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**Article**

## Income Polarisation in Germany Is Rising

Weekly Report

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# Weekly Report

## Income polarisation in Germany is rising

*Income disparities between poorer and richer households in Germany have been widening since reunification. Although this income polarisation is reduced during economically favourable periods by strong growth in employment, once the good times are over, it rises all the faster.*

*The longer-term trend not only shows that the number of poorer households is steadily increasing, but also that on average they are getting poorer. On the flip side, the trend is toward an increasing number of richer individuals, whose average wealth is steadily increasing. This contrast is not only felt to be highly unfair, but also creates uncertainty among the middle class.*

*Although the year of the financial crisis, 2009, saw the number of high-income households decrease, the average incomes of the remaining rich households continued to rise. As a result of job market measures, the lower income bracket has scarcely been affected by the financial and economic crisis.*

Evidence of an increasingly unequal distribution of income in the US since the late 1970s has been virtually undisputed. In Europe, too, the widening income gap has become ever more apparent. In Germany, however, there was still no clear trend towards rising inequality in the income distribution even as late as the mid-1990s.<sup>1</sup>

Since 2000, the disparity in incomes has without question widened in Germany as well.<sup>2</sup> The discussion and empirical research on this issue has focused on the phenomenon of rising poverty.<sup>3</sup> As of yet, however, there has been little empirical analysis addressing the question of income polarisation. Polarisation is understood to mean the increasing difference in incomes between the rich and the poor—in other

<sup>1</sup> For example, Hauser, R.: Die Entwicklung der Einkommens- und Vermögensverteilung in Deutschland—ein Überblick. [The development of income and wealth distribution in Germany - an overview.] In: „Informationen zur Raumentwicklung“ [Information on Spatial Development], 3-4, 2003, pp. 111-124.

<sup>2</sup> Frick, J. R., Goebel, J., Grabka, M. M., Krause, P., Schäfer, A., Tucci, I., Wagner, G. G.: Zur langfristigen Entwicklung von Einkommen und Armut in Deutschland. [On the long-term development of income and poverty in Germany] Wochenbericht des DIW 4/2005; Bach, S., Steiner, V.: Increasing inequality in market incomes: Real growth only for the rich. Wochenbericht des DIW Berlin 13/2007.

<sup>3</sup> Frick, J. R., Grabka, M.M.: Weiterhin hohes Armutsrisiko in Deutschland: Kinder und junge Erwachsene sind besonders betroffen. [Continuing high risk of poverty in Germany: children and young adults are especially at risk.] Wochenbericht des DIW Berlin 7/2010.

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words, between each pole of the income distribution and the centre.

### Polarisation does not equal inequality

The analysis of income polarisation differs fundamentally from the analysis of income inequality or income poverty in that changes in the income distribution are analysed by focusing on how the two tails of the income distribution change compared to the centre.<sup>4</sup> In contrast to poverty research, the interest here is not only in changes the size and income levels of the lower bracket, but also those of the upper bracket. In measuring income polarisation, therefore, three groups are generally distinguished: lower, middle and upper.

However, a generally recognised practice used to demarcate the upper and lower income ranges does not exist. In the following, therefore, these income ranges will follow the definitions used in the German Federal Government's Report on Poverty and Wealth.<sup>5</sup> It describes the lower income range as the *low-income group*, defined as households with a *needs-weighted equivalised disposable* income of greater than 30 percent below the median income. The upper income bracket begins with a household income 50 percent or more above the median income and covers the income bracket with assured prosperity. The following groups are based on these definitions:

- Lower bracket (low income): a household income of less than 70 percent of the median; in 2005, this equalled around 860 euros per month.
- Medium bracket (middle income): a household income of at least 70 percent, but not more than 150 percent of the median income; in 2005, this equalled around 1,844 euros per month.
- Upper bracket (high income): a household income of more than 150 percent of the median; in 2005, this was more than 1,844 euros per month.

Various types of polarisation can be distinguished: on the one hand, a *relative* polarisation in which the medium income group shrinks in relation to

the other two, but with no worsening in the average income position of any group as a whole. *Absolute* polarisation refers to an increase not only of the share of the lower income group in the income distribution, but additionally with a decreasing median income in this income group.

### Severe polarisation threatens social cohesion

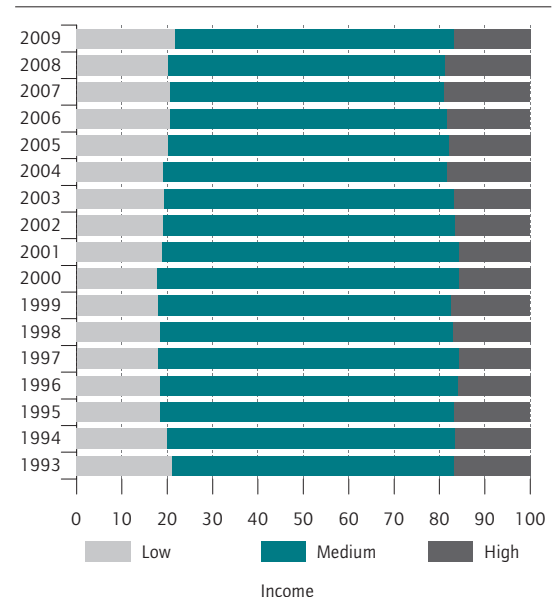
From a socio-economic viewpoint, polarisation has to be judged differently than a unilateral increase in poverty or a general increase in the inequality of the distribution. When there is an increase in the inequality of an income distribution that remains stable in its overall structure, that is, the relative size of the groups remains constant. All of the groups may be earning more than they were before, but the disparities between them have increased. When there is polarisation in incomes, however, the structure shifts in such a way that both the top and bottom income groups grow, while the middle group shrinks. Put simply, some people in this middle group will rise to join the upper income group while others will fall into the lower group.

This shift is relevant, regardless of whether it is accompanied by an increase in the statistically meas-

Figure 1

#### Income groups in Germany

Share in percent



<sup>4</sup> For a more detailed description of the concept of income polarisation, see Esteban, J., Debraj, R.: On the Measurement of Polarisation. *Econometrica* 62, 1994, pp. 819-851.

<sup>5</sup> Federal Ministry of Labor and Social Affairs (2001, 2005, 2008). The poverty risk threshold per the standard EU definition in the Report on Poverty and Wealth is set at 60 percent of the median income. The wealth threshold is taken as 200 percent of the median income.

Sources: SOEP; calculations by DIW Berlin.

DIW Berlin 2010

*Viewed over the long term*, it is above all the medium income group that has declined the most.

ured inequality or not. In people's perceptions, this is seen as an increase in inequality: on the one hand, the number of wealthy people increases, while on the other, the number of those forced to subsist on a low income or below the poverty line also increases. Understandably, this trend is particularly worrisome for the middle-income group, who perceive descent into the lower income group as a severe threat to the status they have managed to achieve.<sup>6</sup> Severe polarisation in incomes may threaten social cohesion, since the stabilizing effect that a broadly-based middle class has will diminish when the life and consumption opportunities available to the people—and with it their realms of experience—begin to develop more strongly in opposite directions.

Prior analyses have identified at least the beginnings of increasing polarisation in Germany, as demonstrated by a decreasing share of households in the middle-income group (the so-called “middle class”) and slightly increased in the upper and lower groups.<sup>7</sup> The present analysis builds upon this result with current figures, and broadens its scope with the income positions of the various groups (Box 1). The focus is also on another question: whether developments in the economy as a whole—such as the current financial and economic crisis—influence the trend toward polarisation.

### The tails of income distribution gain in significance

Taking into consideration the distribution among the three groups used here, the constant growth in the share of households with low incomes in the last five years is particularly conspicuous (Figure 1). These households increased from 19 percent of the population in 2004 to almost 22 percent in 2009. Parallel to this, an increase in the share of households with more than 150 percent of the median income is also evident. In fact, their numbers have risen by and large continuously since 2000. Only in 2009, with the advent of the financial and economic crisis, did the proportion of richer households decline slightly. The longer-term trend has thus seen the medium-income group decline in size more than the other groups. As a result, the significance of the „middle

<sup>6</sup> Lengfeld, H., Hirschle, J.: Die Angst der Mittelschicht vor dem sozialen Abstieg. Eine Längsschnittanalyse 1984–2007. [The middle class's fear of social decline. A cross-sectional analysis 1984–2007.] Zeitschrift für Soziologie [Journal of Sociology], Vol. 38, Issue 5, 2009, pp. 379–398; Schupp, J.: Aspekte sozialer Ungleichheit in Deutschland. [Aspects of social inequality in Germany.] Zeitschrift für Wirtschaftspolitik [Journal of Economic Policy], Vol. 59, Issue 1, 2010, pp. 6–22.

<sup>7</sup> Frick, J. R., Grabka, M. M.: Schrumpfende Mittelschicht—Anzeichen einer dauerhaften Polarisierung der verfügbaren Einkommen? [Shrinking middle class—signs of sustained polarisation in disposable incomes?] Wochenbericht des DIW Berlin 10/2008.

### Box 1 Database

Our analysis of disposable household incomes is based on data from the Socio-Economic Panel (SOEP) study, conducted by DIW Berlin in partnership with TNS Infratest Social Research.<sup>1</sup>

Disposable household income is measured in a number of ways in the SOEP. First, at the end of the questionnaire is an explicit question (screener) about the respondent's current monthly household income at the time of the survey—i.e., regular earnings after deducting taxes and social security contributions, and including any social security transfers received. Second, all individual (gross) earnings of current respondents in the household are added up for the past year. This, with the aid of estimated tax and social security contributions and imputed values for missing data or non-respondents, is used to calculate the annual net income for the previous year.<sup>2</sup> This analysis relies on the net monthly needs-weighted household income (screener) because this data is more up-to-date.<sup>3</sup> Note, however, that the values for 2009 are based on a provisional weighting derived from observations of the SOEP sample survey.

All income data is in euros. The analyses are performed at the individual level and represent the entire German population in private households. To take into account the development of purchasing power, incomes have been adjusted across the board to 2005 prices.<sup>4</sup> The price adjustment is in each case based on the year of the survey.

<sup>1</sup> The SOEP is a representative tracking study of private households that has been conducted annually in West Germany since 1984 and since 1990 in the former East Germany, cf. Wagner, G. G., Göbel, J., Krause, P., Pischner, R., Sieber, I.: Das Sozio-oekonomische Panel (SOEP): Multidisziplinäres Haushaltspanel und Kohortenstudie für Deutschland—Eine Einführung (für neue Datennutzer) mit einem Ausblick (für erfahrene Anwender). [The Socio-Economic Panel (SOEP): Multidisciplinary household panel and cohort study for Germany - An introduction (for new data users) with outlook (for advanced users).] In: AStA Wirtschafts- und Sozialstatistisches Archiv, Vol. 2, Issue 4, 2008, pp. 301–328.

<sup>2</sup> Frick, J. R., Grabka, M. M.: Item Nonresponse on Income Questions in Panel Surveys: Incidence, Imputation and the Impact on Inequality and Mobility. Allgemeines Statistisches Archiv, Issue 89, 2005, pp. 49–61.

<sup>3</sup> The income situations of households of various sizes and compositions are compared by translating them into „equivalised” incomes, i.e. per-capita incomes weighted to needs. This involves converting household incomes using a scale proposed by the OECD. As a result, the head of household is given a weighting of 1, further adults a weighting of 0.5 and children 0.3. Everyone under the age of 14 is considered a child.

<sup>4</sup> Taken from the official price indices of the Federal Office of Statistics.

class“ has diminished. At first glance, however, the trend toward a shrinking middle class appears to have been halted with the financial and economic crisis of 2009. The share of persons in households with median incomes has risen again for the first time since 2000, if only by 0.6 percentage points, from 60.9 percent in 2008 to 61.5 in 2009.

However, whether the current trend indicates the end of income polarisation can only be assessed by including the evolution of income relationships between the groups. Calculations of average household income in the three income groups show that both absolute and relative income differences have increased dramatically since 1993 (Table). The earnings gap between those earning low incomes and those earning high incomes has continued to widen in Germany.

Since 2000, this development has gained pace markedly, with the absolute gap between the lower and the medium income group growing from around 590 euros in 1999 to some 630 euros in 2009. In relation to median incomes, the relative earnings deficit has increased from 46 to more than 48 percent. This clearly means that not only are the ranks of the poor

increasing, but that they are on average becoming poorer as well.

The differences between the upper income groups show a similar trend toward polarisation. In absolute terms, the gap between the upper income group and the middle income group rose from 1,165 euros in 1999 to 1,360 euros in 2009. The upper income group's relative earnings increased from 91 to more than 104 percent of the median income. This confirms the trend in Germany that the rich are not only growing in number but are, on the whole, getting richer as well. Although the financial crisis of 2009 caused the share of high-income households to decrease, the households in this group in 2009 had a far higher average income than in the years before. In absolute terms, the gap between the upper and middle income group increased considerably between 2008 to 2009 as well.

### Income polarisation increasing gradually

Not least because of the aforementioned ambiguous developments in the shares of income groups and the

#### Box 2

#### The methodology

In 1994, Esteban and Ray not only formulated the identity-alienation framework, but also proposed how polarisation might be measured empirically.<sup>1</sup> The index they set out weights relationships of population groups to each other by the absolute distance between the median incomes in each group. A simple Euclidean distance is used to measure the gap. The index is thus defined as

$$ER(\pi, y) = \sum_{j=1}^n \sum_{i=1}^n \pi_i^{1+\alpha} \pi_j |y_i - y_j|$$

where  $n$  represents the number of groups,  $\pi_i$  the relative size of group  $i$ , and  $y_i$  the median income in group  $i$ . The parameter  $\alpha$  determines the degree of sensitivity of the population to polarisation, i.e., how much the degree of polarisation varies from standard inequality measures. Or, to put it another way, it measures how strongly an individual in group  $i$  feels alienated from group  $j$ .<sup>2</sup> If  $\alpha = 0$ , this polarisation measure is identical with the Gini coefficient used in measuring inequality. Since the bounds are set randomly, Esteban, Gradín and Ray propose a generalized version of this index, defined as follows:<sup>3</sup>

$$P(f, \alpha, \beta) = ER(\alpha, \rho^*) - \beta [G(f) - G(\rho^*)]$$

$ER$  is the Esteban and Ray polarisation index described above, from which an *error term* has been subtracted.  $G$  is the Gini coefficient. The difference between the Gini coefficient of the original and the grouped incomes can be weighted with  $\beta$ . The generalization set forward by Esteban, Gradín and Ray, however, corrects not only the otherwise disregarded inequality within the defined groups, but also proposes an algorithm to automatically set the group boundaries. Researchers today no longer define exact income bands, but only the number of groups to be formed. The group bounds are then selected in such a way that the spread of incomes within the groups is minimized, or expressed differently, in such a way that the corrective term deducted later is minimised. In the empirical analysis,  $\alpha = 1.3$  and  $\beta = 0.5$ , and thus correspond to the centre of each possible range.

To estimate the statistical error probability in determining the polarisation measure, confidence intervals were set by a bootstrap method. We worked in each case with 500 replications.

<sup>1</sup> Esteban, J., Debraj, R.: On the Measurement of Polarisation. *Econometrica* 62, 1994, pp. 819-851.

<sup>2</sup> Esteban and Ray further show that  $\alpha$  must be less than 1.6 if the axioms they propose to measure polarisation with are to remain valid.

<sup>3</sup> Esteban, J., s Gradín, C., Debraj, R.: An Extension of a Measure of Po-

larisation, with an Application to the Income Distribution of Five OECD Countries. *The Journal of Economic Inequality*, Vol. 5, No. 1, April 2007, pp. 1-19.



Table

**Equivalised monthly incomes in Germany**

	Average values of income groups			Deviations to middle-income group			
	Low incomes	Medium incomes	High incomes	Low incomes	High incomes	Low incomes	High incomes
	in euros			in euros		in %	
1993	643	1,222	2,372	-579	1,149	-47.4	94
1994	646	1,222	2,371	-576	1,149	-47.1	94
1995	643	1,232	2,500	-589	1,269	-47.8	103
1996	664	1,251	2,478	-588	1,227	-47.0	98
1997	660	1,243	2,413	-583	1,170	-46.9	94.1
1998	667	1,237	2,367	-570	1,130	-46.1	91.3
1999	685	1,270	2,436	-586	1,165	-46.1	91.7
2000	680	1,287	2,569	-607	1,282	-47.2	99.7
2001	690	1,300	2,561	-610	1,262	-46.9	97.1
2002	664	1,279	2,669	-616	1,389	-48.1	108.6
2003	669	1,300	2,690	-631	1,390	-48.5	106.9
2004	657	1,264	2,583	-607	1,319	-48.0	104.4
2005	659	1,269	2,567	-610	1,298	-48.1	102.2
2006	650	1,255	2,626	-605	1,370	-48.2	109.2
2007	651	1,251	2,569	-601	1,318	-48.0	105.3
2008	645	1,252	2,538	-607	1,287	-48.5	102.8
2009	677	1,311	2,672	-634	1,360	-48.3	103.7

Sources: SOEP; calculations by DIW Berlin.

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*Income disparities have grown sharply since the turn of the millennium, both in absolute and in relative terms.*

differences in incomes between the groups, attempts have been made to collate the dimensions of polarisation into an index—a polarisation index. One of the best-known and most developed indices is the polarisation index formulated by Esteban, Gradín and Ray (Box 2). Figure 2 shows the development of this index for Germany. The grey field (confidence bands) shows the area where the statistical error probability produced by the sampling methods used to analyse the data is under five percent.

In Germany, the polarisation of income has come in a series of waves. An initial high point in inequality came in the mid-1990s, and was followed by a phase of slightly narrowing polarisation until 2000. After that, polarisation escalated before reaching its current apex in 2006. Since then, no statistically significant change has been recorded. For Germany as a whole, the polarisation index also shows no marked reaction to the crisis of 2009.

Measuring the development of the polarisation index against the dynamics of the national economy, there appears to be a connection in fluctuations in income polarisation and economic growth (Fig. 2). Those years with weaker or declining employment trends—1993, 1994 and 2003 to 2005—were followed in 1995 and 2006 by peaks in income polarisation. The phase of strong economic and employment growth, which lasted from 1998 to 2000, may

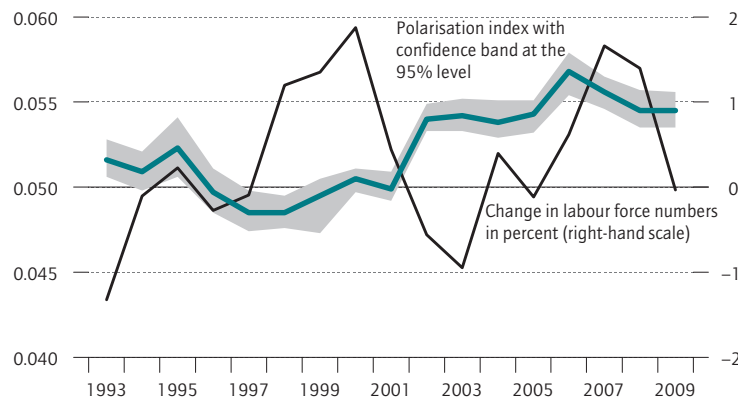
not have decreased the income polarisation much, but it certainly stabilized polarisation at a higher overall level. The indications point to a similar reaction to the strong years of economic growth in 2007 and 2008.

In view of the close link between short-term changes in income polarisation and the trend of economic activity, it also comes as no surprise that the crisis of 2009 has not led to a major increase in polarisation, given that the crisis has so far had little impact on the labour market. Political efforts to dampen the effects of the global financial crisis have at least been successful in warding off a short-term worsening of income polarisation in Germany.

### **Income differences in former East Germany are still lower**

Compared to the country as a whole, East Germany has seen a stronger increase in low-income earners in the last decade, from around 24 in 2000 to almost 31 percent in 2009. While the lower proportion of high-income earners in the East in the first few years after reunification is not surprising, the sharp increase in the share of higher incomes in the East up to just after the turn of the millennium certainly is. Since then, the share of high-income earners has remained relatively stable at nine to ten percent. In

Figure 2

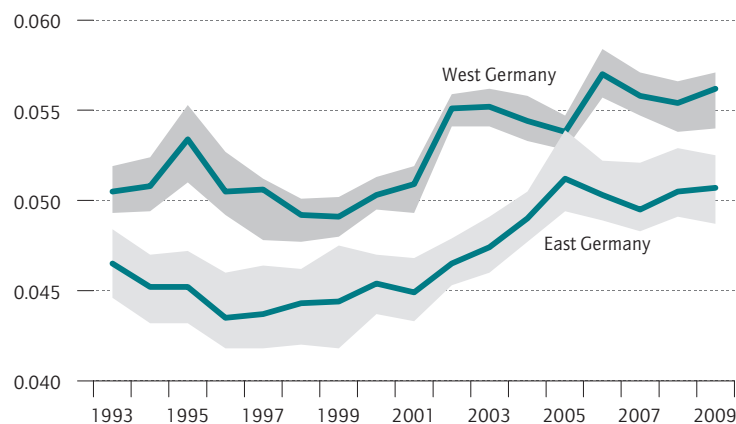
**Polarisation index by income and labour force in Germany**

Sources: SOEP; Federal Office of Statistics; calculations by DIW Berlin.

DIW Berlin 2010

The polarisation index describes the extent to which a society is organised around distant income poles.

Figure 3

**Polarisation index<sup>1</sup> of income in West and former East Germany**<sup>1</sup> Polarisation index with confidence band at the 95% level.

Sources: SOEP; calculations by DIW Berlin.

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Since 1997, polarisation of income in former East Germany has increased at a greater rate than in West Germany.

sum, there has been a more pronounced decline in median incomes in the former East Germany than in the West.

For the low-income bracket in East Germany, the development of income differences follows the overall German development, i.e., an increase in the absolute and relative gap between the low income bracket and the medium income bracket. In the East,

however the gap between the upper income bracket and the medium income bracket is not increasing, but has declined from 106 percent in 1999 to 97 percent in 2009.

The stabilization of high incomes, the strong increase in low-incomes and the increase in the relative distance between the lower income group and the medium income group is also demonstrated in the development of the polarisation index calculated for the former East Germany (Figure 3). From 1997 to 2009, polarisation increased by 16 percent in the East compared to just 11 percent in the West.

**Conclusion**

The analysis presented here shows that the period of relative polarisation from 1993 to 1999, in which all income groups saw a slight increase in real incomes, albeit of differing dimensions, was followed from 2000 to 2009 by a period of absolute polarisation, in which the distances between the groups not only widened, but the upper group's real income grew, while the lower group not only suffered relative losses, but absolute ones as well. An increase in income inequality is certainly a far more serious matter for the losers, who not only see the disparity between their incomes and the higher incomes, but also have less money at their disposal with each passing month.

The data analysis presented here proves that there has been a clear rise in the lower-income earning groups, and that middle-income group, which has grown enormously over the period since the Second World War, has lost out through the income redistribution of the last decade.<sup>8</sup> While some have risen from this group into the upper income bracket, many more have descended into lower income brackets.<sup>9</sup>

If this descent is perceived as imminent, or even as a potential threat, it can, as C. W. Mills termed it, nurture „status panic“ among the middle classes.<sup>10</sup> Since the middle classes' status is based on income and not property, they are particularly sensitive to developments that threaten this status. That may go hand-in-hand with a tendency to blame another population group for this loss of status, and may

<sup>8</sup> Herbert Quandt Foundation: Zwischen Erosion und Erneuerung. Die gesellschaftliche Mitte in Deutschland. Ein Lagebericht. [Between Erosion and Renewal. The Middle Classes in Germany. A status report.] Bad Homburg, 2007.

<sup>9</sup> Frick, J. R., Grabka, M. M.: Schrumpfende Mittelschicht [The shrinking middle class], *ibid.*

<sup>10</sup> Mills, C. W.: Menschen im Büro: Ein Beitrag zur Soziologie der Angestellten. [White Collar: The American Middle Classes.] Oxford University Press, USA, 1951.

contribute to the spread of discriminatory attitudes (such as xenophobia and racism).<sup>11</sup> Income polarisation cannot therefore be dismissed as an irrelevant shift in the income distribution. Rather, it indicates the crucial need to safeguard the “centre ground” in order to maintain the stability of democratic decision-making processes.

Moreover, sustained income polarisation is also linked with potentially negative consequences in terms of the social environment. This is especially the case in the major cities.<sup>12</sup> A changed distribution of income and a growing number of households with very low incomes would make a greater concentration of low-income households noticeable in those areas of the city where rents are low. These are dilapidated areas in the older parts of the inner

city, and other districts with low living quality and low social prestige. The transformation of income polarisation can be expected to create greater spatial polarisation in the cities the more that the housing supply is controlled by market forces—if, for instance, public housing plays an ever-diminishing role, as is indeed the case in more and more German cities. In the course of this development, a stronger spatial concentration of households beset by social problems leads to the creation of districts that bear the stigma of a slum. A life context emerges there that is marked by resignation and pessimism, one that is especially disadvantageous for children and young people—especially considering that social segregation in schools is even stronger than in the neighborhood setting.

<sup>11</sup> Vgl. Heitmeyer, W. (Ed.): Deutsche Zustände. [German Conditions.] No. 8, Frankfurt/Main 2009.

<sup>12</sup> Ähnelt, R., Göbel, J., Gornig, M., Häußermann, H.: Soziale Ungleichheit und sozialräumliche Strukturen in deutschen Städten. [Social inequality and socio-spatial structures in German cities.] In: „Informationen zur Raumentwicklung“ [Information on Spatial Development], 6, 2009, pp. 405–413.

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