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Income Comparisons among Neighbours and Life Satisfaction in East and West Germany

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NON-TECHNICAL SUMMARY

A number of studies have shown that people are more satisfied with their life the more income they have, but that they also take into account how this income compares to that of others. This paper investigates whether this is also true when our neighbours are getting richer.

How do we expect people will feel about others around them getting richer? If your immediate reaction is envy or jealousy, according to the happiness research, you have probably been raised in a market economy. In contrast, if you have been raised in a (former) socialist country, you would probably view your neighbours' improvement as a sign that your own situation may also improve soon, hence, be more satisfied with your life.

You may actually think that your happiness cannot be affected at all by your neighbours' income, because people do not typically know their neighbours' income. Unless the neighbours are well-enough acquitted to share information on their jobs or the income itself, all people may base their judgement on is indirect measures. As our neighbours are getting richer they may, for instance, replace their old car by a newer or invest in home improvements. Or, if the income gain is less marked, they may start buying more or higher quality goods. Importantly, if we live in communities in which the neighbours have close ties, we may be able to assess more accurately how our neighbours' financial position is changing than when the assessment is based solely on observation and guessing.

I use longitudinal data for re-unified Germany to investigate whether individual life satisfaction is affected by changes in neighbourhood income, and whether the effect differs between East and West Germany. The results confirm that Westerners (who have always lived in a market economy) are unhappier with their lives if their neighbours are getting richer, while Easterners (who have experienced socialism) are, at best, not bothered. An explanation for this may be that social ties between neighbours are much less developed in East Germany.

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Abstract.

This paper draws on the German Socio-economic Panel Study (SOEP) to investigate whether changes in others' income are perceived differently in post-transition and capitalist societies. We find that the neighbourhood income effect for West Germany is negative and slightly more marked in neighbourhoods where the neighbours interact socially. In contrast, the coefficients on neighbourhood income in East Germany are positive, but not statistically significant. This suggests not only that there is a divide between East and West Germany, but also that neighbours may not be a relevant comparison group in societies that have comparatively low levels of neighbouring.

Keywords: Comparison income, Reference group, Life Satisfaction, Neighbourhood effects

JEL Classification: I31, C23, Z1

INTRODUCTION

A number of studies in the field of happiness research have shown that people evaluate their life more positively the more income they have, but that they also take into account how this income compares to that of others (e.g., Blanchflower and Oswald 2004; Clark and Oswald 1996; Easterlin 1974; Ferrer-i-Carbonell 2005; Frey and Stutzer 2002). Typically the research has been undertaken for industrialised countries and set out to test empirically the "relative income" hypothesis, which, in brief, states that the utility people derive from consumption and savings depends more on one's income in relation to others than on an abstract standard of living (Duesenberry 1949). The implied negative relationship between others income and life satisfaction[1] could be shown for comparisons with others in the same society and also for others in the same profession (Clark and Oswald 1996; Diener et al. 1993; Easterlin 1995; Ferrer-i-Carbonell 2005).

There have been two rather new developments in this field of research. Firstly, authors like Senik (2004; 2008) and Carporale et al. (2009) have investigated the hypothesis in former socialist countries, yielding that the relationship between changes in others' income and life satisfaction is positive. They argue that this is in line with Hirshman and Rothschild (1973)'s conjecture that in post-transition economies changes in the other's circumstances are taken as a positive signal that suggests that one's personal lot may also improve soon.

Secondly, in response to improved access to geo-coded data that can be linked with large scale social surveys, studies have explored whether people in capitalist societies also take into account how their income compares to that of their neighbours. The results were inconclusive. Luttmer (2005) finds a negative effect of changes in other's income on life satisfaction in the USA, but the relative income refers to the income of others in the same profession living in the same geographic area, and may therefore merely confirm the previous results that people mind if others in the same profession start earning more (which is valuable, albeit a different subject). Knies et al. (2008) find no effect of changes in neighbourhood income on life satisfaction in Germany, and neither do Shields et al. (2009).

[1] There is broad consensus in the research community that life satisfaction is a satisfactory proxy for personal utility.

In this paper we synthesise the two recent foci of the happiness research by addressing the question whether reactions to changes in their neighbours' income are different for people living in East and West Germany. Two decades after German re-unification economic circumstances in the two parts of the country are still very different. Moreover, not only have East Germans been shown to be systematically unhappier with their lives (Frijters et al. 2004), levels of social interactions between neighbours appear to be less vibrant in the post-transition country (Knies 2009). People in the East may have relied more on their neighbours for small favours like borrowing a cup of sugar to get by. But they may not have trusted neighbours to the same extent as in West Germany: getting together socially was regarded with great suspicion, and often got sanctioned, by the GDR regime. It may be that, in a society where trusting neighbourhood relationships could not flourish for decades, sensitive information on income[2] is not shared with neighbours.

Neighbourhood Income and Life Satisfaction

There is a plethora of research that finds that people are happier with their life if they live in less polluted areas (Rehdanz and Maddison 2008), or in areas with access to green space and recreational facilities (Knies et al. 2008), or in areas where there is less crime (Mccrea et al. 2005) and more neighbourliness (Shields and Wooden 2003). There also is a huge body of literature looking at how these and other aspects of local neighbourhoods get capitalised in house prices (see, e.g., Gibbons and Machin 2008). In contrast, the conjecture that income levels in the local neighbourhood may affect how satisfied people are with their life is, at least in the empirical literature, a rather recent one and as such not yet well researched. Better neighbourhoods tend to attract richer neighbours, and we would therefore expect that people will be happier the more affluent their neighbours are. It is less clear, however, how people will react if their neighbours are getting richer. Will they covet their neighbours' income and dread entering into a struggle to keep up, or will they assume that if the Joneses' purses are filling up now, so will theirs next time round?

[2] Talking about one's income is one of the big taboo issues in German society. The Gehaltsreport 2009, for example, suggests that people who earn more than average are unwilling to share information on their earnings fearing their colleagues' envy. Conversely, those who earn less than the assumed average are too embarrassed about their income. The Gehaltsreport is a survey undertaken on behalf of Manager Magazine Germany and looks into how well-paid professionals in Germany are. http://www.spiegel.de/unispiegel/jobundberuf/0,1518,652626,00.html (German only).

The research into income comparisons with others in the same profession suggests that which is the case may be determined by the economic system in which these comparisons take place. In societies that are characterised by relatively low levels of actual and perceived mobility, utility tends to be negative in other's income. In post-transitional societies, on the other hand, where mobility is perceived high, utility appears to be positive in other's income (Senik 2008). The two effects may only be interpreted as comparison effect if it is reasonable to assume that people know (or learn about) the typical incomes earned in their profession. This may very well be the case, for instance, because those working together pick up some information about each other's promotions through direct observation or hearsay, or the unemployed learn about pay levels during their job search. But is it also plausible that people know about the typical income in their neighbourhood?

Neighbours will have some idea of how well off the others are, be it for the kind of cars parking in the streets or the size, design and state of repair of local houses. However, neighbourhood populations are more heterogeneous in qualifications than are people in one's profession, pay levels for many types of jobs the neighbours do may be unknown, and people may not know what their neighbours do for a living. Moreover, people may not even know their neighbours. Unless the neighbours turn their extra pennies into visible consumer goods, it is extremely unlikely that people will know about changes in neighbourhood income, hence, to be hurt or happy about others' changing position. In places, where close bonds between people exist, on the other hand, the information about other people's changing life circumstances may be more readily available.

METHODOLOGY

To investigate differences between East and West Germany in how individual life satisfaction changes in response to changes in neighbourhood income, the analysis proceeds in three stages. The first stage describes the East and West German neighbourhood context. A particular focus is on whether East Germany fulfils the criterion which is held to drive the positive comparison effect in post-transitional countries, namely, that actual levels of income mobility are high (i.e., higher than in West Germany). This stage will also explore whether there are differences in the

intensity of neighbourly relationships in the two parts of Germany, which is motivated by the conjecture that strong bonds between people need to exist between people in order for sensitive information on income to be shared. The second and third stages are concerned with identification of the comparison effect.

Comparison Effects in East and West Germany

Following the familiar approach in the literature we will estimate a standard micro-economic life satisfaction function (Clark et al. 2003; e.g., Clark and Oswald 1996; Frey and Stutzer 2002), but allowing for variation in the neighbourhood j in which an individual i lives at time t

$$S_{it} = \alpha + \beta' X_{it} + \gamma' N_{jt} + \zeta_{it} \qquad (1)$$

where S is a continuous measure of life satisfaction[3], X is a vector of observed characteristics that are held to influence life satisfaction, N is a vector of observed characteristics of neighbourhood j which are held to influence life satisfaction (including neighbourhood income), and ζ_{it} is an error term.

We are interested in obtaining an unbiased estimate of a particular γ, i.e., the extent to which life satisfaction changes as neighbourhood income changes. There are, however, a number of potential problems for identification of this effect. There may be large biases on γ from omitted variables associated with neighbourhood selection. People who mind having richer neighbours may decide not to live in a neighbourhood that attracts rich people, or may respond to observed changes in their neighbours' income by subsequently exiting the neighbourhood. Moreover, unobserved characteristics of the neighbourhood that are correlated with neighbourhood income and life satisfaction may bias our estimate of γ.

We use a fixed effects modelling approach to minimise such potential biases in as much as is feasible. In the fixed effects model we look at how changes in life satisfaction are affected by changes in observed characteristics. In this model (1) turns into

$$\Delta S_i = \Delta\alpha + \beta'(\Delta X_i) + \theta'(\Delta Z_i) + \Delta\zeta_i \qquad (2)$$

3 This is measured on a cardinal scale. Ferrer-i-Carbonell and Frijters (2004) show that the difference is negligible.

The effect of unobserved individual characteristics that do not change over time (the so-called 'fixed effect') drops out of the equation. We will assume that the unobserved underlying preference of individual i to live in a particular neighbourhood j is fixed in our observation period of one year.

Like other methods, this modelling approach cannot take care of unobserved characteristics that vary over time, and, unfortunately, it takes away a large number of degrees of freedom, making it difficult to statistically identify any effects. Moreover, the effects yielded from estimating Eq. (2) may be biased due to variation in unobserved neighbourhood characteristics. However, by restricting the sample to non-movers we can also remove some bias associated with unobserved characteristics of the particular neighbourhood people live in. Such a 'neighbourhood fixed effect' may derive, for instance, from living close to natural attractions like forests, lakes or mountains, from a better micro-climate (Rehdanz and Maddison 2008), or from a more pleasant built environment.

Robustness Tests

The third stage of analysis will test whether some key hypotheses about the particular neighbourhood income effect hold. For West Germany, following Knies et al. (2008), we expect a negative effect of neighbourhood income on life satisfaction and hypothesise that the effect will be more marked for individuals who may be assumed to have closer bonds and better knowledge of their neighbourhood. We will proxy this with whether or not children aged 0-6 live in the household (these people may use local institutions and may be more likely to talk to or about neighbours), whether a person works in the town in which she lives (these persons may know local incomes better) or does not work (these persons may spend more time in the neighbourhood), and whether or not the members of the household socialise with their neighbours (which may increase the number of channels via which people hear about changes in neighbours' income). Note that, to avoid pain, people may prefer to not socialise with neighbours if they envy the others' income (i.e., socialising may be endogenous). An alternative to proxy for neighbourhood social bonds is given by a sample selection on whether or not people live on small residential streets. These

have been shown to be places where lively, close-knit communities tend to exist (Grannis 2004).

For East Germany, following Senik (2004), we expect a positive association between neighbourhood income and life satisfaction because people will take their neighbours' lot as a signal for possible improvements in their own financial situation. We hypothesise that this effect will be more marked the more people may gain from higher personal incomes in the future. To investigate this we run the models separate for people who were not worried at all, slightly worried or very worried about their own financial situation in the year prior to our observation period. We also include interaction terms of neighbourhood income with whether or not a person is male (males may have a higher labour market orientation) and with whether a person is aged below 40 (younger persons may be in the labour market for longer), respectively. We will also test whether the effect is more marked for individuals living on residential streets.

DATA

This paper uses a unique dataset, the 2004 and 2005 waves of the German Socio-economic Panel Study (SOEP) matched with micro-marketing indicators of population characteristics in very tightly drawn neighbourhoods. SOEP is an internationally renowned longitudinal survey representative of the German population living in private households. The survey started in 1986 and contains data on a wide range of economic and social topics[4]. It has frequently been used in the research on comparison income (see, e.g., Ferrer-i-Carbonell and Frijters 2004; Frijters et al. 2004).

Our outcome variable, life satisfaction, is measured annually by the following question: "How satisfied are you at present with your life, all things considered?" There are eleven response categories running from 0 (completely dissatisfied) to 10 (completely satisfied). Socio-economic and demographic characteristics which have been shown in the empirical literature to influence life satisfaction (i.e., age, gender

4 For further information see http://www.diw.de/english/sop/uebersicht/index.html.

and education, in addition to indicators of the family context and financial situation, and health) are also available for every wave of the survey.

A lesser known feature of the survey, which we exploit in this paper is that SOEP provides information about the local neighbourhood from a number of different sources (see Knies and Spiess 2007 for a comprehensive overview). In 5-yearly intervals, respondents are asked to report on the social relationships in their neighbourhood, and on the availability of and distance to local amenities. This information is available for 2004, and we use it to explore whether there are differences in East and West Germany in the local opportunity structure for knowing about changes in the life circumstances of neighbours.

For recent years of the survey, SOEP also offers a wide range of neighbourhood indicators generated for micro-marketing purposes by a private geo-marketing firm, Microm GmbH. The data have been added to SOEP by SOEP Group using the survey respondents' address files and are available for all neighbourhoods in which respondents to SOEP live. The data offers, among life style and socio-demographic indicators, an indicator of whether or not a person lives on a residential street which we use to proxy places where social interactions among neighbours may be more likely and the neighbours may know each other better.

Our key explanatory variable, too, is from this source. The neighbourhood income is an area-level *estimate* of the average purchasing power. Purchasing power is defined as the sum of all market incomes, income maintenance transfers and social security payments, other regular monetary transfers, and income of non-profit organisations, assumed asset income flows, refunds from health insurers, sick payments, and income from living in owner-occupied housing, less taxes on income and assets, national insurance contributions and other regular payments. This follows the German Federal Statistical Office's definition of income (hence our dubbing of the indicator as 'neighbourhood income').

Neighbourhood income is expressed as income 'per household' and the currency is Euro. It is measured at street section level. Microm GmbH divides Germany up into

1.5 million street sections containing an average of 25 households.[5] Street section areas comprise of households that live next door to each other and live on the same side of the street. Measuring neighbourhood income at this geographical scale has a number of advantages. Firstly, because there are so few neighbours, the likelihood of their knowing each other's life circumstances well enough to let this affect individual life satisfaction may be higher. Secondly, the neighbours may be more likely to have contact to each other as they will be able to get to each other and chat to each other without having to cross a (potentially busy) street (Grannis 1998; Grannis 2001). A disadvantage of this measure is, however, that it does not consider any comparisons to neighbours that live on the other side of the street.[6]

All incomes are adjusted to 2004 prices and enter the models in log form. This is to reflect diminishing marginal returns to income, a consistent finding across various definitions of life satisfaction in the literature (Frey and Stutzer 2002). To absorb any biases on the comparison effect to do with the spurious correlation between neighbourhood income and neighbourhood quality, we control for how satisfied respondents to SOEP are with the services provided in their local area. Satisfaction with local services is measured in the same way as life satisfaction (i.e., on an eleven point Likert scale) and is available from the main survey for 2004 and 2005 (hence our selection on these two waves of the survey).

RESULTS

Neighbourhoods in East and West Germany

Table I gives information on neighbourhood contexts in East and West Germany. It can be seen that there are significant differences. While the greatest share of the population in West Germany lives in mid-sized towns or villages in communities that tend to be dominated by single occupancy homes, the Eastern German population tends to live in villages or city neighbourhoods that are dominated by houses shared by more than two parties or apartment blocks. Eastern Germans, on average, are also

[5] Households are statistically defined on the basis of the last names of the people living in the same building. Note that this is a different conceptualisation of household from that in SOEP, where cohabiting people regardless of their family name are considered as one household.

[6] We undertook the analysis presented in this paper using the neighbourhood indicator measured at the scale of market-cells, which comprise of adjacent street-sections and are home to an average of 400 households. The results did not change.

less satisfied with the quantity and quality of services and amenities provided in their local area.

Perhaps the most relevant difference is that while the majority of the population in both parts of Germany lives on residential streets (i.e., streets which are not also home to restaurants, shops or firms), the proportion is four percentage points higher in West Germany. If residential streets are places where social bonds between people are more likely to exist, there will be less connectedness in East Germany. This conjecture also finds empirical support in the finding that Westerners are more likely to live in neighbourhoods where the intensity of neighbourhood social contacts is higher. Given the sensitive nature of income information, it may then be that neighbours in East Germany do not reach high enough levels of participation in each others' private lives to realise how the neighbours' life circumstances are changing. Hence, we may not expect any comparison effect in East Germany.

TABLE I
Neighbourhood contexts in East Germany and West Germany 2004.

	East Germany	West Germany	Pearson Chi2	Pr
Population share living in community of type				
village, small town, single occupancy	0.29	0.28	23.8	0.000
village, small town, not single occupancy	0.15	0.09	56.4	0.000
mid-size town, single occupancy	0.04	0.17	35.2	0.000
mid-size town, not single occupancy	0.11	0.12	8.3	0.004
city, single occupancy	0.03	0.07	77.7	0.000
city, old build., not single occupancy	0.13	0.07	58.8	0.000
city, new build., not single occupancy	0.12	0.08	61.7	0.000
city, mixed housing stock, other	0.13	0.12	0.2	0.672
Mean satisfaction with local services	6.17	6.55	6.0	0.000
Population share living on residential streets	0.53	0.56	13.2	0.000
Population share living in a neighbourhood where				
Neighbours hardly know each other	0.10	0.08	16.3	0.000
Neighbours sometimes talk to each other	0.61	0.58	18.5	0.000
Neighbours have relatively close relationships	0.22	0.23	18.1	0.000
Neighbourhood social relations vary	0.08	0.10	21.5	0.000

Notes: Information is weighted using person weights provided in SOEP.
Source: SOEP 23 matched with micromarketing indicators. Author's calculations.

TABLE II

Mean changes in incomes. East and West Germany 2004 to 2005.

	East Germany					West Germany				
	Mean	SD	Min	Max	N	Mean	SD	Min	Max	N
Neighbourhood income										
all	-219	2250	-16402	11382	3882	-773	3222	-32301	85785	10671
non-movers	-248	2008	-8105	10977	3610	-809	2760	-32301	85785	9823
Household income										
all	-897	7406	-60626	88150	4211	148	13161	-66364	270151	10188
non-movers	-1031	7397	-60626	71825	3916	-22	13162	-66364	270151	9440

Notes: Information is weighted using person weights provided in SOEP.
Source: SOEP 23 matched with micromarketing indicators. Author's calculations.

The question of differences in neighbourhood income inequalities is interesting in its own right, but we are interested in it mainly because our identification strategy crucially depends on the presence of changes in neighbourhood income. Table II shows that, in real terms, there is not a lot of change in neighbourhood incomes from 2004 to 2005. On average, the population living in East Germany experienced a drop of 219€ in their average neighbours' income. In West Germany, this figure amounts to 773€. Average real income losses, both at personal level and at neighbourhood level, appear higher for non-movers. This may reflect both that people often move for economical reasons (i.e., because they find a job) and that they tend to move to similar or slightly better neighbourhoods. As expected, the variance of changes in household income is much higher than the variance of changes in mean neighbourhood income (taking the mean of the mean smoothes out more variation). Neighbourhood incomes fluctuate more in West Germany than in East Germany. Conversely, household incomes fluctuate more in East Germany.

Comparison Effects in East and West Germany

Table III reports the results from fixed effects regressions on life satisfaction in East and West Germany. For each region, the results are presented for the whole population and for non-movers only.[7]

The results on socio-economic and socio-demographic characteristics in Models 1-4 are, broadly speaking, in line with previous findings in the literature. For example, not being employed is negatively associated with life satisfaction but less so for females (see, e.g., Blanchflower and Oswald 2004) who may have alternative role models to their avail (such as being a good mother or wife). Likewise, improvements in self-reported health translate into higher reported life satisfaction while deterioration in one's health translates into lower life satisfaction. Compared to married people, widowers and divorcees are unhappier with their lives[8] (see, e.g., Blanchflower and Oswald 2004; Clark and Oswald 1996). Household income does not affect life satisfaction. However, average changes on this measure are very low in our sample, making it difficult to find statistically significant effects.

[7] To complete the picture, we also undertook the analysis for movers. See Appendix III.
[8] At least in West Germany; the effects for East Germany are insignificant.

TABLE III

Fixed effects regression of life satisfaction. East and West Germany 2004 and 2005.

	All				Non-movers only			
	(1) East Germany		(2) West Germany		(3) East Germany		(4) West Germany	
	Coefficient	*p-value*	Coefficient	*p-value*	Coefficient	*p-value*	Coefficient	*p-value*
Annual neighbourhood income (log)	0.120	0.738	-0.338	0.086	0.251	0.510	-0.489*	0.032
Satisfaction with local services	0.129***	0.001	0.098***	0.000	0.111**	0.005	0.097***	0.000
Satisfaction with local services (log)	-0.390*	0.025	-0.256*	0.015	-0.312	0.078	-0.244*	0.024
Number of years of education	0.426	0.777	-1.771*	0.050	0.437	0.780	-1.344	0.197
Household size	-0.055	0.498	0.086*	0.046	0.051	0.643	0.117*	0.042
Marital status (married)								
separated	-0.398	0.215	-0.530***	0.001	-0.059	0.882	-0.829***	0.000
single	0.252	0.436	-0.162	0.301	0.162	0.678	-0.245	0.195
divorced	0.073	0.837	-0.284	0.089	0.002	0.996	-0.495*	0.011
widowed	-0.425	0.236	-0.647*	0.010	-0.218	0.549	-0.695**	0.009
Subjective health								
better	0.935***	0.000	0.917***	0.000	0.854***	0.000	0.863***	0.000
worse	-0.794***	0.000	-0.855***	0.000	-0.900***	0.000	-0.891***	0.000
Annual household income (log)	-0.138	0.128	0.060	0.241	-0.185	0.052	0.009	0.866
Not employed	-0.370**	0.002	-0.604***	0.000	-0.319**	0.009	-0.568***	0.000
Not employed female	0.397*	0.014	0.351**	0.001	0.293	0.086	0.367**	0.001
Constant	5.372	0.317	14.167***	0.000	4.180	0.459	15.134***	0.000
Observations	7160		19608		6658		18170	
R-squared	0.021		0.030		0.020		0.030	

Significant at *** 99%, ** 95%, * 90%.

Source: SOEP 23 matched with micromarketing indicators.

The results corroborate the conjecture that the nature of the neighbourhood income effect may be different in East and West Germany. The results to Model 1 and Model 2, respectively, show that the association between neighbourhood income and life satisfaction is positive in East Germany and negative in West Germany. However, the effects are not statistically significant. When we make some controls for the unobserved characteristics of the particular neighbourhood people live in by restricting the sample to only the non-movers (Models 3 and 4), the comparison effect in both parts of the country becomes more pronounced, and, in West Germany only, statistically significant.

Robustness Tests

Our robustness tests are concerned with testing the hypothesis that comparison effects are more pronounced in neighbourhoods where people may know each other well enough to perceive changes in others' income (and be hurt or happy in consequence). Given the baseline models did not yield statistically significant effects for East Germany this may also be regarded a last resort for finding any effect at all.

Table IV reports separately for East and West Germany the estimation results yielded from restricting the sample to people living on residential streets (Models 5 and 11), living in neighbourhoods where close ties exist between neighbours (Models 6 and 12) or where neighbourhood ties are more intense than just 'hardly knowing each other' (Models 7 and 13). The subsequent three models restrict the sample to the respective flip-side.

For East Germany, we find no effects. In West Germany, there are statistically significant negative effects of neighbourhood income on life satisfaction for individuals living on residential streets and for individuals living in neighbourhoods where the neighbours at least know each other. Moreover, the effect appears to be more pronounced in neighbourhoods where we hypothesise the existence of strong(er) bonds between people.

TABLE IV

Fixed effects regressions on life satisfaction differentiated by intensity of neighbourhood social ties. East and West Germany 2004-5.

	Neighbourhood income coefficient	p-value	N	R2
East Germany				
(5) Residential streets	0.698	0.187	3579	0.022
(6) Close ties between neighbours	0.497	0.503	1404	0.029
(7) Neighbours at least know each other	0.565	0.140	5982	0.020
(8) Non-residential streets	-0.319	0.562	3079	0.029
(9) No close ties between neighbours	-3.344	0.097	556	0.114
(10) Neighbours hardly know each other	0.297	0.503	5134	0.023
West Germany				
(11) Residential streets	-0.758*	0.016	10264	0.033
(12) Close ties between neighbours	-0.697	0.143	4566	0.039
(13) Neighbours at least know each other	-0.502*	0.033	16824	0.031
(14) Non-residential streets	-0.164	0.619	7906	0.032
(15) No close ties between neighbours	0.407	0.664	1204	0.078
(16) Neighbours hardly know each other	-0.417	0.110	13462	0.030

Notes: All models include the same controls as Model 1, see Table III. Significant at *** 99%, ** 95%, * 90%.
Source: SOEP 23 matched with micromarketing indicators.

TABLE V

Testing hypotheses about the comparison effect in East and West Germany. Fixed effects regressions for non-movers.

	Neighbourhood income coefficient	p-value	Interaction coefficient	p-value	N	R2
East Germany						
Worries about financial situation						
(17) Not at all	-0.550	0.471	-	-	1988	0.043
(18) slightly	0.606	0.233	-	-	3510	0.019
(19) A lot	1.034	0.216	-	-	1100	0.085
(20) Male	0.165	0.752	0.182	0.811	6658	0.020
(21) Aged under 40	0.250	0.511	0.002	0.911	6658	0.020
West Germany						
(22) Having young children in the household	-0.491*	0.031	0.012	0.209	18170	0.031
(23) Working in town of residence	-0.484*	0.034	-0.007	0.221	18170	0.031
(24) Not working	-0.583*	0.030	0.197	0.506	18170	0.030
(25) Socialising with neighbours	-0.568	0.130	0.133	0.778	18086	0.031

Notes: All models include the same controls as Model 1, see Table III. Significant at *** 99%, ** 95%, * 90%.
Source: SOEP 23 matched with micromarketing indicators.

Table V presents results from models specified so as to test common assumptions about the signalling hypothesis (East Germany) and the relative income hypothesis (West Germany). In light of the finding that there is a neighbourhood fixed effect on life satisfaction (see Table IV), models 17-25 are estimated for individuals who lived in the same neighbourhood in 2004 and 2005. The first three models, Models 17-19, are for individuals that expressed to be not at all, slightly or very much worried about their financial situation, respectively. Models 20 to 25, then, include interaction terms of neighbourhood income with characteristics of the individual that have been suggested to make them more receptive to undertaking income comparisons.

The results are consistent with the previous findings. There are no income comparison effects in East Germany. The size of the coefficients, however, suggests that people who are more worried may be happier if others around them are improving their situation, which is in line with the signalling hypothesis. The coefficients on the interaction terms are also in the right direction, albeit not statistically significant. In West Germany, the raw neighbourhood income effect remains statistically significant when interaction terms are included (in all models but model 25). None of the interaction terms is statistically significant, however, and the people who we suggested may be more likely to know their neighbours' circumstances and therefore be unhappier than others if the neighbours improve their situation, appear in fact slightly less unhappy with their lives than others.

CONCLUSION

We use longitudinal data for East and West Germany matched with micro-marketing data of population characteristics in very immediate neighbourhoods to investigate whether individual life satisfaction is affected by changes in neighbourhood income, and whether the effect differs between East and West Germany. The results confirm the hypothesis that peoples' life satisfaction is affected by their neighbours' income but also highlight that the cultural context matters.

For West Germany, there are statistically significant and negative effects but only in some specifications. In particular, the effects were present only when we controlled for unobserved neighbourhood characteristics by restricting the sample to non-movers. Movers tend to appreciate living in richer neighbourhoods, but non-movers

are unhappier if their neighbours are getting richer. We also uncovered a negative income comparison effect by restricting the sample to individuals living on residential streets, suggesting that the existence of social bonds in the neighbourhood may be an important factor in determining whether income comparisons affect life satisfaction. In East Germany, where less intense social bonds exist between neighbours, neighbourhood income has no significance for life satisfaction. The coefficients are systematically positive, which is consistent with the signalling hypothesis, but they are not statistically significant.

It may be that sample sizes in East Germany are too small to estimate the effect with the desired precision and the same methodological rigour,[9] however, the result could also be indicative of a more general issue. We may not expect people to know about changes in their neighbours' income unless the neighbours talk about it or if visible consumption (for instance, neighbours replacing their cars, undertaking major refurbishment work or doing up the front gardens) is adjusted. Consumption of this type may not be adjusted to the extent that it affects people's perception of how the average neighbourhood income has changed. Neighbourhood social ties, on the other hand, may not be strong enough for sensitive information on income to be shared. If there is neither talking nor visible consumption, we may not find any effect.

Future research may investigate whether this conjecture extends to other neighbourhood effects that are hypothesised to operate via knowing once neighbours.

[9] Note that Luttmer (2005)'s comparison effect was not robust to controlling for unobserved neighbourhood heterogeneity.

REFERENCES

Blanchflower, D. G. and Oswald, A. J. (2004) 'Well-being over time in Britain and the USA', *Journal of Public Economics*, 88: 1359-1386.

Caporale, G. M.,Georgellis, Y.,Tsitsianis, N. and Yin, Y. P. (2009) 'Income and happiness across Europe: Do reference values matter?' *Journal of Economic Psychology*, 30(1)2009/2: 42-51.

Clark, A. E.,Diener, E.,Georgellis, Y. and Lucas, R. E. (2003) 'Lags and Leads in Life Satisfaction: A Test of the baseline hypothesis', *DELTA Working Paper*, 13August 2003: 1-30.

Clark, A. E. and Oswald, A. J. (1996) 'Satisfaction and Comparison Income', *Journal of Public Economics*, 61(3): 359-381.

Diener, E.,Sandvic, E.,Seidlitz, L. and Diener, M. (1993) 'The relationship between income and subjective well-being: Relative or absolute?' *Social Indicators Research*, 28: 195-223.

Duesenberry, J. S. (1949) *Income, Saving and the Theory of Consumer Behavior*. Cambridge, MA: Harvard University Press.

Easterlin, R. A. (1974) 'Does economic growth improve the human lot? Some empirical evidence', in P. A. David and W. R. Levin (eds) *Nations and households in economic growth.* Stanford, CA: Stanford University Press.

— (1995) 'Will raising the inocmes of all increase the happiness of all?' *Journal of Economic Behavior and Organization*, 27(1): 35-47.

Ferrer-i-Carbonell, A. (2005) 'Income and well-being: an empirical analysis of the comparison income effect', *Journal of Public Economics*, 89(5-6)Jun: 997-1019.

Ferrer-i-Carbonell, A. and Frijters, P. (2004) 'How important is methodology for the estimates of the determinants of happiness?' *Economic Journal*, 114: 641-659.

Frey, B. S. and Stutzer, A. (2002) *Happiness and Economics.* Oxfordshire: Princeton University Press.

Frijters, P.,Haisken-DeNew, J. P. and Shields, M. A. (2004) 'Money does matter! Evidence from increasing real income and life satisfaction in East Germany after re-unification', *American Economic Review*, 94(3)June 2004: 730-740.

Gibbons, S. and Machin, S. (2008) 'Valuing school quality, better transport, and lower crime: evidence from house prices', *Oxf Rev Econ Policy*, 24(1)March 1, 2008: 99-119.

Grannis, R. (1998) 'The importance of trivial streets: Residential streets and residential segregation', *American Journal of Sociology*, 103(6): 1530-1564.

— (2001) 'Street islands: social networks, street networks, and segregation.'Ithaka:

— (2004) 'Networks in the global village: Life in contemporary communites', *Social networks*, 26(4): 342-347.

Hirschman, A. O. and Rothschild, M. (1973) 'The Changing Tolerance for Income Inequality in the Course of Economic Development', *The Quarterly Journal of Economics*, 87(4)1973/11: 544-566.

Knies, G. (2009) 'The Effects of Mobility on Neighbourhood Social Ties', *ISER Working Paper 2009-15*,

Knies, G.,Burgess, S. and Propper, C. (2008) 'Keeping up with the Schmidts: An empirical test of relative deprivation theory in the neighbourhood context', *Journal of Applied Social Sciences Studies*, 1(2008)

Knies, G. and Spiess, C. K. (2007) 'Regional data in the German Socio-Economic Panel Study (SOEP)', *DIW Berlin Data Documentation*,

Luttmer, E. F. P. (2005) 'Neighbours as negatives: Relative earnings and well-being', *Quarterly Journal of Economics*, 120(3): 963-1002.

Mccrea, R.,Stimson, R. and Western, J. (2005) 'Testing a Moderated Model of Satisfaction with Urban Living Using Data for Brisbane-South East Queensland, Australia', *Social Indicators Research*, 72(2)Jun 2005: 121-152

Rehdanz, K. and Maddison, D. (2008) 'Local environmental quality and life-satisfaction in Germany', *Ecological Economics*, 64(4)February: 787-797.

Senik, C. (2004) 'When information dominates comparison. Learning from Russian subjective panel data', *Journal of Public Economics*, 88: 2099– 2123.

— (2008) 'Ambition and Jealousy: Income Interactions in the 'Old' Europe versus the 'New' Europe and the United States', *Economica*, 75(299): 495-513.

Shields, M. and Wooden, M. (2003) 'Investigating the Role of Neighbourhood Characteristics in Determining Life Satisfaction', *Melbourne Institute Working Paper Series*, 24(Melbourne Institute of Applied Economic and Social Research): The University of Melbourne.

Shields, M. A.,Price, S. W. and Wooden, M. (2009) 'Life satisfaction and the economic and social characteristics of neighbourhoods', *Journal of Population Economics*, 22(2)Apr: 421-443.

APPENDIX I

Summary statistics of sample characteristics. East Germany 2004.

	Mean	SD	Min	Max	N
Life satisfaction	6.26	1.80	0	10	4289
Neighbourhood income	28336	3047	20024	44869	4289
Satisfaction with local services	6.05	2.62	0	10	4289
Social visits with neighbours	0.54	0.50	0	1	4289
Lives on residential street	0.55	0.50	0	1	4240
Female	0.53	0.50	0	1	4289
Age	49	17	18	94	4289
Number of years of education	12.24	2.40	7	18	4289
Household size	2.55	1.13	1	12	4289
Lives with children aged 0-6	0.11	0.31	0	1	4289
Marital status					
single	0.23	0.42	0	1	4289
partner	0.60	0.49	0	1	4289
divorced	0.10	0.30	0	1	4289
widowed	0.07	0.26	0	1	4289
Annual per capita household income	12037	5911	924	65611	4289
Employment status					
full-time employed	0.39	0.49	0	1	4289
part-time employed	0.08	0.27	0	1	4289
student, apprentice, military service	0.03	0.17	0	1	4289
not employed	0.46	0.50	0	1	4289
other employment status	0.04	0.20	0	1	4289
Works in town where lives	0.29	0.46	0	1	4289
Self-reported health status					
Very good	0.06	0.24	0	1	4289
good	0.40	0.49	0	1	4289
fine	0.36	0.48	0	1	4289
Not good	0.14	0.35	0	1	4289
poor	0.04	0.19	0	1	4289

Source: SOEP 23 matched with neighbourhood indicators.

APPENDIX II

Summary statistics of sample characteristics. West Germany 2004.

	Mean	SD	Min	Max	N
Life satisfaction	6.91	1.78	0	10	11495
Neighbourhood income	38625	6171	10067	121758	11495
Satisfaction with local services	6.48	2.57	0	10	11495
Social visits with neighbours	0.57	0.50	0	1	11495
Lives on residential street	0.58	0.49	0	1	11441
Female	0.53	0.50	0	1	11495
Age	49	17	18	95	11495
Number of years of education	11.79	2.60	7	18	11495
Household size	2.71	1.28	1	13	11495
Lives with children aged 0-6	0.18	0.38	0	1	11495
Marital status					
single	0.19	0.39	0	1	11495
partner	0.67	0.47	0	1	11495
divorced	0.08	0.27	0	1	11495
widowed	0.07	0.25	0	1	11495
Annual per capita household income	14180	7812	834	72325	11495
Employment status					
full-time employed	0.40	0.49	0	1	11495
part-time employed	0.11	0.32	0	1	11495
student, apprentice, military service	0.02	0.15	0	1	11495
not employed	0.41	0.49	0	1	11495
other employment status	0.05	0.22	0	1	11495
Works in town where lives	0.28	0.45	0	1	11495
Self-reported health status					
Very good	0.09	0.29	0	1	11495
good	0.40	0.49	0	1	11495
fine	0.32	0.47	0	1	11495
Not good	0.14	0.35	0	1	11495
poor	0.04	0.19	0	1	11495

Source: SOEP 23 matched with neighbourhood indicators.

APPENDIX III

Fixed effects regression of life satisfaction. East and West Germany 2004 and 2005. Movers only

	(26) East Germany		(27) West Germany	
	Coefficient	*p-value*	Coefficient	*p-value*
Annual neighbourhood income (log)	-0.718	0.552	0.158	0.721
Satisfaction with local services	0.276	0.101	0.140	0.124
Satisfaction with local services (log)	-1.179	0.139	-0.495	0.261
Number of years of education	-0.019	0.997	-3.385	0.101
Household size	-0.091	0.621	0.240*	0.021
Marital status (married)				
separated	-0.966	0.163	-0.064	0.834
single	0.304	0.676	0.066	0.838
divorced	1.321	0.268	0.065	0.865
widowed	-1.844	0.413	0.385	0.682
Subjective health				
better	1.238	0.101	1.235***	0.000
worse	0.883	0.340	-0.644*	0.041
Annual household income (log)	0.047	0.882	0.417*	0.021
Not employed	-0.718	0.095	-0.879**	0.002
Not employed female	0.960	0.109	0.183	0.626
Constant	13.670	0.473	9.171	0.197
Observations	502		1438	
R-squared	0.076		0.061	

Significant at *** 99%, ** 95%, * 90%.

Source: SOEP 23 matched with micromarketing indicators.