximately 1.0, whereas the highest score is registered in Hamburg (7.36) and the lowest one in Brandenburg (6.34). The estimation results of reported life satisfaction at the regional level suggest that the existing regional differences can be to a greater extent explained by unemployment, measured as ratio of unemployed persons to the total civil workforce, rather than by aggregated income in terms of real GDP per capita.

Controlling for individual characteristics life satisfaction is largely explained by income and unemployment also in the studies of Winkelmann and Winkelmann (1998) and Frijters et al. (2004b). According to the results of Noll and Weick (2010), higher levels of household income strongly increase life satisfaction, whereas being unemployed significantly reduces it. In the empirical literature consensus on the negative causal relationship between own unemployment and life satisfaction has been reached. In fact, the detrimental impact of unemployment on subjective well-being is confirmed across time and data sets and is often referred to as stylized fact (Oswald 1997; Clark et al. 2010). Being unemployed, nevertheless, has a different impact with respect to gender and age (Gerlach/Stephan 1996). Indeed, the cost of unemployment in terms of reduced life satisfaction is higher for men than women and largest for younger workers (Winkelmann/Winkelmann 1998).

Empirical studies do not find similar clear-cut impact of income on life satisfaction. In fact, no unambiguous results have so far been found concerning income. Frijters et al. (2004b)

focus their attention on East Germany. Using the SOEP data for the period 1991 to 2001 the authors conclude, that significant improvements in life satisfaction can to a great extent be explained by higher real household monthly incomes in the East, whereby the largest effects can be observed in the years immediately after reunification. Moreover, better circumstances proxied by year controls significantly contribute to higher satisfaction levels of Eastern inhabitants directly after the transition (Frijters et al. 2004b). Till the late 1990s life satisfaction in East Germany improved, notwithstanding the unemployment rate increased (Easterlin/Plagnol 2008). Easterlin and Plagnol (2008) attribute this correlation to a remarkable increase in household income in East Germany due to substantial public transfers from West Germany. According to Oswald (1997) additional income is a less important factor in explaining life satisfaction. However, more recent empirical studies in this field emphasize that higher income levels may still increase life satisfaction scores significantly, once numerous materialistic demands have been accomplished already (Clark et al. 2008). In the face of evidence supportive of the explanatory power of income, economists have no unanimous view on whether income is a good predictor of subjective well-being, and if so, which income measure should be preferred. According to Ferrer-i-Carbonell (2005) household income rather than personal income better accounts for individuals' real access to economic resources. Easterlin and Plagnol (2008) contribute to this debate from another perspective. They review the effect on life satisfaction of both relative and absolute income measures. In the context of the German reunification the authors examine annual means of life satisfaction and economic conditions in East and West Germany using the SOEP data up to 2004. They conclude that relative income, defined as the ratio of mean household income for a given group to the mean for Germany as a whole or as a response to a "satisfaction with income" question having addressed the issue of personality traits bias, explains life satisfaction better than absolute income, expressed in terms of adjusted mean household income. Moreover, it seems that income inequality within one country has a negative impact on happiness of lower-income households, attributable to higher unfairness perception and lack of trust among the individuals in the lowest 20 percent income group (Oishi et al. 2011).

Using the SOEP data for the period 1991 to 2007, van Hoorn and Maseland (2010) analyze the heterogeneity in the structure of life satisfaction in East and West Germany. In fact, variables related to work, income and education have different impacts among East and West Germans. In particular, East Germans value being a blue collar worker, a white collar worker and self-employed relative to being unemployed more positively than the West Germans. This result may be indicative of a stronger preference for working among the East Germans,

irrespective of the employment type. With respect to education, any vocational training is more appreciated than a university degree, which reflects a higher consideration of manual labor in the East than in the West. However, higher educated individuals both in the East and West benefited most from the transition (Frijters et al. 2004b). Finally, the authors find evidence of a higher level of materialism among the East than the West Germans. The positive effect of income on the overall life satisfaction is almost 60 percent higher in the East.

With respect to age, the results of Frijters et al. (2004b) suggest that younger males and females experienced larger gains in life satisfaction following reunification than the older ones. Easterlin (2009) finds evidence in favor of this result, affirming that in this context individuals aged fifty and over showed the most adverse attitude towards reunification. Apart from the standard covariates, Noll and Weick (2010) introduce additional socio-economic variables, which have a significant impact on subjective well-being. These refer to the respondents' trust in country's parliament and legal system, and their worries that income in old age will not be adequate to cover later years, which should capture people's confidence in the performance of the pension system. Interestingly, life satisfaction gap between West and East Germany reduces considerably if the above mentioned measures of confidence in welfare state institutions and trust in political and legal systems are included in the analysis. Thereby, age becomes no longer significant.

More recent studies have addressed the issue of whether the reunification process since 1990 has reached its terminal point. Our contribution to the existing literature in this field is twofold. We first analyze the most recent data available (1992-2013) in order to discover whether the convergence course has succeeded and East-West differentials can nowadays be declared negligible. Moreover, we propose a novel perspective of analyzing the German reunification process by considering birth cohort differences.

3. Data and econometric approach

We use the German Socio-Economic Panel (SOEP[2]) for the post-reunification period 1992 to 2013 (Wagner et al. 2007). The SOEP is a representative longitudinal survey of private households and comprises household as well as individual information such as household

[2] Socio-Economic Panel (SOEP), data for years 1984-2013, version 30, SOEP, 2014, doi:10.5684/soep.v30.

composition, labor market participation, income, education, health, and satisfaction levels. We start our analysis with the year 1992, because the survey questionnaires in East and West Germany are uniform for the first time in 1992 and because we want to exclude short-term adjustments in 1990 and 1991 driven by potential "honeymoon effects" directly after reunification from our analysis. Our main focus is on the differences in overall life satisfaction between individuals living in East and West Germany and its trends over the two decades. As we apply regression analyses for 22 years of panel data, our estimation sample excludes all observations with missing values in the used variables that are described subsequently.[3] The final sample consists of n=370,244 observations of N=50,180 individuals with an average panel length of T=7.38 years in an unbalanced panel design. The sample is almost equally split between men and women; for women n=192,288 and N=25,815 and for men n=177,956 and N=24,365.

Our empirical analysis is divided in two parts. First, we analyze in how far the mean raw East-West gap in life satisfaction is reduced by the inclusion of household income, individual employment status, and socio-demographic characteristics that control for differences between individuals living in East and West Germany. Second, we estimate conditional life satisfaction trends for East and West in order to analyze the development of the East-West gap in life satisfaction and to what extent convergence has been achieved. Equation (1) illustrates our basic model, in which Greek letters indicate parameters to be estimated:

$$\begin{aligned} LS = {} & \alpha + \beta_1 EAST + \beta_2 YEAR + \beta_3 EAST \times YEAR \\ & + \gamma_1 \log HHINCOME + \gamma_2 UNEMPLOYED + \gamma_3 RETIRED \\ & + \gamma_4 EDUCATION + \gamma_5 NONEMPLOYED + \delta X + \varepsilon \end{aligned} \tag{1}$$

The dependent variable *LS* measures overall life satisfaction on a 11-point Likert scale ("How satisfied are you at present with your life as a whole?"; 0: completely dissatisfied, 10: completely satisfied). Mean life satisfaction in the estimation sample is 6.98 (SD=1.78). Our main explanatory variable of interest is *EAST*, which is binary and takes the value one if an individual lives in East Germany, which is the case for 25.6 percent of our observations. We further include dummy variables for the survey years (*YEAR*) and interaction terms between living in East Germany and the survey years (*EAST*×*YEAR*) for the estimation of trends in East and West Germany. log*HHINCOME* is the log of monthly nominal net household

[3] Note that some determinants of life satisfaction have been not considered in our analysis, because the relevant variables are not available for all years.

income in Euros, which has a mean of 7.69 log points (SD=0.57). *UNEMPLOYED* is a dummy variable that takes the value one if an individual is in registered unemployment, which is the case for 6.8 percent of the observations. Note that the unemployment rate in our sample is rather low, as we do not impose an age restriction on our sample, i.e., the sample contains also non employed individuals in retirement or in education. Therefore, we also include different non-employment status variables so that the reference group includes only employed individuals. About 17 percent of the observations are in old age retirement (*RETIRED*), about 3.4 percent are in education (*EDUCATION*), and about 21.8 percent are non employed for other reasons (*NONEMPLOYED*). Furthermore, a set of socio-demographic control variables (*X*) is included in the regressions: female, kids under 16 in household, number of persons in household, age and age squared, German citizenship, secondary schooling degrees, apprenticeship degree, university degree, and marital status. In order to account for a potential bias stemming from the survey context (e.g., Chadi 2012) the control variables include also a dummy variable for being personally interviewed in the SOEP (in contrast to written or telephone survey), the years since the last SOEP interview, and the years since the first SOEP interview. A list of the variables, their mean values and standard deviations are presented in Table 1.

- *Insert Table 1 about here*

In order to estimate the life satisfaction equation, we apply OLS regressions. As the life satisfaction variable is measured on an ordinal scale, one might question if linear regressions are appropriate or if ordered Probit or Logit models might not be the better alternatives. In fact, it has been shown in many life satisfaction research papers that the cardinality or ordinality assumption is not very important (Ferrer-i-Carbonell/Frijters 2004). Of larger concern is unobserved heterogeneity that might bias the results (Ferrer-i-Carbonell/Frijters 2004). In our application we are interested in regional differences so that identification in an individual specific fixed effects model stems only from the within variation of moving between East and West. Although our sample is quite large, we can only observe 883 individuals who move from East to West or vice versa, which is however seldom the case. Additionally, location choice is not a random assignment, as a rational choice implies that individuals should only move if they gain in utility. Moreover, age and time trends are perfectly collinear in individual fixed effects models. To conclude, estimates of fixed effects models might be inefficient and inconsistent in our application so that we prefer pooled OLS regressions with clustered standard errors at the individual level. Nevertheless, we also

present the results from individual specific fixed effects OLS regressions as a robustness check. Also note that we do not claim to establish a causal effect but rather want to describe regional differences between East and West Germany conditional on important individual characteristics such as income, unemployment, family, education, and age.

4. Estimation results

4.1. Mean East-West gap in overall life satisfaction

Before we start our analysis of the East-West gap in life satisfaction and how it is affected by taking into account differences in household income, individual unemployment, and socio-demographic characteristics, let us have a look at the East-West differences in household income and registered unemployment in the estimation sample. For this purpose, we estimate pooled OLS regressions with interaction terms of East and years and further socio-demographic control variables. The estimation results are then used to predict trends of conditional log household income and conditional unemployment for an average individual in East and West in Figure 1.

- *Insert Figure 1 about here*

It can be seen from the predicted trends in Figure 1 that monthly nominal net household income is significantly lower and unemployment significantly larger for individuals living in East than in West Germany. Mean household income in East Germany was about 0.4 log points lower in 1992, about 0.3 log points lower in 1993, about 0.25 log points lower in 1994, and between 0.2 and 0.25 log points lower from 1995 to 2013.[4] Thus, convergence in household income can only be observed in the early years following the reunification and the gap remained quite stable and large since the mid-nineties. The probability to be unemployed is more than twice as large for individuals in our sample who live in East Germany. But the East-West gap in unemployment decreases since 2006, which might be related to the labor market reforms.

[4] Note that the jump in household income for East and West in the year 2002 is due to the inclusion of an additional sample with high income (>4500 Euros monthly net income) in the SOEP. The East-West gap in household income and also the subsequent results for life satisfaction remain however unaffected by the inclusion of this additional sample.

Given the significant differences in household income and registered unemployment, the question arises in how far the mean raw East-West gap in life satisfaction is reduced by the inclusion of household income, individual unemployment, and socio-demographic characteristics that control for differences between individuals living in East and West Germany. Table 2 contains five different specifications of our life satisfaction equation, which all comprise *EAST* and *YEAR* but not their interaction terms. The first specification does not take into account any other covariates and the estimated coefficient of -0.6262 can be interpreted as the mean raw East-West gap in life satisfaction, which indicates that overall life satisfaction is about 0.63 points lower in East than in West Germany. The second specification includes log*HHINCOME*, which has the expected significant positive impact on life satisfaction and reduces the East-West gap to -0.4684. The third specification includes *UNEMPLOYED*, *RETIRED*, *EDUCATION*, and *NONEMPLOYED*, which reduces the East-West gap to -0.4282. *UNEMPLOYED* has the expected significant negative impact on life satisfaction, whereas *RETIRED* and *EDUCATION* seem to be positively correlated with life satisfaction. The fourth specification takes into account further control variables (*X*) as listed in Table 1. The East-West gap slightly increases to -0.4314. In the fifth specification, we add individual specific fixed effects, which reduces the East-West gap to -0.2235. But as discussed in the previous section, the fixed effects model serves only as a robustness check which supports the tendency of lower life satisfaction in East than in West Germany. We have also re-estimated the regressions separately for men and women, which did however not reveal noteworthy gender specific differences. To sum up, the regressions indicate that only part of the raw East-West gap in life satisfaction is due to differences in household income, unemployment status and other characteristics and that a significant conditional life satisfaction gap remains. The trends of this conditional life satisfaction gap are analyzed in more detail in the next section.

- *Insert Table 2 about here*

4.2. Trends in conditional life satisfaction and East-West gap

At first, the unconditional life satisfaction trends in East and West are estimated in order to obtain a reference. For this purpose, the life satisfaction equation is estimated only with *EAST*, *YEAR* and additional interaction terms of living in East Germany and the survey years (*EAST*×*YEAR*). In the next step, all control variables are included in the regression in order to

study the trends in conditional life satisfaction and in the East-West gap. The results for the East and West trends are presented in Table 3. The first and second specifications are estimated using pooled OLS and the third specification includes additionally individual fixed effects. Due to the collinearity problem between age and the time trend, the dummy variable for the year 2013 has been dropped from the third specification. Thus, the fourth specification includes individual fixed effects and excludes the age variables. When comparing the results across the specifications, it can easily be seen that the results for the year dummies, i.e., for the general time trend, differ strongly. But the results for the East-West gaps, i.e., for *EAST* and *EAST×YEAR*, are comparable in size. The comparison between the third and the fourth specification shows only small differences in the third digit of the coefficients so that the collinearity problem in individual fixed effects models does not seem to affect the estimated East-West gaps. The comparison with the pooled OLS results in the second specification and the individual fixed effects models indicates larger gaps of approximately 0.2 life satisfaction points for pooled OLS in every year, which is comparable in size with the findings in the previous section (see Table 2). More important is however that the trends in the gaps are comparable between the specifications so that the fixed effects results support the pooled OLS results. In the subsequent discussion we focus therefore on our preferred results from the specifications using pooled OLS.

- *Insert Table 3 about here*

In order to facilitate the interpretation of the regression results, we have used the results from the first and the second specification in Table 3 to predict unconditional and conditional life satisfaction trends for an average individual living in East and West Germany in the upper and lower graphs in Figure 2. The unconditional trends serve only as reference and it can easily be seen that the conditional East-West gap is substantially smaller than the unconditional East-West gap. The subsequent discussion focuses on the conditional trends. Mean life satisfaction was more than 0.9 points lower in East than in West Germany in the year 1992. Mainly due to a decrease in life satisfaction in West Germany until 1997, the life satisfaction gap decreased to about 0.5 points and remained quite stable until 2007. From 2008 to 2013 the life satisfaction gap is only about 0.3 points. We have also re-estimated the regressions and predicted conditional life satisfaction trends separately for men and women. The trends are depicted in Figure 3 and do neither reveal noteworthy gender specific differences in the levels nor in the trends. To sum up, the conditional life satisfaction trends for the complete sample and separately for men and women show significant lower life satisfaction in East than in

West Germany. Moreover, convergence has only partly been achieved, namely directly in the years after reunification and again in the last years since 2008. One explanation for the observed lower East-West gap of about 0.3 points in the last years after a stable gap of about 0.5 points between 1997 and 2007 might be a change in the population and consequently in the composition of our sample, which is to some extent representative. As younger birth cohorts have entered the sample in more recent years, they might be responsible for the reduction in the East-West gap in life satisfaction. Therefore, we analyze cohort differences in the East-West gap and in the conditional life satisfaction trends in East and West in the next section.

- *Insert Figure 2 about here*

- *Insert Figure 3 about here*

4.3. Cohort differences

A tremendous system change such as the German reunification might affect birth cohorts differently. Even though the reunification was voluntary, at least for most people living in East Germany, many spheres of life might have been adversely affected and hopes might not have been fulfilled. For example, most people were probably surprised by the high level of persistent unemployment after reunification and the depreciation of many labor market skills. These adverse effects are likely to be larger for older individuals at the time of the reunification, who have been longer or even completely socialized in the old system and who have invested in human capital that had more value in the old than in the new system. Younger birth cohorts might however not been so deeply affected by such a system change, as they have not been socialized and did not invest in human capital in the old system.[5] In order to study cohort differences, we define four groups of birth cohorts. We have decided to use the following division in four birth cohorts based on the subsequent rationales:

(1) Cohort 1 comprises individuals born before 1945. These individuals were born before the end of World War II, have been older than 6 years in 1950, when the Federal

[5] Van Hoorn and Maseland (2010) apply a robustness check in their analysis of the determinants of life satisfaction by using a subsample of individuals born between1946 and 1971. They argue that these individuals have been socialized in either the East or the West German system so that differences in values and preferences should be most pronounced in this birth cohort.

Republic of Germany (BRD) and the German Democratic Republic (DDR) have been independent separate states for the first time, and have been older than 45 years at time of the German reunification in 1990. Thus, cohort 1 has been socialized before and during World War II as well as in the separated German states. Number of observations in the sample is n=105,810 of N=13,173 individuals.

(2) Cohort 2 comprises individuals born between 1945 and 1974. These individuals have been not older than 6 years in 1950 and older than 16 years in 1990. Thus, cohort 2 has been socialized mainly in the separated German states. More generally, cohort 2 belongs to the post-World War II and to the generation X. Number of observations in the sample is n=208,519 of N=25,770 individuals.

(3) Cohort 3 comprises individuals born between 1975 and 1984. These individuals have been between 6 and 16 years in 1990. Thus, cohort 3 has been partly socialized in the separated German states and partly in reunified Germany. Cohort 3 also belongs to the generation X. Number of observations in the sample is n=41,451 of N=6,926 individuals.

(4) Cohort 4 comprises individuals born after 1984. These individuals have been younger than 6 years in 1990 or even born after 1990. Thus, cohort 4 has been socialized in reunified Germany. Cohort 4 belongs to the generation Y. Number of observations in the sample is n=14,464 of N=4,311 individuals.

At first, we have re-estimated the pooled OLS regression with control variables for the complete sample. But instead of the interaction terms *EAST×YEAR*, we include interaction terms of the four cohorts and living in East Germany (*EAST×COHORT*). The results in Table 4 indicate a mean conditional East-West gap in life satisfaction of about 0.5 points for cohort 1 (<1945) and cohort 2 (1945-1974). The East-West gap is significantly lower for younger birth cohorts. Whereas the East-West gap for cohort 3 (1975-1984) is still 0.3 points, the gap is only 0.1 points for cohort 4 (>1984).

- *Insert Table 4 about here*

In the next step, we have re-estimated the pooled OLS regression with control variables and the interaction terms *EAST×YEAR* for each of the four groups of birth cohorts separately. Based on the regression results we predict the conditional life satisfaction trends for East and West separately for each cohort in Figure 4. It can easily be seen from the graphs that the

conditional East-West gap in life satisfaction is smaller and that convergence is much stronger for younger birth cohorts. The East-West gap remains quite stable and sizeable at around 0.5 points since the mid-nineties for cohort 1 (<1945). For cohort 2 (1945-1974) the East-West gap decreases from more than 0.5 points in the mid-nineties to about 0.2 points in recent years. For cohort 3 (1975-1984) the East-West gap decreases even more strongly from more than 0.5 points in the mid-nineties to about 0.1 to 0.2 points in recent years. Information about the youngest cohort 4 (>1984) is only available in the data since 2002, as they have been too young to participate in the SOEP before that year. These young individuals living in East Germany are on average not even 0.2 points less satisfied with their lives than their counterparts in West Germany and the gap is virtually nonexistent in some of the recent years.

- *Insert Figure 4 about here*

4.4. Robustness checks

We have performed several robustness checks to analyze the sensitivity of our results, which we summarize shortly in this section. In our regressions, we have used nominal net household income. Our results do not change noteworthy, if we use real household income or the adjusted household income variable provided by the SOEP. Unfortunately, the adjusted income variable is not available for 2012 and 2013. Moreover, the computation of real household income using the consumer price index provided by the SOEP is not unproblematic, because the CPI is separated for East and West until 2000 and not separated afterwards. Two further robustness checks are concerned with our estimation sample. In our data, Berlin is still separated in East and West. But our results do not change noteworthy, if we exclude Berlin from the sample. Moreover, our results do not change noteworthy, if we exclude individuals with non-German citizenships from the sample. A last robustness check is kind of a Placebo check for the cohort differences.[6] Instead of dividing the regions in East and West, we divide the Western German federal states without Berlin in the regions North (Schleswig-Holstein, Hamburg, Bremen, Niedersachsen, Nordrhein-Westfalen, Hessen) and South (Bayern, Baden-Württemberg, Rheinland-Pfalz, Saarland). The conditional life satisfaction levels and trends do neither differ significantly between North and South nor between the four birth cohorts. Thus, it seems unlikely that the results for the cohort

[6] We thank Joachim Wagner for suggesting this robustness check.

differences in the East-West gap and its trends, which have been presented in the previous section, are only a statistical artifact.

5. Concluding remarks

Our results indicate that part of the raw East-West gap in life satisfaction is due to differences in household income and individual unemployment status. The conditional gap remains however sizeable. As we control for important economic and socio-demographic variables at the individual and household level, the remaining conditional East-West gap might be driven by individual non-monetary and unobserved differences between people living in East and West Germany. These differences can include psychological factors related to the system change such as a loss in identity as well as values and preferences driven by socialization (van Hoorn/Maseland 2010). Noll and Weick (2010: pp. 82/83) report, for example, evidence from the European Social Survey that the East-West gap is significantly reduced after controlling for differences in worries about the retirement system and in trust in institutions such as the legal system and the parliament. Moreover, regional economic aspects such as the provision of public goods and external effects of higher unemployment rates might be responsible for the lower conditional life satisfaction in Eastern Germany.

The second part of our analysis has focused on trends in conditional life satisfaction and the evolution of the East-West gap. Our results indicate that the conditional East-West gap in life satisfaction decreased in the first years after the German reunification and remained quite stable and sizeable since the mid-nineties for the complete sample. Thus, it seems as if the lower life satisfaction in East Germany is quite persistent even 25 years after reunification and that convergence has not been achieved yet and might be achieved only very slowly in the future. This rather pessimistic outlook is however attenuated by our analysis of cohort differences, which indicate that the conditional East-West gap in life satisfaction is smaller and that convergence is much stronger for younger birth cohorts. For the youngest cohorts the gap is not even significant in recent years. Consequently, we can be more optimistic that convergence is achievable for younger birth cohorts with socialization in the reunified Germany. For older birth cohorts with socialization in the old system, i.e., in the German Democratic Republic, the gap remains however sizeable and convergence is rather unlikely. From these findings, we can indirectly conclude that the East-West gap seems rather to be driven by socialization in the old system of the German Democratic Republic than by

individual and regional economic factors, which are either controlled for in our regressions or the same for different birth cohorts living in the same region, though the cohorts might be affected differently.

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Table 1: Descriptive statistics

	Mean	SD
LS: overall life satisfaction (0: completely dissatisfied, 10: completely satisfied)	6.9774	1.7774
EAST (dummy): living in former East Germany	0.2564	0.4366
logHHINCOME: log of monthly nominal net household income in Euros	7.6931	0.5694
UNEMPLOYED (dummy): registered unemployment status	0.0681	0.2520
RETIRED (dummy): old age retirement	0.1700	0.3756
EDUCATION (dummy): in education	0.0335	0.1800
NONEMPLOYED (dummy): other reasons for non-employment	0.2177	0.4126
Control variables (*X*):		
Female (dummy)	0.5194	0.4996
Kids <16 years in household (dummy)	0.3091	0.4621
Number of persons in household	2.7605	1.2960
Age in years	47.4944	17.4113
Age squared	2558.87	1745.01
German citizenship (dummy)	0.9102	0.2860
Medium secondary schooling degree ("Realschule") (dummy)	0.2944	0.4558
High secondary schooling degree ("Abitur") (dummy)	0.1834	0.3870
Apprenticeship degree (dummy)	0.5958	0.4907
University degree (dummy)	0.2109	0.4079
Marital status (dummies)		
Married, living together	0.6039	0.4891
Married, separated	0.0165	0.1274
Single	0.2250	0.4176
Divorced	0.0684	0.2525
Widowed	0.0649	0.2463
Personnel SOEP interviewer (dummy)	0.6464	0.4781
Years since last SOEP interview	0.2836	1.3417
Years since first SOEP interview	9.7506	7.0135
Birth cohorts (dummies)		
<1945	0.2858	0.4518
1945-1974	0.5632	0.4960
1975-1984	0.1120	0.3153
>1984	0.0391	0.1938

Notes: SOEP 1992-2013. Number of observations is n=370,244. Number of individuals is N=50,180. Average panel length is T=7.38.

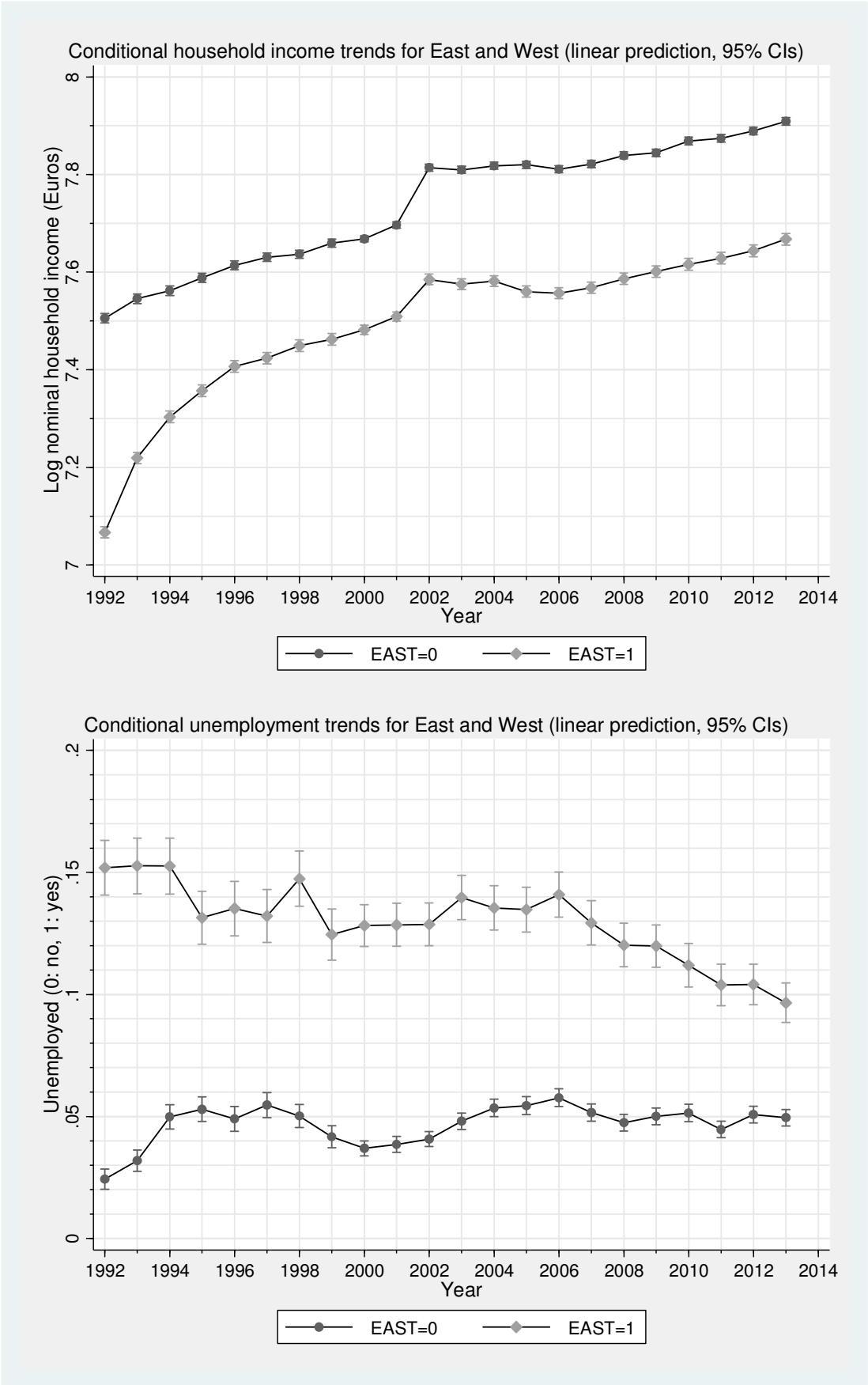

Figure 1: Conditional income and unemployment trends (pooled OLS)

Table 2: East-West gap in life satisfaction

	(1)	(2)	(3)	(4)	(5)
EAST	-0.6262***	-0.4684***	-0.4282***	-0.4314***	-0.2235***
	[0.0168]	[0.0163]	[0.0160]	[0.0165]	[0.0456]
logHHINCOME		0.7064***	0.6270***	0.6381***	0.3505***
		[0.0113]	[0.0114]	[0.0130]	[0.0119]
UNEMPLOYED			-0.8232***	-0.7884***	-0.5762***
			[0.0226]	[0.0226]	[0.0175]
RETIRED			0.0586**	0.0403	0.0360
			[0.0183]	[0.0257]	[0.0200]
EDUCATION			0.3704***	0.1597***	0.0848***
			[0.0199]	[0.0224]	[0.0213]
NONEMPLOYED			-0.0869***	-0.0598***	-0.0151
			[0.0150]	[0.0158]	[0.0119]
YEAR	Yes	Yes	Yes	Yes	Yes
Controls *X*	No	No	No	Yes	Yes
Individual fixed effects	No	No	No	No	Yes
R squared	0.0268	0.0740	0.0919	0.1126	0.0353

Notes: SOEP 1992-2013. Number of observations is n=370,244. Number of individuals is N=50,180. Average panel length is T=7.38. OLS regressions. SE clustered at individual level in brackets. Significant at * p<0.05, ** p<0.01, *** p<0.001.

Table 3: Trend in East-West gap in life satisfaction

	(1)	(2)	(3)	(4)
EAST (dummy)	-1.1436***	-0.9592***	-0.7672***	-0.7712***
EAST×YEAR (dummies)				
1993	0.1893***	0.1233***	0.1664***	0.1663***
1994	0.3097***	0.1956***	0.2752***	0.2746***
1995	0.5094***	0.3681***	0.4296***	0.4287***
1996	0.5149***	0.3482***	0.4278***	0.4232***
1997	0.5853***	0.4129***	0.5216***	0.5172***
1998	0.5547***	0.4243***	0.5250***	0.5204***
1999	0.5915***	0.4562***	0.5603***	0.5556***
2000	0.5056***	0.4634***	0.5140***	0.5097***
2001	0.5027***	0.4590***	0.5165***	0.5121***
2002	0.4803***	0.4984***	0.5314***	0.5272***
2003	0.4762***	0.4917***	0.5197***	0.5152***
2004	0.4840***	0.4914***	0.5096***	0.5049***
2005	0.5020***	0.5213***	0.5367***	0.5322***
2006	0.4893***	0.5191***	0.5319***	0.5278***
2007	0.5117***	0.5315***	0.5541***	0.5497***
2008	0.6574***	0.6777***	0.7016***	0.6973***
2009	0.6253***	0.6540***	0.6856***	0.6817***
2010	0.7002***	0.7174***	0.7647***	0.7608***
2011	0.7091***	0.7239***	0.7692***	0.7656***
2012	0.6360***	0.6620***	0.7023***	0.6984***
2013	0.7030***	0.7300***	0.7481***	0.7437***
YEAR (dummies)				
1993	-0.0938***	-0.0946***	-0.0859***	-0.0300
1994	-0.1569***	-0.1397***	-0.1578***	-0.0458
1995	-0.1919***	-0.1856***	-0.1740***	-0.0056
1996	-0.1819***	-0.1797***	-0.1395***	0.0817
1997	-0.3089***	-0.2924***	-0.2647***	0.0125
1998	-0.1670***	-0.1732***	-0.1396***	0.1939
1999	-0.1394***	-0.1545***	-0.0960***	0.2933
2000	-0.0286	-0.1786***	-0.0847***	0.3614
2001	0.0057	-0.1445***	-0.0473**	0.4541
2002	-0.0572**	-0.3059***	-0.2038***	0.3533
2003	-0.1358***	-0.3449***	-0.2353***	0.3770
2004	-0.2969***	-0.4889***	-0.3698***	0.2980
2005	-0.1626***	-0.3309***	-0.2117***	0.5117
2006	-0.2047***	-0.3735***	-0.2521***	0.5267
2007	-0.1638***	-0.3304***	-0.1970***	0.6366
2008	-0.1581***	-0.3233***	-0.1765***	0.7118
2009	-0.1664***	-0.3488***	-0.2214***	0.7215
2010	-0.0486*	-0.2255***	-0.0787***	0.9184
2011	-0.1375***	-0.3234***	-0.1510***	0.9002
2012	-0.0292	-0.2543***	-0.0720***	1.0332
2013	0.0263	-0.2115***		1.1590
logHHINCOME , UNEMPLOYED, RETIRED, EDUCATION, NONEMPLOYED	No	Yes	Yes	Yes
Controls *X* incl. age and age squared	No	Yes	Yes	No
Controls *X* without age and age squared	No	No	No	Yes
Individual fixed effects	No	No	Yes	Yes
R squared	0.0282	0.1137	0.0370	0.0367

Notes: SOEP 1992-2013. Number of observations is n=370,244. Number of individuals is N=50,180. Average panel length is T=7.38. OLS regressions. SE clustered at individual level. Coefficients significant at * p<0.05, ** p<0.01, *** p<0.001.

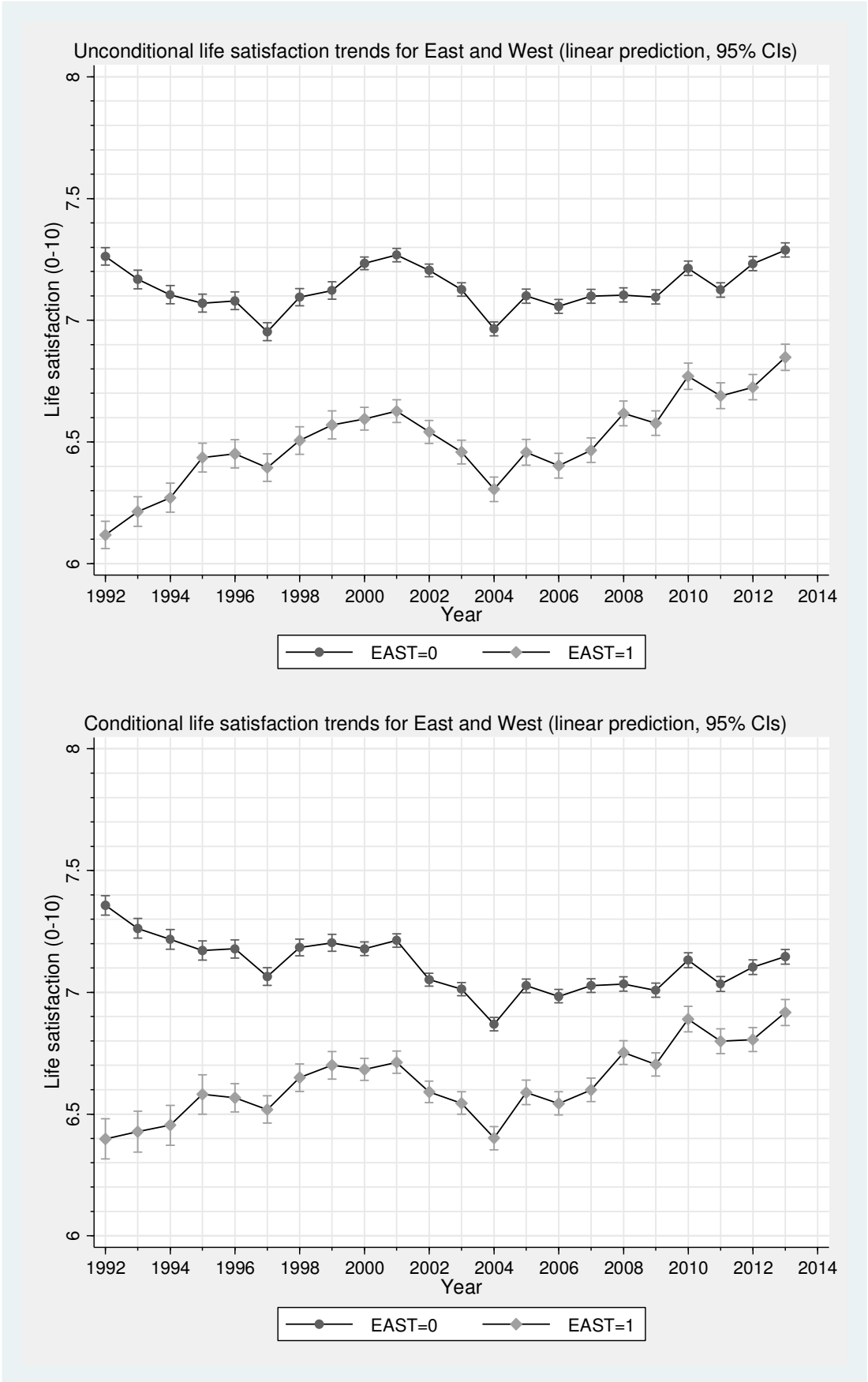

Figure 2: Unconditional and conditional life satisfaction trends (based on specifications (1) and (2) in Table 3)

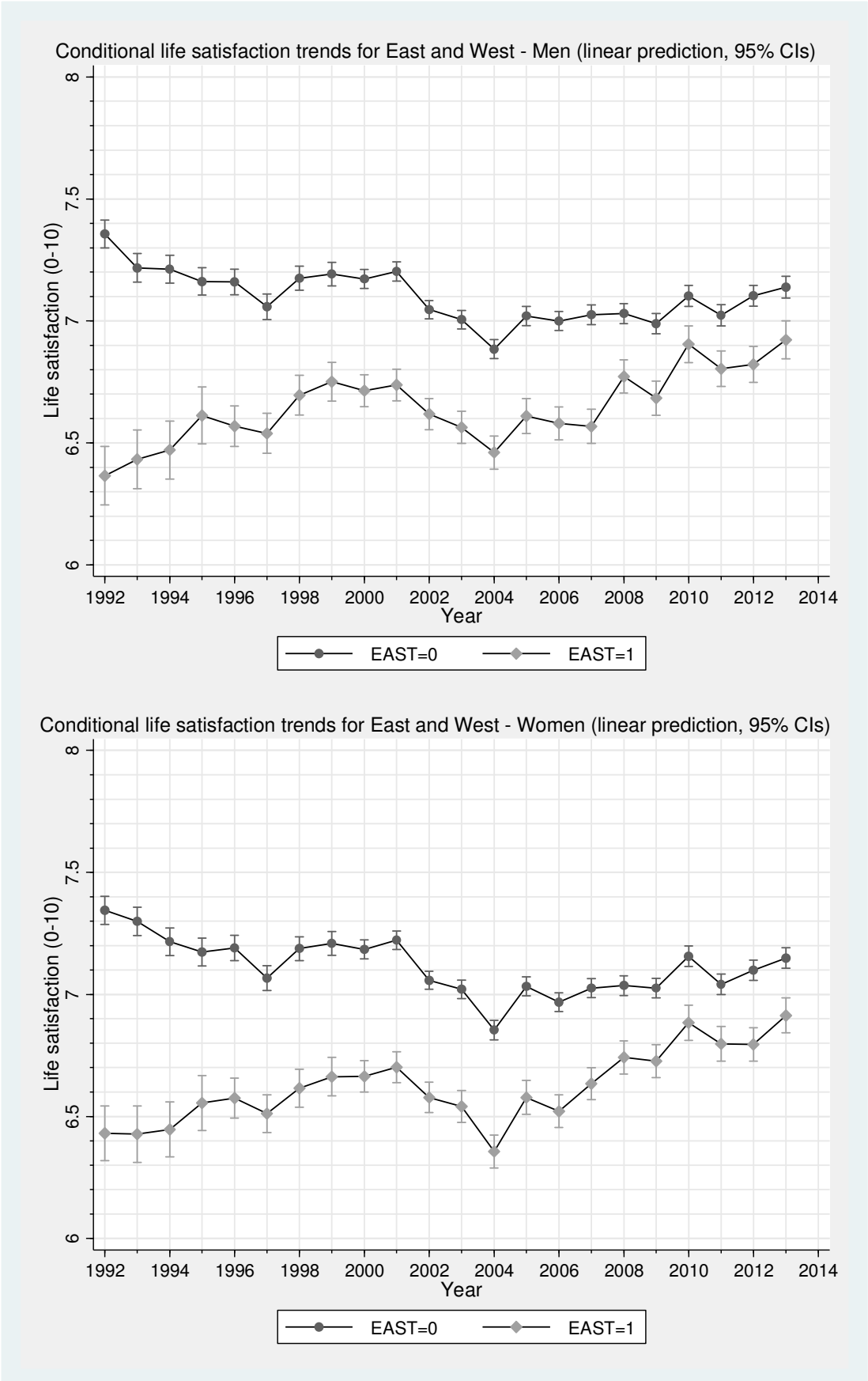

Figure 3: Conditional life satisfaction trends for men and women

Table 4: Cohort differences in the East-West gap in life satisfaction

	(1)
EAST (dummy)	-0.5033***
	[0.0310]
EAST×*COHORT* (dummies)	
1945-1974	0.0326
	[0.0376]
1975-1984	0.2054***
	[0.0452]
>1984	0.4213***
	[0.0556]
COHORT (dummies)	
1945-1974	-0.3195***
	[0.0320]
1975-1984	-0.2193***
	[0.0480]
>1984	-0.2272**
	[0.0581]
logHHINCOME , UNEMPLOYED, RETIRED, EDUCATION, NONEMPLOYED	Yes
YEAR	Yes
Controls *X*	Yes
Individual fixed effects	No
R squared	0.1155

Notes: SOEP 1992-2013. Number of observations is n=370,244. Number of individuals is N=50,180. Average panel length is T=7.38. OLS regressions. SE clustered at individual level in brackets. Significant at * p<0.05, ** p<0.01, *** p<0.001.

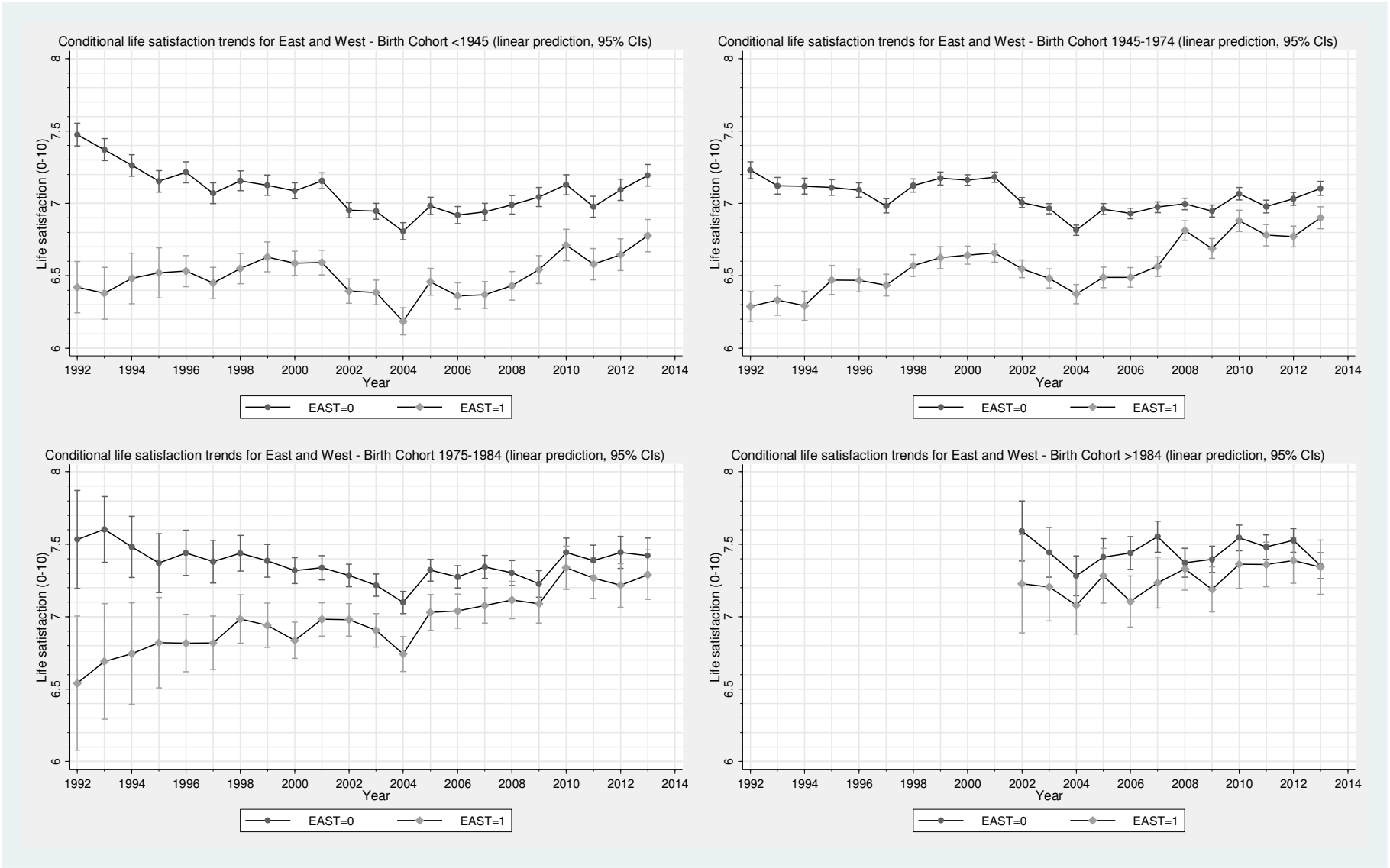

Figure 4: Conditional life satisfaction trends for birth cohorts

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