

# VALUING THE BENEFITS OF REUNIFICATION FOR EAST GERMANS: AN INVESTIGATION OF CHANGES IN LIFE SATISFACTION

Paul Frijters <sup>1</sup>, John P. Haisken-DeNew <sup>2</sup> and Michael A. Shields <sup>3</sup>

<sup>1</sup> *RSSS, Australian National University, Australia*

<sup>2</sup> *RWI Essen, DIW Berlin, IZA Bonn, Germany*

<sup>3</sup> *Department of Economics, University of Melbourne, Australia*

## Abstract

Recent years have seen a considerable increase in the number of economists researching the role of income, employment status and other demographic characteristics in determining individual life satisfaction or happiness. In this paper we investigate how life satisfaction is affected by a large exogenous shock, namely, reunification for East Germans. In particular, we identify the effects of the substantial increase in real household income and increased unemployment. We implement a new fixed-effect estimator for ordinal life satisfaction in the German Socio-Economic Panel and develop a decomposition approach that accounts for new entrants and panel attrition. We find that average life satisfaction in East Germany increased by around 20% in the years following reunification, leading to a clear convergence with West Germany. Importantly, increased real household incomes in East Germany accounted for around 35-40% of this increase.

Keywords: Life Satisfaction, German Reunification, Fixed-Effects Panel Models, Causal Decomposition, Income

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Corresponding author: Michael A. Shields, Department of Economics, University of Melbourne, Parkville, Melbourne, Australia 3010. E-mail: [mshields@unimelb.edu.au](mailto:mshields@unimelb.edu.au); Fax: +61 3 8344 6899. We would like to thank David Fielding and Gert G. Wagner for useful comments.

## 1. Introduction

One of the most prominent political and economic events of recent decades was the falling of the Berlin Wall on November 9, 1989 which was quickly followed by the reunification of the formerly separate entities of East and West Germany. It is well acknowledged that the falling of the wall was a completely unanticipated event in Germany (Bach and Trabold, 2000), thus it provides a useful exogenous shock or natural experiment with which we can establish more firmly causality in empirical analyses. In this paper we aim to contribute to the growing economics literature on the determinants of life satisfaction (or happiness) by investigating how life satisfaction in East Germany changed over the decade following reunification.<sup>1</sup> We are particularly interested in identifying the contribution that the substantial increase in real household income in East Germany in the post-reunification years (i.e. over 60%, between 1990 and 2001) made to reported levels of life satisfaction.

In order to achieve this aim, we apply a new conditional fixed-effect ordinal estimator to our ordinal measure of life satisfaction using data from the German Socio-Economic Panel (GSOEP). The estimates from this new model are then decomposed, using a new causal technique, in order to identify the factors that drove the average changes in life satisfaction in East Germany following reunification. Our methodology exploits the fact that the GSOEP is an evolving panel, allowing us to make a distinction between changes in variables affecting everyone and changes in the aggregate unobserved fixed individual characteristics of the panel due to new entrants (who are also mostly younger cohorts), and panel attrition.

In Section 2 we briefly review the literature and describe our data. In Section 3 we present the fixed-effect methodology and the causal decomposition approach that we adopt. Section 4 presents the results. Section 5 concludes.

## 2. Literature and data

### *(i) Literature*

The investigation of the factors affecting human life satisfaction or happiness is central to the discipline of psychology, but economists have become increasingly active in this field in recent years.<sup>2</sup> In particular economists have been interested in establishing the relationships between

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<sup>1</sup> A detailed investigation of changes in life satisfaction for West Germans can be found in Frijters et al. (2002).

<sup>2</sup> For informative reviews and recent contributions (but not an exhaustive list), see Clark and Oswald, 1994; Clark *et al.*, 1996; Gerlach and Stephan, 1996; Gerdtham and Johannesson, 1997; Korpi, 1997; Oswald, 1997; Theodossiou, 1998; Winkelmann and Winkelmann, 1998; Kahneman et al., 1999; Frey and Stutzer, 2000; Frijters, 2000; Bertrand and Mullainathan, 2001; Clark *et al.*, 2001; Di Tella *et al.*, 2001; McBride, 2001; Ravallion and Lokshin, 2001; Clark, 2002; Easterlin, 2002; Frey and Stutzer, 2002; Shields and Wailoo, 2002; Frijters *et al.*, 2002; Di Tella *et al.*, 2003).

income, unemployment and life satisfaction. Whilst there is a firm consensus based on both cross-sectional and longitudinal data that unemployment leads to a substantial loss of life satisfaction regardless of the exact definition of life satisfaction, the relationship between income and satisfaction is less clear. Perhaps the most widely accepted viewpoint is that income does matter, but not very much (Oswald, 1997; Diener and Oishi, 2000; Frey and Stutzer, 2002). This has led to interest in the role of relative rather than absolute income in determining life satisfaction (e.g. Clark and Oswald, 1996; McBride, 2001), and the relationship between income and life expectations (Easterlin, 2002). An additional result from both psychology and the recent economics literature that is highly relevant to this paper is the strong presence of individual heterogeneity, especially unobserved personality traits (Kahneman *et al.*, 1999). This makes it important to use econometric models that take account of fixed individual traits. The other variables economists minimally include in their models are age, marital status, children and health variables. Most studies have found a U-shaped relationship between age and life satisfaction, with satisfaction being lowest in the 30's and 40's. Marriage is often (but not always) found to be positively associated with higher life satisfaction, whilst the converse is true for poor health. There is no consistent finding for the effect of children on life satisfaction.

## *(ii) Data*

To examine the impact of reunification and socio-economic characteristics on the life satisfaction of East German residents, we use data from the German Socio-Economic Panel (GSOEP). The GSOEP is a nationally representative panel that has closely followed around 13,500 West Germans each year since 1984. Following reunification, the panel was extended to include residents of the former East Germany.<sup>3</sup> In this paper we focus on males and females, aged 21-64, who resided in East Germany, whom we follow from 1991-2001.<sup>4</sup> However, sample attrition is a notable problem in a panel of this length, with only around 35% of respondents observed in all eleven waves in the East German sample. The average length in the panel is 5.4 years. Consequently the GSOEP is an evolving panel that automatically incorporates new members into the panel each wave to maintain the size and representativeness of the data. We allow for possible biases due to the differing unobservable characteristics (e.g. personality traits) of new entrants and exits in our decomposition methodology. This methodology is outlined in the following section.

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<sup>3</sup> In this paper we use the German version of the GSOEP data (See Haisken-DeNew and Frick, 2000 for details), although the same analysis can be conducted with the international 'scientific use' version, albeit with around 5% fewer observations.

<sup>4</sup> We do not use the 1990 wave of the data since household income was still measured in East German Marks, and we do not have an exchange rate (which changed almost daily) to make household income in that year comparable with later years. An investigation into life satisfaction in West Germany following reunification can be found in Frijters *et al.* (2000).

The central variable in our analysis is a measure of life satisfaction derived from the following question posed to respondents in each wave of the GSOEP: ‘How satisfied are you at present with your life, all things considered?’ The responses run from 0 (completely dissatisfied) to 10 (completely satisfied).

Figure 1 highlights the changes in aggregate life satisfaction for East and West Germans between 1990 and 2001. We also provide the corresponding profile for West Germans. It is clear that average life satisfaction in East Germany increased considerably following reunification, whilst West Germans experienced a fall in life satisfaction between 1990 and 1997, which was somewhat offset by improvements in the later years. To illustrate the changing distribution of life satisfaction in East Germany, Table 1 provides the distributions for 1991 and 2001. The main change is the increase in the percentage of respondents reporting satisfaction scores of 7 and 8, and a decline in those reporting scores between 1 and 5. There appears to be little change in the percentage reporting scores of 9 or above over this period.

### 3. Econometric Framework and Decomposition Approach

#### (ii) Fixed-Effects

The recent psychology literature has found that fixed personality traits are very important predictors of general satisfaction (see, for example, Argyle, 1999 and Diener *et al.*, 1999). Lacking these variables, we use the following fixed-effect ordered logit model developed in Ferrer and Frijters (2001) in order to correct for the presence of such unobservables:<sup>5</sup>

$$GS_{it}^* = x_{i,t}\beta + \delta_t + f_i + \varepsilon_{it} \quad (1)$$

$$GS_{it} = k \Leftrightarrow GS_{it}^* \in [\lambda_k, \lambda_{k+1})$$

where  $GS_{it}^*$  is latent life satisfaction;  $GS_{it}$  is observed satisfaction;  $\lambda_k$  is the cut-off point (increasing in  $k$ ) for the satisfaction answers;  $x_{it}$  is observable time-varying characteristics;  $\delta_t$  denotes unobserved time-varying general circumstances;  $f_i$  is an individual fixed characteristic; and  $\varepsilon_{it}$  is a time-varying logit-distributed error-term that is orthogonal to all characteristics. Our conditional estimator for  $\delta_t$  and  $\beta$  maximizes the following conditional likelihood:

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<sup>5</sup> Most of the studies that have used panel data to examine the determinants of life satisfaction have tested the appropriateness of the random effects versus fixed-effects specifications. In each case the random-effects model, based on the assumption that the unobservable individual effect (e.g. personality traits) is uncorrelated with the explanatory variables, is clearly rejected. Our own test results support this finding, thus we only report results for the fixed-effects specification in this paper.

$$\begin{aligned}
& L[I(GS_{i1} > k_i), \dots, I(GS_{iT} > k_i) | \sum_t I(GS_{it} > k_i) = c] \\
& = \frac{e^{\sum_{t=1}^T I(GS_{it} > k_i) x_{it} \beta}}{\sum_{GS \in S(k_i, c)} e^{\sum_{t=1}^T I(GS_{it} > k_i) x_{it} \beta}}
\end{aligned} \tag{2}$$

which is the likelihood of observing which of the  $T$  satisfactions of the same individual are above  $k_i$ , given that there are  $c$  out of the  $T$  satisfactions that are above  $k_i$ . Here,  $S(k_i, c)$  denotes the set of all possible combinations of  $\{GS_{i1}, \dots, GS_{iT}\}$  such that  $\sum_t I(GS_{it} > k_i) = c$ . Also,  $GS_{it}$  is used to denote the random variable and  $GS_{it}$  the realisation.

This model is an extension of the fixed-effect logit model by Chamberlain (1980). Unlike the Chamberlain methodology, which imposes a common threshold for everyone (say,  $k$ ), our model uses person-specific thresholds (say,  $k_i$ ). When some individuals only report values between 4 and 6, and others only between 7 and 9, then using the same barrier for everyone cannot record changes for both groups of individuals. Some individuals then have to be dropped from the estimation procedure. With individual specific barriers all individuals whose satisfactions differ over time can be included. The most important advantage is that this allows us to use more than 90% of the observations. In comparison, the loss of data in applications with the Chamberlain method is usually close to 50% (see, for example, Winkelman and Winkelman, 1998; Hamermesh, 2001; Clark *et al.*, 2001).

### *(ii) Explanatory Variables*

Following the previous literature we include the most commonly used observable time-varying predictors of life satisfaction, which are marital status, number of children, health, employment status and real household (monthly) income (in 1995 prices). Our measure of health is less subjective than most, and is based on whether or not the individual is registered as being disabled and the extent of their disability (which is measured in percentage terms). In addition, given the 'caring' responsibilities that many of the sample respondents report we also control for whether there is an invalid in the household (usually the spouse or a parent). We have also been able to derive a 'Border' variable equalling unity if the respondent lives on the border of East and West Germany (zero otherwise). The latter variable is included because we might expect the immediate impact of reunification on life satisfaction to affect those living on the border more. In order to capture changes in aggregate circumstances we also include dummy variables for each year. Since

we cannot simultaneously identify the effects of ageing and time with our panel data, the ageing of the panel complicates the interpretation of the time dummies. We will discuss this in more detail in the results section. We fit separate models for males and females to allow the determinants of life satisfaction to differ by gender.

(iii) *Causal Decomposition Analysis*

We decompose changes in expected latent satisfaction for East German men and women separately in the post-reunification period using the estimates from the fixed-effects models. This means we analyse:

$$E\{\widehat{GS_{e,t+1}^*} - \widehat{GS_{e,t}^*}\} = (\bar{x}_{e,t+1} - \bar{x}_{e,t})\widehat{\beta} + (\widehat{\delta_{t+1}} - \widehat{\delta_t}) + (E_{e,t+1}f - E_{e,t}f) \quad (3)$$

Denote the set of East Germans who are in the sample at time  $t$  and at time  $t+1$  as  $S_t^e$ . For the individuals in  $S_t^e$  (the balanced panel), this decomposition is straightforward, because for them  $(E_{e,t+1}f - E_{e,t}f) = 0$ . A complicating factor arises when we consider the importance of those individuals whom are only observed in either  $t$  or  $t+1$ , i.e. the inflows and outflows of the GSOEP. For them  $(\bar{x}_{e,t+1} - \bar{x}_{e,t})\widehat{\beta} + (\widehat{\delta_{t+1}} - \widehat{\delta_t})$  is still easily computed, but the unknown component  $(E_{e,t+1}f - E_{e,t}f)$  poses a problem. This term is only 0 when the distribution of the unknown characteristics is constant over time. This is clearly very improbable because, for instance, education levels and expectations will differ. From the fixed-effect ordered logit results alone, there is no information on  $(E_{e,t+1}f - E_{e,t}f)$ . So we have to use extra information in order to get an estimate of this term.

In order to get an estimate of  $(E_{e,t+1}f - E_{e,t}f)$ , we make the following assumption:

$$E\{GS(GS^* + \Delta) - GS(GS^*)\} = \Delta\mu + \sigma(\Delta) \quad (4)$$

This assumption implies that the change in observed satisfaction is (by approximation) linear in the change in latent satisfaction. The responsiveness itself,  $\mu$ , is taken to be constant over time. This first-order approximation can now be used, by noting that we can estimate  $\mu$  by calculating, for those individuals whom we observe in all time-periods, what the response is of the observed satisfaction levels to the estimated changes in latent satisfaction. A consistent estimator for  $\mu$  is therefore:

$$\hat{\mu} = \frac{\sum_t \sum_{S_t} (GS_{t+1} - GS_t)}{\sum_t \sum_{S_t} (x_{t+1} - x_t) \hat{\beta}} \quad (5)$$

where we have dropped the subscript  $e$ .

Having this estimate of  $\mu$ , we can now use (5) to get a consistent estimator of  $(E_{e,t+1}f - E_{e,t}f)$ :

$$\overline{(E_{e,t+1}f - E_{e,t}f)} = \frac{\overline{GS_{t+1}} - \overline{GS_t}}{\hat{\mu}} - (\bar{x}_{t+1} - \bar{x}_t) \hat{\beta} \quad (6)$$

This captures the degree of changes in the sample composition over time. In order to provide additional insight in the factors affecting life satisfaction we further decompose  $(x_{t+1} - x_t)\beta$  into separate groups of variables. In particular, we decompose the total changes in latent satisfaction into changes in:

1. Household Income.
2. Employment status variables: having been fired, employed, non-participation, part-time employed, on parental leave.
3. Family related variables: the number of children, birth, marital status, divorced, separated.
4. Health related variables: whether someone is disabled and the level of disability, invalid in household.
5. Living in a region on the border.
6. Time (which also includes the effects of ageing).
7. The unobserved individual effects distribution.

It is possible to attach a causal explanation to the changes due to groups 1 to 5. Given the changes in characteristics, they explain a part of the changes in latent satisfaction levels. The changes due to groups 6 and 7 are not explained by anything observed and hence form the ‘true’ unexplained part of the changes over time. The larger these terms, the less well our variables capture the important aspects of the changes over time.

We can construct confidence intervals for most elements in the decomposition by noting that, because  $\hat{\beta} \sim N(\beta, \Sigma)$ , it holds that  $(\bar{x}_{t+1} - \bar{x}_t) \hat{\beta} \sim N(\beta, (\bar{x}_{t+1} - \bar{x}_t) \Sigma (\bar{x}_{t+1} - \bar{x}_t)')$ . When we replace  $\Sigma$

with its Maximum Likelihood estimate, this yields confidence intervals. Since the term  $\frac{\overline{GS}_{t+1} - \overline{GS}_t}{\hat{\mu}}$  in the formula  $\overline{(E_{e,t+1}f - E_{e,t}f)}$  is not well behaved (i.e. there is no a priori reason for it to have a bounded mean or variance), we cannot use standard inference or bootstrapping methods to compute confidence bands for  $\overline{(E_{e,t+1}f - E_{e,t}f)}$ . So what we report is whether  $\overline{(E_{e,t+1}f - E_{e,t}f)}$  contains 0 in the set of values when each of the stochastic elements in  $\overline{(E_{e,t+1}f - E_{e,t}f)}$  can range in its 95% confidence interval.

#### 4. Empirical Results

##### (i) Fixed-Effects Results

Table 2 provides the causal estimates from the Ordered Logit model with fixed effects for East German males and females, respectively. Unfortunately, the fixed-effects model does not provide estimates of the probabilities of having a particular level of life satisfaction, so it has no Marginal Effects (ME) proper. By approximation, however, an increase of 1 in a variable with coefficient  $\beta$  has an effect of  $\hat{\mu}\beta$  on *expected* life satisfaction.

We find that both employment status and real household income are important predictors of life satisfaction for East Germans. A one unit increase in log income leads to around a 0.5 increase in life satisfaction for both men and women. This large effect concurs with the economists' intuition that money must surely matter a lot, even though many other studies find only small effects (see Oswald, 1997). Similarly, being employed, either full or part-time, leads to a substantial satisfaction gain for both genders. In fact being a non-participant, even for males, is associated with far higher satisfaction than unemployment. These effects are large, with full-time employment, leading to a 0.451 (0.704\*0.641) increase in satisfaction for males and a 0.574 (0.751\*0.764) increase for females. It is therefore clear that it is not the most unobservably 'unhappy' or 'pessimistic' who were observed in unemployment, which firmly points to the involuntary nature of unemployment for both sexes (Clark and Oswald, 1994).

As to marriage, divorce, separation and widowhood, it is important to keep in mind that the reference group is someone who has never been married. Having been married is hence clearly favoured above never being married for males, but not such effect is found for females. In contrast to our expectations, we find no evidence that becoming separated or divorced cause a loss in satisfaction for East Germans. For both males and females, children have a positive effect on life satisfaction. Interestingly, the gain in satisfaction of having an additional child is greater for men (0.071) than for women (0.051).



Both having a disability and the extent of disability are negatively associated with life satisfaction. However, these effects are not precisely determined, with the level of disability for males being the only variable to be statistically significant. In contrast, having an invalid in the household (other than oneself) leads to a substantial loss in life satisfaction, which is much greater for females (0.456) than males (0.199). This reflects the fact that females typically carry much of the caring responsibility for an invalid spouse or parent.

Turning to the reunification variables, we find that living on the border of East and West Germany is associated with a large loss of life satisfaction for males (0.367), but not for females. This is a difficult result to explain, as our expectation was that living on the border would be satisfaction enhancing given the close proximity to many of the 'better' public amenities in the West (especially in the first few years following reunification). Perhaps the reason for this result is precisely because East Germans near the border are more influenced by unfavourable comparisons with the West Germans than that the other East Germans are.

The time profiles tell an interesting story. For both males and females there was a clear improvement in aggregate circumstances over the decade. Life satisfaction, however, peaked in 1999, with satisfaction being 0.340 and 0.404 higher for men and females, respectively, than in 1991. Examples of such improved circumstances are greater personal freedom and mobility, and better housing and public services. However, as noted earlier, given the panel nature of our data we cannot disentangle the effects of ageing in the panel from the time effects. Whilst many studies using cross-sectional or random-effects models have found a U-shaped relationship between age and life satisfaction, the marginal effect of an additional year of age at any point in the age distribution is typically very small. Thus we would argue that the ageing of the panel is not the main component of the time effects.

#### *(ii) Decomposition Results*

The results from our decomposition experiments for East German males and females are provided in Tables 3 and 4, respectively.

Beginning with females, we see that in the five years after transition (Total Change, 1991-1996) average latent life satisfaction increased by 0.567. Higher real household income accounted for about two-fifth (0.255) of this increase, with unobserved aggregate variables accounting for the lion share of the rest (0.289). Real household income increases were from DM 2,662 to DM 3,751 (41%) per month in this period (in 1995 prices). These gains were somewhat offset by negative changes in job status (the unemployment rate increased for females from 10.4% in 1991 to 16.8% by 1996). Family circumstances and health circumstances seem on average to have become somewhat worse over the entire period, but their total effects are small compared to income and job

effects. The findings on the unobserved component suggest that the new entrants into the panel (who were typically younger) were structurally happier than the older female cohorts. A possible explanation is that younger females might have had less human capital (sunk cost) written-off in the reunification process and were more flexible, thus able to gain from reunification.

The decomposition results differ considerably for the later years following reunification. Although average latent life satisfaction increased by 0.177 between 1996 and 2001, this can mostly be attributed to the higher aggregate unobserved variables: the general change in life satisfaction captured by the year variables was only slightly lower than in the previous 5 years (0.167), suggesting that the general living environment (e.g. political and social, since we capture economic changes through the income and job variables) for East German females still improved after 1996. There were additional small negative effects of job factors, and family effects.

Turning to East German males, we find that average latent life satisfaction in East Germany rose by 0.689 over the period 1991 to 2001. About one third of this is captured by increases in real income (0.276), which entirely occurred between 1991 and 1996. General circumstances, captured by the year variables, clearly improved by 0.288, however, once again this occurred in the first few years following reunification. The contribution of the combined effect of new entrants and exits from the panel was to increase unobserved individual effects steadily throughout this period by a cumulative 0.265. Apart from these main effects, we find a small fall attributable to worsening job outcomes (unemployment rose for men from 7.1% in 1991 to 12.2% by 2001). Family circumstances also slightly deteriorated in this period, with the health and border variables contributing little to the aggregate changes.

The main conclusions from the decomposition analyses are that higher real household incomes following reunification led to significant gains in satisfaction levels for East Germany. The largest effects, however, were clearly seen in the immediate post-reunification years.

## **6. Conclusion**

Recent years have seen a growth of interest by economists in the determinants of life satisfaction and happiness. In this paper we contribute to this literature by investigating how life satisfaction changed as a result of a large-scale exogenous shock – German reunification. In particular we are interested in establishing the role of increased real household income in improving life satisfaction. Life satisfaction in East Germany was significantly below that of West Germany throughout the decade following reunification. However, there was clear convergence resulting from a continual increase in life satisfaction in East Germany up until 1999.

We implemented a new fixed-effect estimator for ordinal life satisfaction in the German Socio-Economic Panel (1991-2001) and developed a decomposition approach which accounts for the

differing unobservable characteristics of new entrant and exits from the panel. As with previous studies for other countries, we find that income and employment status are very important predictors of life satisfaction. Importantly, our decomposition results suggest that around 35-40% of the increase in life satisfaction in East Germany was attributable to the large increase in real household incomes. There are also clear improvements in aggregate circumstances, such as improved personal freedom and public services. Finally, our results clearly emphasise the importance of controlling for changes in the fixed-effect distribution when using an unbalanced panel (with new entrants and attrition) data for econometric analysis. Failure to control for such effects would have led us to over-estimate the role that exogenous income changes had on improving life satisfaction. Our future research aims to further detangle the improvement in aggregate circumstances by using disaggregated regional data on housing and public services.

## References

- Argyle, M. (1999). Causes and correlates of happiness. In Kahneman, D., Diener, E. and Schwarz N. (eds.), *Foundations of Hedonic Psychology: Scientific Perspectives on Enjoyment and Suffering*. Russell Sage Foundation.
- Bach, S., Trabold, H. (2000). Ten years after German monetary, economic and social union: An introduction. *Quarterly Journal of Economic Research*, 2, 149-151.
- Bertrand, M., Mullainthan, S. (2001). Do people mean what they say? Implications for subjective survey data. *American Economic Review*, Papers and Proceedings, 91, 67-72.
- Chamberlain, G. (1980). Analysis of covariance with qualitative data. *Review of Economic Studies*, 47, 225-38.
- Clark, A. (2002). Unemployment as a social norm: Psychological evidence from panel data. *Journal of Labor Economics*, forthcoming.
- Clark, A., Georgellis, Y., Sanfey, P. (2001). Scarring: the psychological impact of past unemployment. *Economica*, 68, 221-241.
- Clark, A., Oswald, A. (1994). Unhappiness and unemployment. *Economic Journal*, 104, 648-59.
- Clark, A., Oswald, A., Warr, P. (1996). Is job satisfaction U-shaped in age? *Journal of Occupational and Organizational Psychology*, 69, 57-81.
- Diener, E., Lucas, R. (1999). Personality and subjective wellbeing. In Kahneman, D., Diener, E., Schwarz, N. (Eds), *Foundations of Hedonic Psychology: Scientific Perspectives on Enjoyment and Suffering*, New York: Russel Sage Foundation.
- Diener, E., Oishi, S. (2000). Money and happiness: Income and subjective wellbeing across nations, in: Diener, E., Eunkook, S. (Eds.), *Culture and Subjective Wellbeing*. The MIT Press, Cambridge, MA.
- Di Tella, R., MacCulloch, R. and Oswald, A. (2001). Preferences over inflation and unemployment: Evidence from surveys of happiness. *American Economic Review*, 91, 335-341.
- Di Tella, R., MacCulloch, R. and Oswald, A. (2003). The macroeconomics of happiness. *Review of Economics and Statistics*, forthcoming.
- Easterlin, R. (2001). Income and happiness: A unified theory. *Economic Journal*. 111, 1-20.
- Ferrer-i-Carbonel, A., Frijters, P. (2001). The effect of methodology on the determinants of happiness. Mimeo, Free University, Amsterdam.
- Frey, B., Stutzer, A. (2000). Happiness, economy and institutions. *Economic Journal*, 110, 918-938.
- Frey, B. and Stutzer, A. (2002). What can economists learn from happiness research? *Journal of Economic Literature*, XL, 402-435.
- Frijters, P. (2000). Do individuals try to maximize general satisfaction? *Journal of Economic Psychology*, 21, 281-304.

- Frijters, P., Haiken De-New, J. and Shields, M. (2002). The value of reunification in Germany: An analysis of changes in life satisfaction. IZA Working Paper no. 419, Bonn.
- Gerdtham, U., Johannesson, M. (1997). The relationship between happiness, health and socio-economic factors: results based on Swedish micro data. Working Paper in Economics and Finance, no. 207, Stockholm School of Economics.
- Gerlach, K., Stephan, G. (1996). A paper on unhappiness and unemployment in Germany. *Economics Letters*, 52, 325-330.
- Haiken-DeNew, J. and Frick, J. (2000). Desktop companion to the German Socio-Economic Panel Study (GSOEP). German Institute for Economic Research: Berlin.
- Hamermesh, D. (2001) The changing distribution of job satisfaction. *Journal of Human Resources*, 36, 1-30.
- Kahneman, D., Diener, E., Schwarz, N. (1999, Eds), *Foundations of Hedonic Psychology: Scientific Perspectives on Enjoyment and Suffering*. New York: Russel Sage Foundation.
- Korpi, Y. (1997). Is utility related to employment status? Employment, unemployment, labour market policies and subjective wellbeing among Swedish youth. *Labour Economics*, 4, 125-47.
- McBride, M. (2001). Relative-income effects on subjective wellbeing in the cross-section. *Journal Of Economic Behaviour And Organization*, 45, 251-278.
- Oswald, A. (1997). Happiness and economic performance. *Economic Journal*, 107, 1815-1831.
- Ravallion, M. and Loskin, M. (2001). Identifying welfare effects from subjective questions. *Economica*, 68, 335-357.
- Shields, M. and Wailoo, A. (2002). Exploring the determinants of unhappiness for ethnic minority men in Britain. *Scottish Journal of Political Economy*, 49, 445-466.
- Theodossiou, I. (1998). The effects of low-pay and unemployment on psychological wellbeing: A logistic regression approach. *Journal of Health Economics*, 17, 85-104.
- Winkelmann, L., Winkelmann, R. (1998). Why are the unemployed so unhappy? Evidence from panel data. *Economica*, 65, 1-17.

FIGURE 1: Average Life Satisfaction for East and West Germans, 1991-2001

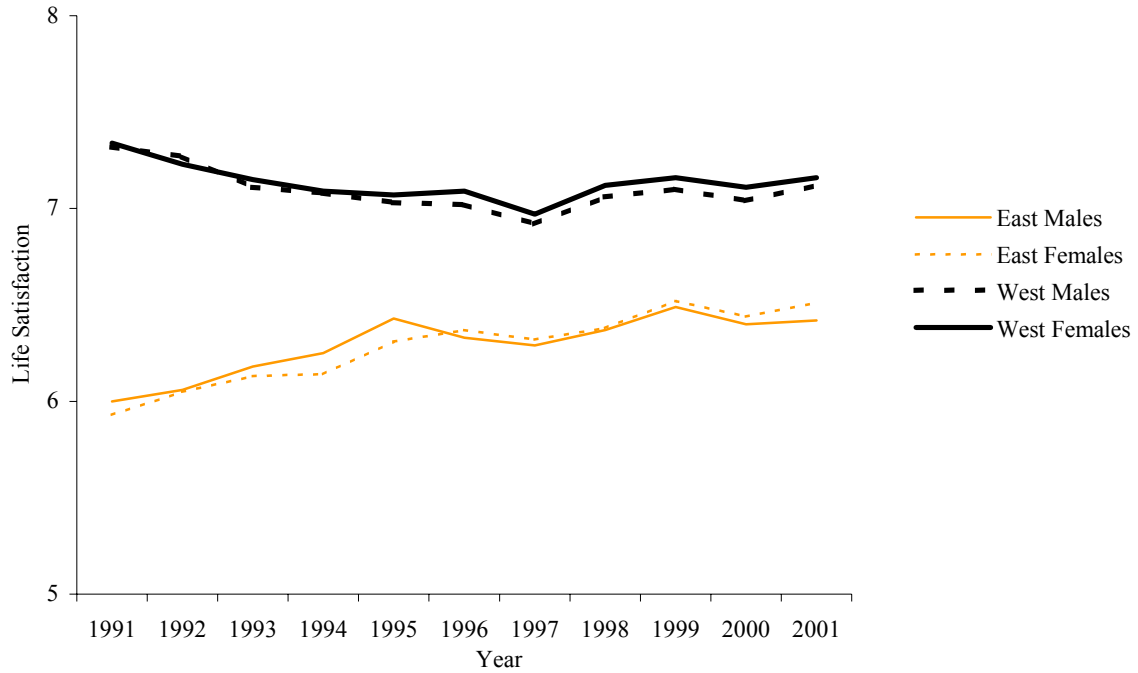


TABLE 1: The Distribution of Life Satisfaction in East Germany by Gender, 1991 and 2001

Percentage	1991		2001	
	Males	Females	Males	Females
10 (very satisfied)	1.5 (0.32)	1.6 (0.30)	1.0 (0.28)	1.5 (0.34)
9	3.7 (0.48)	4.2 (0.50)	3.5 (0.53)	4.8 (0.60)
8	18.7 (0.10)	17.6 (0.96)	25.4 (1.25)	25.3 (1.2)
7	21.8 (1.07)	19.3 (0.99)	27.3 (1.28)	27.0 (1.3)
6	14.1 (0.90)	14.4 (0.88)	15.7 (1.05)	12.5 (0.93)
5	22.4 (1.08)	25.2 (1.11)	15.0 (1.03)	18.3 (1.09)
4	7.3 (0.67)	6.5 (0.63)	5.4 (0.65)	5.5 (0.64)
3	6.1 (0.62)	6.5 (0.62)	4.5 (0.60)	3.1 (0.49)
2	2.5 (0.40)	2.5 (0.39)	0.7 (0.25)	1.1 (0.29)
1	0.7 (0.22)	0.8 (0.22)	1.0 (0.28)	0.8 (0.25)
0 (very unsatisfied)	1.2 (0.28)	1.5 (0.30)	0.5 (0.20)	0.1 (0.10)
Mean	6.00	5.93	6.42	6.51
Observations	1504	1582	1211	1262

Notes: Standard errors of mean values are in parentheses. The mean values for 2001 are significant higher than for 1991 for both males and females.

TABLE 2: The Determinants of Life Satisfaction for East German Males and Females:  
Ordered Logit Models with Fixed-Effects

	Males		Females	
Covariates	$\beta$	<i>t</i> -stat	$\beta$	<i>t</i> -stat
Married	0.271	1.98	-0.038	0.27
Separated	0.069	0.29	0.134	0.64
Divorced	0.306	1.46	0.209	1.14
Widowed	0.464	1.49	0.192	0.81
Number of children	0.110	2.76	0.067	1.64
Disabled	-0.260	0.98	-0.009	0.04
Level of disability	-0.009	1.92	-0.003	0.72
Invalid in household	-0.310	1.99	-0.597	3.92
Employed full-time	0.704	11.45	0.751	12.20
Employed part-time	0.468	2.30	0.741	9.40
Maternity leave	-	-	0.864	7.32
Non-participant	0.561	6.22	0.638	7.93
Log real household income (post-tax)	0.855	12.44	0.717	11.30
Live on the border of East and West Germany	-0.572	3.68	0.108	0.70
1992	-0.074	0.92	0.073	0.93
1993	-0.031	0.38	0.152	1.93
1994	0.114	1.42	0.060	0.76
1995	0.307	3.67	0.230	2.84
1996	0.235	2.81	0.289	3.52
1997	0.104	1.24	0.159	1.90
1998	0.293	3.44	0.342	4.05
1999	0.531	6.10	0.528	6.22
2000	0.360	4.08	0.387	4.53
2001	0.288	3.20	0.456	5.12
Mean Log likelihood	-3.575		-3.704	
$\hat{\mu}$	0.641		0.764	
Individuals	1796		1852	

Notes: The omitted categories are single, no disability, no invalid in the household, unemployed, not living on the border of East and West Germany and 1991. By approximation, however, we can calculate that an increase of 1 in a variable with coefficient  $\beta$  has an effect of  $\hat{\mu}\beta$  on *expected* life satisfaction.

TABLE 3: Decomposition Results for East German Males

From → To	Year/Age	Income	Job	Family	Health	Border	f	Total
1991 → 1992	-0.074 (0.080)	0.109 (0.009)	-0.031 (0.004)	-0.013 (0.004)	0.002 (0.001)	0.005 (0.001)	0.127*	0.126
1992 → 1993	0.043 (0.081)	0.091 (0.007)	-0.012 (0.001)	-0.001 (0.001)	0.001 (0.001)	0.001 (0.000)	0.038	0.161
1993 → 1994	0.145 (0.082)	0.035 (0.003)	0.001 (0.001)	-0.014 (0.004)	0.000 (0.001)	0.001 (0.000)	-0.034	0.132
1994 → 1995	0.193 (0.085)	0.033 (0.003)	0.014 (0.002)	-0.005 (0.003)	-0.001 (0.001)	-0.009 (0.002)	0.037	0.263
1995 → 1996	-0.072 (0.086)	0.012 (0.001)	-0.014 (0.001)	-0.006 (0.001)	0.000 (0.001)	-0.004 (0.001)	-0.053	-0.136
<b>Total Change 1991 → 1996</b>	<b>0.235</b>	<b>0.281</b>	<b>-0.042</b>	<b>-0.039</b>	<b>0.002</b>	<b>-0.006</b>	<b>0.115</b>	<b>0.545</b>
1996 → 1997	-0.131 (0.084)	-0.011 (0.001)	-0.006 (0.001)	-0.010 (0.003)	-0.002 (0.001)	-0.003 (0.001)	0.097	-0.067
1997 → 1998	0.189 (0.087)	-0.006 (0.001)	-0.014 (0.001)	-0.007 (0.002)	0.001 (0.001)	-0.007 (0.002)	-0.041	0.114
1998 → 1999	0.239 (0.091)	0.022 (0.002)	0.012 (0.002)	-0.007 (0.002)	0.000 (0.000)	-0.001 (0.000)	-0.051	0.214
1999 → 2000	-0.171 (0.091)	-0.006 (0.000)	-0.004 (0.001)	-0.006 (0.003)	-0.001 (0.000)	-0.001 (0.000)	0.033	-0.156
2000 → 2001	-0.072 (0.092)	-0.002 (0.000)	-0.007 (0.001)	0.002 (0.001)	0.001 (0.000)	0.006 (0.002)	0.111*	0.038
<b>Total Change 1996 → 2001</b>	<b>0.052</b>	<b>-0.004</b>	<b>-0.019</b>	<b>-0.028</b>	<b>-0.002</b>	<b>-0.005</b>	<b>0.150</b>	<b>0.144</b>
<b>Total Change 1991 → 2001</b>	<b>0.288</b>	<b>0.276</b>	<b>-0.061</b>	<b>-0.067</b>	<b>0.000</b>	<b>-0.012</b>	<b>0.265</b>	<b>0.689</b>

Notes: Standard errors in parentheses. For **f** an \* indicates statistically significant at the 95% confidence level for the year-on-year changes.



TABLE 4: Decomposition Results for East German Females

From → To	Year/Age	Income	Job	Family	Health	Border	f	Total
1991 → 1992	0.073 (0.079)	0.085 (0.008)	-0.065 (0.006)	-0.001 (0.004)	0.004 (0.001)	-0.001 (0.002)	0.062	0.157
1992 → 1993	0.079 (0.077)	0.074 (0.007)	-0.002 (0.001)	-0.002 (0.001)	-0.002 (0.001)	0.000 (0.000)	-0.061	0.087
1993 → 1994	-0.092 (0.082)	0.040 (0.004)	-0.006 (0.002)	-0.002 (0.002)	0.002 (0.001)	-0.001 (0.001)	0.063	0.004
1994 → 1995	0.170 (0.081)	0.026 (0.002)	0.026 (0.002)	0.000 (0.002)	-0.003 (0.001)	0.001 (0.002)	0.006	0.226
1995 → 1996	0.059 (0.083)	0.030 (0.003)	-0.004 (0.001)	-0.002 (0.002)	0.001 (0.001)	0.000 (0.000)	0.011	0.095
<b>Total Change 1991 → 1996</b>	<b>0.289</b>	<b>0.255</b>	<b>-0.051</b>	<b>-0.006</b>	<b>0.001</b>	<b>0.000</b>	<b>0.080</b>	<b>0.567</b>
1996 → 1997	-0.131 (0.084)	-0.008 (0.001)	0.002 (0.001)	-0.004 (0.003)	-0.002 (0.001)	0.001 (0.002)	0.057	-0.084
1997 → 1998	0.184 (0.088)	-0.005 (0.000)	0.000 (0.001)	0.000 (0.003)	0.000 (0.001)	0.001 (0.001)	-0.102*	0.077
1998 → 1999	0.186 (0.087)	0.014 (0.001)	0.021 (0.002)	-0.001 (0.002)	-0.001 (0.001)	0.000 (0.000)	-0.053	0.165
1999 → 2000	-0.141 (0.085)	-0.003 (0.000)	-0.004 (0.001)	-0.002 (0.002)	-0.002 (0.001)	0.000 (0.000)	0.077	-0.075
2000 → 2001	0.070 (0.089)	0.007 (0.001)	-0.008 (0.006)	0.000 (0.001)	0.002 (0.001)	-0.001 (0.001)	0.024	0.094
<b>Total Change 1996 → 2001</b>	<b>0.167</b>	<b>0.005</b>	<b>0.011</b>	<b>-0.007</b>	<b>-0.003</b>	<b>0.001</b>	<b>0.003</b>	<b>0.177</b>
<b>Total Change 1991 → 2001</b>	<b>0.456</b>	<b>0.260</b>	<b>-0.041</b>	<b>-0.013</b>	<b>-0.002</b>	<b>0.001</b>	<b>0.083</b>	<b>0.745</b>

Notes: Standard errors in parentheses. For **f** an \* indicates statistically significant at the 95% confidence level for the year-on-year changes.