

## Income Inequality and Rents in Germany



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DIW Berlin—Deutsches Institut  
für Wirtschaftsforschung e.V.  
Mohrenstraße 58, 10117 Berlin  
T +49 30 897 89 -0  
F +49 30 897 89 -200

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# Has Income Inequality Spiked in Germany?

by Markus M. Grabka, Jan Goebel and Jürgen Schupp

New analyses of personal income distribution in Germany, based on data from the German Socio-Economic Panel (SOEP), show that real market income in private households rose significantly from 2005 to 2010. An increase in real disposable income was also observed. At the same time, income inequality decreased in both western and eastern Germany. However, the latter showed a further spread at the lower end of disposable income distribution. In the course of this development, the poverty risk in western Germany fell slightly from 2009 to 2010, while it remained unchanged in the eastern part of the country.

This report updates and expands on previous studies by DIW Berlin on income inequality and poverty risk (relative income poverty) up to 2010.<sup>1</sup> Compared to previous publications by DIW Berlin, in which the results were assigned to the survey year, this report shows the year when the income was received (income year). This means that annual income is shown for the year before the relevant survey year. However, the demographic structure of private households relates to the survey year, as in all previous publications by DIW Berlin. Consequently, the current data on annual income from the 2011 survey relates to income for the 2010 calendar year with the demographic structure of the first half of 2011.<sup>2</sup>

The empirical basis of the data collected by DIW Berlin, in cooperation with the fieldwork organization TNS Infratest Sozialforschung, was from the German Socio-Economic Panel study (SOEP),<sup>3</sup> which enables the development of personal income distribution in Germany to be analyzed over consistent time frames due to repeated annual data capture.

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**1** See M.M. Grabka and J.R. Frick (2010), „Weiterhin hohes Armutsrisiko in Deutschland: Kinder und junge Erwachsene sind besonders betroffen,“ Wochenbericht des DIW Berlin, no. 7 and J. Goebel and M.M. Grabka (2011), „Zur Entwicklung der Altersarmut in Deutschland,“ Wochenbericht des DIW Berlin, no. 25.

**2** By changing the income year, DIW Berlin is following the procedure laid out in the draft of the 4th Poverty and Wealth Report by the Federal government, the Federal Ministry of Labor and Social Affairs 2012: Living circumstances in Germany, and in the report by the German Council of Economic Experts, last Annual Report 2011/2012: Taking responsibility for Europe.

**3** The SOEP is an annual, representative follow-up survey of private households which has been conducted in West Germany since 1984 and in eastern Germany since 1990, see G.G. Wagner, J. Goebel, P. Krause, R. Pischner, and I. Sieber (2008), „Das Sozio-oekonomische Panel (SOEP): Multidisziplinäres Haushaltspanel und Kohortenstudie für Deutschland – Eine Einführung (für neue Datennutzer) mit einem Ausblick (für erfahrene Anwender),“ AStA Economic and Social Statistical Archive 2, no. 4: 301–328.

## 2005-2010: Increasing Incomes...

The average equivalized and inflation-adjusted market incomes of persons in private households remained virtually unchanged from 1991 to 1998. At the end of the '90s, they increased significantly in line with the economic boom, but then decreased again up to 2005 (see Figure 1, see Box 1 for the definition and measurement of income). In western Germany, average market incomes declined by approximately 1,000 euros (-4 percent) from 1999 to 2005, while in eastern Germany it was about 2,000 euros (-13 percent). This decrease was primarily due to a deterioration in the labor market; the number of unemployed in eastern Germany increased significantly more than in western Germany during this period.

The significant reduction in unemployment observed since then has been accompanied by a change to the income development trend. From 2005 to 2010, market income, the main component of which was earned income, increased by almost 1,000 euros or four percent in western Germany. Consequently, average market income was once again as high as it was at the turn of the century. In eastern Germany, where unemployment declined more than in the west, income growth was much stronger at just under 2,900 euros or 20 percent. On average, income in eastern Germany was just under 71 percent of that in western Germany.

### Box 1

#### Definitions, Methods and Assumptions in Measuring Income

The analyses presented in this report are based on the German Socio-Economic Panel Study (SOEP), a longitudinal survey of primarily annual household income. Here, all the income components affecting the surveyed household as a whole, as well as all the individual gross incomes of the respondents currently in the household (market income is the sum of capital and earned income, including private transfers and private pensions) are added together in the survey year ( $t$ )—with its demographic structures (in the first half of each observation year) for the relevant calendar year ( $t-1$ ) (income year). In addition, income from state pensions and social transfers (income support, housing benefit, child benefit, support from the German Employment Agency, and others) are taken into account, and then net annual income is calculated using a simulation of tax and social security contributions—one-time payments are also taken into account (13th and 14th month salaries, Christmas bonuses, holiday pay, etc.).

The annual burden of personal income tax and social security contributions is based on a micro-simulation model,<sup>1</sup> which implements a tax assessment taking into account all types of income covered by the German Income Tax Act, as well as allowances, advertising costs, and special expenses. Due to the complexity of German tax law, not all special tax regulations can be simulated

with the aid of this model. On the basis of net income calculated by the SOEP, it should be assumed that actual income inequality is underestimated.

Since the reference to the income year has now become established in reports on poverty and wealth published by the German government, contrary to earlier publications by DIW Berlin, results in this report refer to the income year (and no longer to the survey year). Here, it should be pointed out that the demographic structure of households refers to the survey year, which, for this reason, was chosen as a temporal reference point in previous publications.

According to international literature,<sup>2</sup> notional (net) income components from owner-occupied housing ("imputed rent") are also added to income. In addition, non-monetary income components from cheaper rental housing (social housing, private or employer-subsidized housing, households paying no rent) are also taken into account in the following, as required by the European Commission for EU-wide income distribution accounting based on EU-SILC.

<sup>1</sup> J. Schwarze (1995), „Simulating German income and social security tax payments using the GSOEP. Cross-national studies in aging,” Program project paper, no. 19, (Syracuse University, US).

<sup>2</sup> See: J.R. Frick, J. Goebel, and M.M. Grabka (2007), „Assessing the distributional impact of „imputed rent” and „non-cash employee income” in microdata,” European Communities (ed.): Comparative EU statistics on Income and Living Conditions: Issues and Challenges. Proceedings of the EU-SILC conference (Helsinki, 6-8 November 2006), (EUROSTAT: 2007): 116-142.

The development of disposable household income was broadly similar to that of market income.<sup>4</sup> It can be divided into three phases. Up to 1999, real equivalized household income rose only slightly in western Germany. In eastern Germany, however, it increased dramatically during the transformation process, bringing the two parts of the country closer in line with each other (see Figure 2). In the subsequent years up to 2005, disposable income stagnated in the west, or in terms of

average income, the median,<sup>5</sup> it even declined. At more than six percent in eastern Germany, this decline was more pronounced than in western Germany. From 2005 to 2010, real incomes rose again in Germany. However, the severe economic crisis of 2008/2009 has—unlike, for example, in the United States<sup>6</sup>—not had any long-term impact on the labor market and consequently on

**4** Disposable household income consists of market income, statutory pensions, and state benefits such as child benefit, housing benefit, and unemployment benefit, less direct taxes and social security contributions.

**5** If the population is sorted according to level of income and then two groups of equal size are formed, the median shows the income received by the income earners at the center of the distribution.

**6** As a result, the median of total income (before payments for personal income taxes, social security, union dues, medicare deductions, etc.) in the US from 2007 to 2010 in real terms has decreased by 6.7 percent, U.S. Census Bureau, „Current Population Survey,” Annual Social and Economic Supplement. [www.census.gov/hhes/www/income/data/historical/household/2011/H10AR\\_2011.xls](http://www.census.gov/hhes/www/income/data/historical/household/2011/H10AR_2011.xls).

The income situations of households of various sizes and compositions—according to international standards—are compared by translating them into equivalized incomes (per capita incomes weighted to needs). This involves using a generalized demand scale proposed by the OECD and universally accepted in European statistics, and each household member is assigned a calculated equivalized income, with the assumption that all household members benefit equally from the joint income. The head of the household is given a needs weighting of 1; each additional adult is given a weighting of 0.5 and children up to 14 years are given a weighting of 0.3. Thus an economy of scale is assumed for larger households. This means that, for example, the household income for a four-person household (parents and a 16 and 13-year-old child) is not divided by 4 as in a per capita calculation ( $= 1 + 1 + 1 + 1$ ) but by 2.3 ( $= 1 + 0.5 + 0.5 + 0.3$ ).

One particular challenge in all population surveys is the proper inclusion of missing information for individual interviewees, particularly for questions considered sensitive, such as those about income. Households often refuse to give information, especially if the household's income is either above or below average.

In the SOEP data analyzed here, missing data are replaced using complex, cross-sectional and longitudinal-based imputation procedures.<sup>3</sup> This also applies to missing information where individual members of otherwise willing households have refused to provide details. In these cases, a multi-level statistical method is applied to

six individual components of gross income components (earned income, pensions and transfer payments in the event of unemployment, training/study, maternity pay/child benefit/parental benefits and private transfers).<sup>4</sup> As a result, not only is data from even earlier survey years (for example, data from  $t-2$  for  $t-1$ ) used for missing data in earlier survey years (up to  $t-1$ ), but also for future data (for example, data from  $t$  for  $t-1$ ). All the missing data are imputed, also retroactively, for each new data survey which can lead to changes in previous evaluations (as between SOEP version v27 and v28, see Box 3). However, these changes are generally minor. Since no information for  $t+1$  is available at the current boundary ( $t$ ), the imputation for the current survey boundary is less certain than that for  $t-1$  and earlier survey years, which is why a further wave of collected data at the current boundary may lead to relatively larger changes in imputed values.

Since first-time respondents provide less accurate information, especially for income data, than people familiar with the SOEP, the first wave of individual SOEP random samples is excluded from the calculations. Studies show that the respondents' behavior is subject to learning effects after the first survey.<sup>5</sup>

**3** J.R. Frick and M.M. Grabka (2005), „Item Non-response on Income Questions in Panel Surveys: Incidence, Imputation and the Impact on Inequality and Mobility,” *Allgemeines Statistisches Archiv*, 89(1): 49–61.

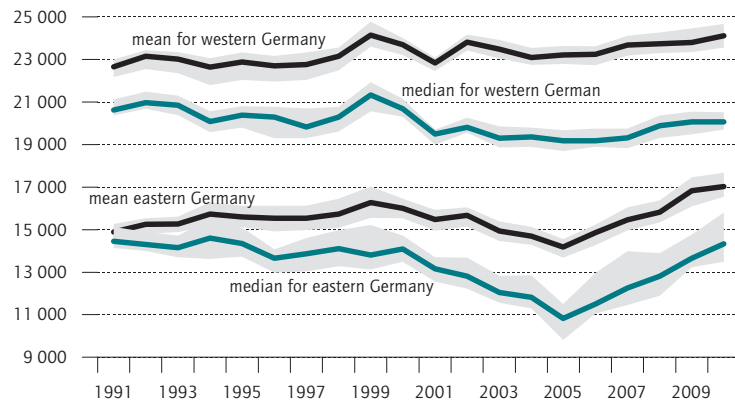
**4** J.R. Frick, M.M. Grabka, and O. Groh-Samberg (2012), „Dealing with incomplete household panel data in inequality research,” *Sociological Methods and Research*, 41 (1): 89–123.

**5** J.R. Frick, J. Goebel, E. Schechtman, G.G. Wagner, and S. Yitzhaki (2006), „Using Analysis of Gini (ANOGI) for Detecting Whether Two Subsamples Represent the Same Universe: The German Socio-Economic Panel Study (SOEP) Experience,” *Sociological Methods Research* vol. 34 no. 4: 427–468.

Figure 1

**Real Household Market Income<sup>1</sup>**

In euros at 2005 prices



<sup>1</sup> Data on annual incomes gathered in the following year, market income including a nominal employer contribution for civil servants, needs-weighted in line with the modified OECD equivalence scale. The gray shading shows the 95-percent confidence bands (see Box 3).

Source: SOEPv28.

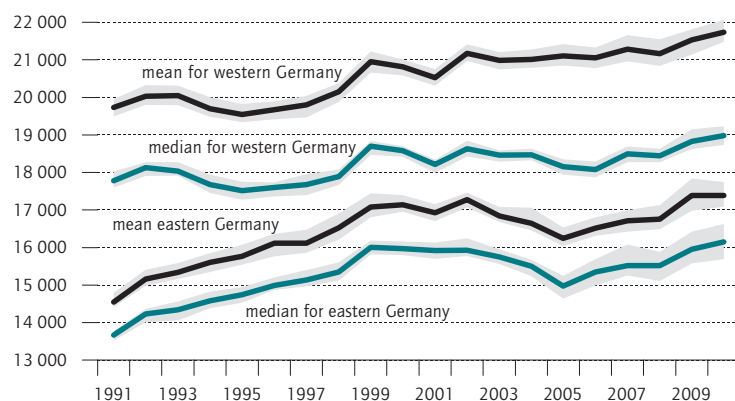
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Market incomes have increased more in eastern Germany than in western Germany since 2005.

Figure 2

**Real Disposable Household Income<sup>1</sup>**

In euros at 2005 prices



<sup>1</sup> Data on annual incomes gathered in the following year included the rental value of owner-occupied housing, needs-weighted in line with the modified OECD equivalence scale. The gray shading shows the 95-percent confidence bands (see Box 3).

Source: SOEPv28.

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Disposable incomes and market income developed along similar lines.

the disposable income of private households.<sup>7</sup> In western Germany, the increase in real disposable income from 2005 to 2010 amounted to just over 600 euros (three percent). Income in eastern Germany increased by more than 1,100 euros (seven percent). Nevertheless, incomes in eastern Germany still average only four-fifths of western German income levels.

Looking only at the development from 2009 to 2010 for Germany as a whole, there are clear differences between the income groups. The lower 40 percent of the population were able to increase their disposable income in real terms by an above-average two percent. This development was accompanied by an increase in the number of people with earned income by around 700,000.<sup>8</sup> Moreover, the collective wage increases during this period were higher than in previous years and this is likely to have also been reflected in actual earnings.<sup>9</sup> In contrast, medium and high disposable incomes remained static in 2010. The decline in income from assets would have played a considerable role here.

**...and Reduced Income Inequality**

The standard unit for measuring income inequality is the Gini coefficient. It can have values between 0 and 1. The higher the value, the more pronounced the inequality. According to this measurement, the inequality of market incomes in eastern Germany during the transformation process was statistically significant and rose from 0.37 in 1991 to 0.55 in 2005 (see Figure 3). The inequality of market incomes in western Germany also rose appreciably during this period, but much less than in eastern Germany. Since the mid-90s, the distribution of market incomes in eastern Germany has been significantly less equal than in the west.

From 2005 onwards, during the economic upturn and the subsequent improvements in the labor market situation, income inequality in the whole of Germany decreased. This development was more pronounced in

<sup>7</sup> M.C. Burda and J. Hunt (2011), „What Explains the German Labor Market Miracle in the Great Recession?“, NBER Working Paper, no. 17187, and J. Hunt (2012), „Flexible Work Time in Germany: Do Workers Like It and How Have Employers Exploited It Over the Cycle?“, SOEP papers, no. 489, DIW Berlin. Despite this, it cannot be ruled out that the type of survey in the SOEP underestimate the effects of the financial market and economic crisis, since it does not ask about the precise gross income from gainful employment for every month in the previous year but only an average amount.

<sup>8</sup> The number of employees paying social insurance contributions increased to 550,000 from December 2009 to December 2010, see Federal Employment Agency, Arbeitsmarkt in Zahlen (2012). Beschäftigungsstatistik. Beschäftigung nach Ländern in wirtschaftlicher Gliederung (WZ 2008). (June 2012).

<sup>9</sup> R. Bispinck (2011), Tarifpolitischer Jahresbericht 2010. (Wirtschafts- und Sozialwissenschaftliches Institut in der Hans-Böckler-Stiftung (WSI)).

eastern than in western Germany. The Gini coefficient decreased by almost nine percent in the east, and by three percent in the west. In both parts of the country, market income inequality declined to where it was at the beginning of the last decade.<sup>10</sup>

In addition to the Gini coefficients, income inequality in terms of disposable household income is also measured using mean logarithmic deviation (MLD). This indicator is more sensitive to changes in the lower half of the distribution than the Gini coefficients.

Changes since 1991 can be roughly divided into three phases. From 1991 to 2000, inequality in the distribution of disposable household income barely changed, but it then increased significantly up until 2005 (see Figure 4). Consequently, income inequality from the early 1990s to 2005, measured using the Gini coefficients, increased by almost 20 percent in both parts of the country. From 2005 to 2010, the inequality of disposable income in western Germany declined, parallel to the development of market income (Gini coefficient: -4 percent, MLD: -9 percent). However, this trend is only statistically significant in the choice of a somewhat narrower confidence band with only 90 percent (instead of 95 percent) robustness over random statistical errors.

The situation is different in eastern Germany. Here, disposable income inequality remained static between 2005 and 2010. For MLD coefficients with 90 percent certainty, there was even an increase from 2007 to 2010. This suggests growing inequality in the bottom half of income distribution.

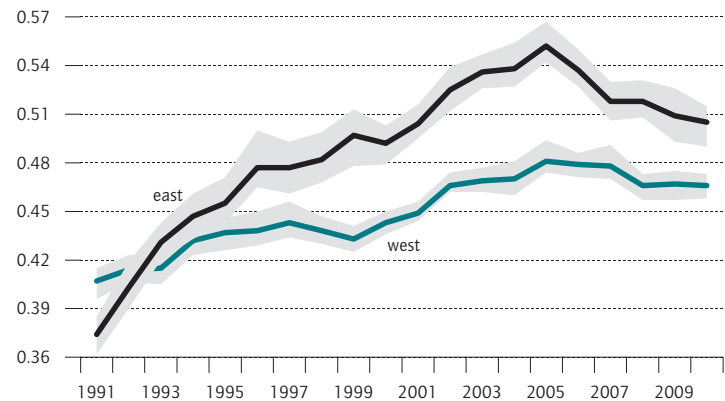
Disposable income inequality did not decline in eastern Germany, despite decreases in market income, because the employment rate in eastern Germany continued to be lower than in the west and pensioners' income has a greater weight in eastern Germany. Certainly, pensioners have suffered real income losses since 2000 but positive developments among the employed have not compensated for this.

<sup>10</sup> The figure for per capita market income is also influenced by changes in the population structure because people with no market income—in particular, pensioners—are given a value of zero in the calculations. The SOEP data for individual earnings show an almost continuous increase in inequality up to the middle of the last decade, and this is especially true when using the MLD coefficient which is sensitive to changes in the lower part of the distribution. During this period, the low-pay sector in Germany became increasingly important, see T. Kalina and C. Weinkopf (2012), „Niedriglohnbeschäftigung 2010: Fast jede/r Vierte arbeitet für Niedriglohn,“ IAQ Report, no. 1; K. Brenke and M.M. Grabka (2011), „Schwache Lohnentwicklung im letzten Jahrzehnt,“ Wochenbericht des DIW Berlin, no. 45. The increase in employment, which began in 2005, put an end to the trend of rising income inequality.

Figure 3

### Inequality of Real Market Household Income<sup>1</sup>

Gini coefficient



<sup>1</sup> Data on annual incomes gathered in the following year, market income including a nominal employer contribution for civil servants, needs-weighted in line with the modified OECD equivalence scale. The gray shading shows the 95-percent confidence bands (see Box 3).

Source: SOEPv28.

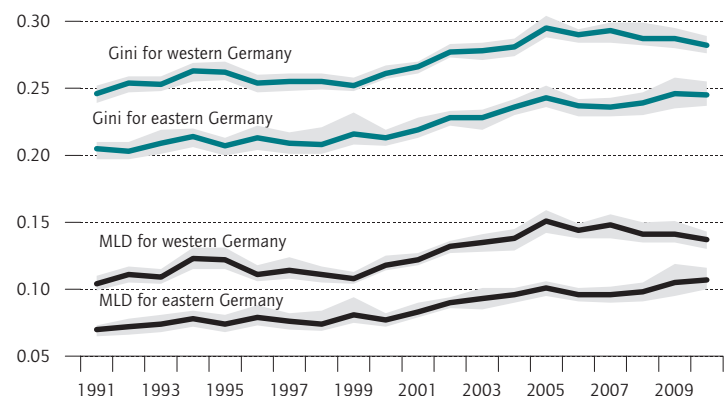
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In eastern Germany, market incomes are distributed less equally than in western Germany, but the gap is closing.

Figure 4

### Inequality of Real Disposable Household Income<sup>1</sup>

Gini coefficient and mean log deviation



<sup>1</sup> Data on annual incomes gathered in the following year included the rental value of owner-occupied housing, needs-weighted in line with the modified OECD equivalence scale. The gray shading shows the 95-percent confidence bands (see Box 3).

Source: SOEPv28.

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Contrary to the trend in market income, the inequality of disposable income in the east remains high.



## Poverty Risk Trends Differ in Eastern and Western Germany

According to the concept of relative income poverty, a person is threatened by poverty if they have to survive on less than 60 percent of the median net household income of total population (see Box 2). Accordingly, the poverty risk threshold in 2010 based on annual income in the SOEP was around 990 euros per month.<sup>11</sup>

Eleven million people or 14 percent of the total population were below this threshold in 2010. This is a slight and statistically insignificant decline in the poverty risk rate after it reached a record high of almost 15 percent in 2009 due to the economic crisis.<sup>12</sup> The main reason for this decline may have been the overall positive developments in the labor market.

Basically, the poverty risk has stabilized at a high level since 2005. At that time, it reached 14 percent largely

<sup>11</sup> This represents a higher poverty risk threshold than social reporting by the Federal Statistical Office based on the microcensus (see [www.amtlche-sozialbe-richterstattung.de](http://www.amtlche-sozialbe-richterstattung.de)).

<sup>12</sup> The average number of short-time workers in 2009 was 1.1 million, see Federal Employment Agency (2012), *Der Arbeits- und Ausbildungsmarkt in Deutschland*, Monatsbericht (May).

due to negative labor market developments in Germany, while the rate fluctuated more in the '90s between ten and twelve percent (see Figure 5).

The poverty risk rate for eastern Germany was significantly higher than the corresponding figure in western Germany which developed similarly to the trend in the whole of Germany. The high ratio in eastern Germany is probably related to higher unemployment, lower wages, and often a lack of additional revenue, such as rental income or other investment income.<sup>13</sup> In the course of the transformation process since reunification, the poverty risk rate decreased significantly in the east because of initially high income growth of almost 19 percent in 1991 to 13 percent in the late '90s. However, after that, it rose again sharply and in 2005 it was at almost 20 percent, more than six percentage points higher than in western Germany. In subsequent years, the poverty risk rate remained at roughly the same level. Further longitudinal analyses are needed to determine whether these developments lead to an increasing number of people at short-term poverty risk, or whether there are signs that households will remain in low-income positions.

## Adolescents and Young Adults at Highest Poverty Risk of All Age Groups

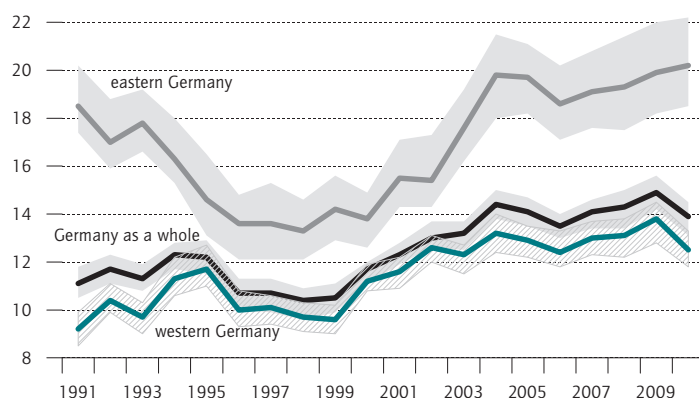
Poverty risk among the individual age groups has developed steadily over the past ten years (see Figure 6). Adults in the two middle age groups (35 to 44 and 45 to 54 years) are still at the least risk of income poverty because in this period of life labor force participation is high and they achieve the highest average incomes. However, in both these groups, the proportion of those threatened by poverty within ten years has increased from seven and eight percent, respectively to roughly ten percent in 2010. However, that is still four percentage points less than the average for the total population, and also the trend has been reversing since 2005: at that time, the proportion was actually at eleven and twelve percent, respectively.

Poverty risk among 65 to 74-year-olds is roughly on a par with the average for total population. However, when considering only the former East German Länder, this finding is no longer valid. The proportion of people threatened by poverty at the age of 65 years or older is now at 15 percent—a significant increase from 9.5 percent in 2003 and higher than the national average. One reason for this could be that statutory pension contributions for

Figure 5

### Poverty Risk Ratio<sup>1</sup> by Region

Figures in percent



<sup>1</sup> People with less than 60 percent of median disposable income. Data on annual incomes gathered in the following year included the rental value of owner-occupied housing, demand-weighted in line with the modified OECD equivalence scale. The gray shading shows the 95-percent confidence bands (see Box 3).

Source: SOEPv28.

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After an all-time high, the percentage of people at risk of poverty in Germany fell slightly in 2010.

<sup>13</sup> P. Krause and I. Ostner (2010), *Leben in Ost- und Westdeutschland. Eine sozialwissenschaftliche Bilanz der deutschen Einheit 1990–2010*. Campus.



## Box 2

**Definitions, Methods, and Assumptions Used in Poverty Risk Measurement**

The procedure chosen for this report for empirically recording income inequality and poverty risk follows recommendations by the European Commission and the Statistical Office of the European Union (Eurostat) in calculating national Laeken indicators.<sup>1</sup> These indicators are part of national action plans initiated by the EU to combat poverty and social exclusion in Europe. The measurement methods are largely taken into account in the German government's Poverty and Wealth Report.<sup>2</sup>

According to this report, those whose income falls below the relative poverty line are at risk of poverty. European convention determines this figure to be 60 percent of the median of annual net equivalized income per household (based on the whole of Germany), including the net rental value of owner-occupied housing ("imputed rent," see also Box 1).

The concept of relative income poverty is often criticized<sup>3</sup> for not sufficiently taking overall wealth gains into account, and therefore shows an equal poverty risk level—even if the income of all persons increases by

a certain percentage. However, this property ensures, among other things, that poverty risk remains unchanged irrespective of the currency used to measure the incomes. It is often overlooked that this relative poverty threshold does not describe a minimum subsistence level, but rather the level of income considered necessary to achieve a minimum level of socio-cultural participation in society as it is currently developing.

Table

**Poverty Risk Threshold of Selected Household Types in 2010  
Based on Nominal Net Household Income<sup>1</sup>**

	Equivalence weight according to the new OECD scale	In euros per month		
		Lower threshold <sup>2</sup>	Estimated value	Upper threshold <sup>2</sup>
1-person household	1.0	981	993	1,005
(Married) couple with no children	1.5	1,472	1,490	1,508
(Married) couple with 1 child	1.8	1,766	1,788	1,809
(Married) couple with 2 children	2.1	2,060	2,086	2,111
(Married) couple with 3 children	2.4	2,354	2,384	2,412
Single parent with 1 child	1.3	1,275	1,291	1,307
Single parent with 2 children	1.6	1,570	1,589	1,608

<sup>1</sup> For information: median of nominal equivalized net household income 19,866 and 1,655 euros per month. <sup>2</sup> Threshold values of 95-percent confidence band.

Source: SOEPv28.

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new pensioners in eastern Germany have declined continuously since 2003.<sup>14</sup>

Elderly people aged 75 and over have an above-average rate of poverty risk: 16 percent of this age group have to live on an income below the poverty threshold. The reason is that many of these people live alone; often they are widows due to the higher life expectancy of women. In

addition, single persons have to bear the fixed costs of a household alone, limiting their spending capabilities.<sup>15</sup>

Adolescents (10 to 17 years) and young adults (18 to 24 years) are currently most at risk of being poor. Among young adults, this finding is due to an increasing percentage of people in tertiary education, in particular university education, which has delayed entry into the la-

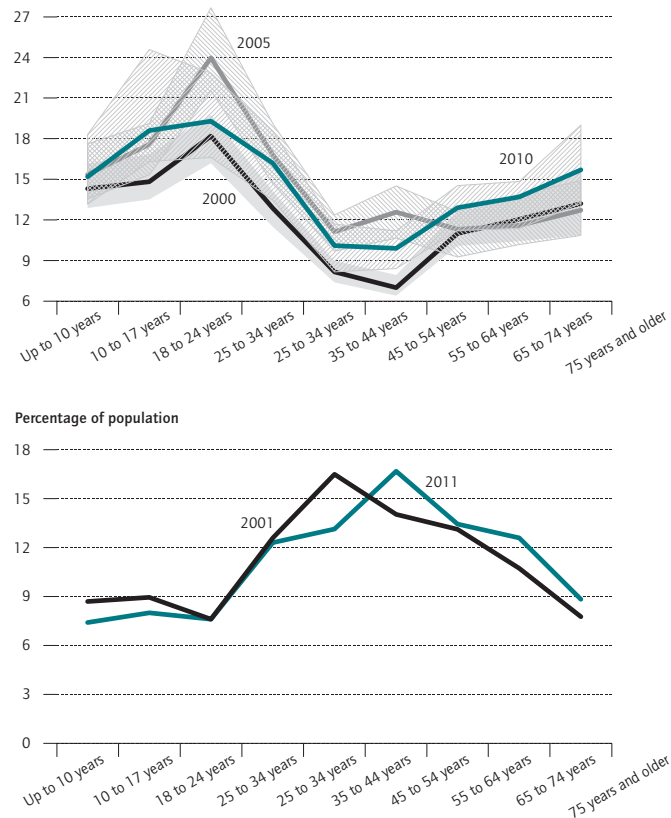
<sup>14</sup> See Goebel and Grabka (2011), "Altersarmut in Deutschland." The average contribution for new pensioners in eastern Germany in 2010 was only 785 euros for men and 666 euros for women.

<sup>15</sup> Moreover, since 2005, there has been a structural change to those living in poverty. While the proportion of people of working age to all those affected by poverty declined in 2005, this figure has been increasing for those aged 55 and over since 2005. The poverty risk is therefore increasingly concentrated on older people.

Figure 6

**Poverty Risk Ratio<sup>1</sup> by Age Group**

Figures in percent



<sup>1</sup> People with less than 60 percent of median disposable income. Data on annual incomes gathered in the following year included the rental value of owner-occupied housing, demand-weighted in line with the modified OECD equivalence scale, population structure of the subsequent year. The gray shading shows the 95-percent confidence bands (see Box 3).

Source: SOEPv28.

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Middle-aged adults are at the lowest risk of poverty, adolescents and young adults at the most.

bor market and earning an income.<sup>16</sup> The trend of young people moving out of the parental household increases the risk of young adults living close to the poverty risk threshold.<sup>17</sup> In addition, entry into the labor market is

increasingly dependent on precarious employment,<sup>18</sup> low paid internships, and in some cases vocational training does not necessarily protect against precarious income situations. As a result, over half of young adults are working in the low-pay sector.<sup>19</sup>

Following a significant increase in poverty risk to 24 percent in 2005, its ratio fell to 19 percent in 2010.<sup>20</sup> This decline was not as sharp in any other group.<sup>21</sup> Among 25 to 34-year-olds, the poverty risk rate was lower, at over 16 percent in 2005 and 2010, but still above average for the total population. The much-discussed and precarious employment situations here could also be the main cause.<sup>22</sup>

It is evident in all three years under review that children and young adults<sup>23</sup> have an above-average poverty risk. This has increased slightly since 2000, but this increase is not statistically significant. The household constellation is instrumental to the risk of growing up in poverty, whether there is only one parent living in the household and, in particular, whether the adult members of the household are in employment.

### Single Parents and Young Adults Living Alone Particularly Affected by Precarious Income Situations

Of all the household types surveyed, single parents still have by far the highest poverty risk rates. Almost half of all single parents with two or more children were three-

<sup>18</sup> B. Keller, S. Schulz, and H. Seifert (2012), „Entwicklungen und Strukturmerkmale der atypisch Beschäftigten in Deutschland bis 2010,“ WSI Diskussionspapier, no. 182, Dusseldorf.

<sup>19</sup> Kalina and Weinkopf, „Niedriglohnbeschäftigung,“ I. c.

<sup>20</sup> In the group of young adults living alone, it is possible that they receive transfers from the parental home, which cannot be fully taken into account here (this applies, for example, to taking over housing costs or financing commodities or consumer goods).

<sup>21</sup> This finding is also explained by the increase in the number of 20 to 25-year-olds in employment subject to social insurance contributions. This figure increased by 180,000 or eight percent between March 2006 and March 2010. Federal Employment Agency (2012), Arbeitsmarkt in Zahlen – Beschäftigungsstatistik. Sozialversicherungspflichtige Beschäftigte nach Altersgruppen; see also K. Brenke (2012), „Unemployment in Europe: Young People Affected Much Harder than Adults,“ Economic Bulletin no. 9.

<sup>22</sup> It is important to note here that people in the low-pay sector work more hours than the average, presumably to achieve a certain standard of living, and not to fall into poverty, see K. Brenke (2012), „Long Hours for Low Pay,“ Economic Bulletin, no. 7.

<sup>23</sup> See also P. Krause, H. Falkenberg, I. Herzberg, and J. Schulze-Buschhoff, Zur Entwicklung von Armutsrisiken bei Kindern, Jugendlichen und jungen Erwachsenen. Evaluations based on SOEP. Unpublished draft of the 14th Children and Youth Report will probably be published in the first quarter of 2013. According to the draft of the 4th Poverty and Wealth Report of the Federal Government, all relevant data sources, such as the microcensus, EU-SILC, or the Income and Consumption Survey, reveal an above-average poverty risk for children.

<sup>16</sup> See OECD (2011), Education at a glance.

<sup>17</sup> S. Scherger (2008), Flexibilisierte Lebensläufe? Die Dynamik von Auszug und erster Heirat, M. Szydlík, Flexibilisierung. Folgen für Arbeit und Familie, (Wiesbaden), 193–212.

atened by income poverty in 2010 (see Figure 7). One third of all single parents with one child are affected. The corresponding rate for both groups has increased by six percentage points since 2000, although this is not statistically significant due to the small sample size in this population group. The main reason for the low income of single parents is most probably the problem of reconciling family and career.

By contrast, both married and unmarried couples of working age with only one child or no children have the lowest poverty risk at less than six percent. These households benefit from having more than one earned income and are able to share basic household costs. After an interim increase in the poverty risk rate of three percentage points between 2000 and 2005, this figure is now the same as it was at the beginning of the decade.

The fact that an increasing number of children means an increasing risk of poverty also applies to cohabiting households: if a couple has three or more children, their poverty risk in 2010 was almost 14 percent. But the evidence shows that even for this group, the poverty risk declined between 2005 and 2010.

Compared to couples, those who live alone have an above-average poverty risk. In the 30 to 65-year age group, one in five singles were affected by income poverty in 2010, representing a significant increase since 2000 of approximately five percentage points or almost 600,000 people. 22 percent of people living alone at retirement age were threatened by poverty, especially widows living alone.

Young people living alone up to the age of 30—almost three percent of the population—are most at risk of poverty. Due to the size of the group, the increase in poverty risk is not significant, but at nine percentage points (49 percent in 2010 compared to 40 percent in 2000) very appreciable. This age group is likely to be particularly affected by the expansion of the low-pay sector and precarious forms of employment, which has an adverse effect on their income situation so, for example, the proportion of full-time workers in this age group has declined from 60 percent in 2000 to 45 percent in 2010.

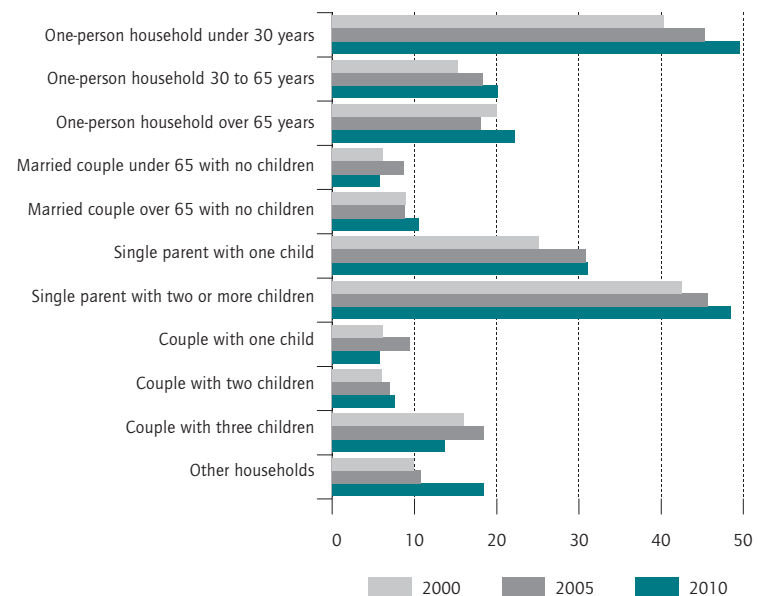
### Poverty Risk Despite Employment

Gainful employment is generally considered the best protection against poverty. Also, the amount of future state pension is linked to social contributions paid. Against the background of a low-pay sector that has been increasing for many years and employment situations not requiring the payment of social insurance con-

Figure 7

#### Poverty Risk Ratio<sup>1</sup> by Household Type

Figures in Percent



<sup>1</sup> People with less than 60 percent of median disposable income. Data on annual incomes gathered in the following year included the rental value of owner-occupied housing, demand-weighted in line with the modified OECD equivalence scale, population structure of the subsequent year.

Source: SOEPv28.

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Young single-person households and single parents are most at risk of poverty.

tributions which are usually limited to monthly earnings of 400 euros, the question arises as to whether household income earned from employment is sufficient to exceed the poverty risk threshold at working age, and, more importantly, at retirement age.

If at least one person in a household is employed, regardless of whether the job is full or part-time, the poverty risk was reduced by about a quarter, or three percentage points, in 2010 (see Figure 8). If at least one person has a full-time job, then the poverty risk decreases by up to ten percentage points less than the total working-age population. In the long term, the development of poverty risk for individuals living in households in which at least one person is employed (whether full or part-time) is similar to overall developments in poverty risk rates. This means that up to 2005, a significant increase was observed, but since then, poverty risk has remained at eleven percent. The situation is different for households where at least one member has a full-time job. In this case, only about five percent have been at risk of poverty over the last 15 years. Consequently, it

## Box 3

**Updating SOEP Data and Comparison with Other Data Sources**

The SOEP microdata (version v28 based on the 28th data collection wave in 2011) underlying these analyses produce a representative picture of the population in private households, taking into account extrapolation and weighting factors, thereby allowing conclusions to be drawn about the entire population. The weighting factors correct differences in the design of the various SOEP random samples, and the participation behavior of respondents. People living in institutional households (for example, in retirement homes) are not generally considered here.

As well as updating imputations of missing values from the previous year's income, a targeted revision of extrapolation and weighting factors has also been undertaken. To increase compatibility with official statistics, these factors will be adapted to currently available framework data from the microcensus of official statistics. Among other things, this includes information regarding the ownership rate of apartments and residential houses from the microcensus. This information is only collected in the microcensus every five years, however, so an interpolation is necessary for the intervening years. In 2011, data on the ownership rate was captured again in the microcensus, so a revision of the weighting factors in SOEP's current data supply was implemented retroactively.

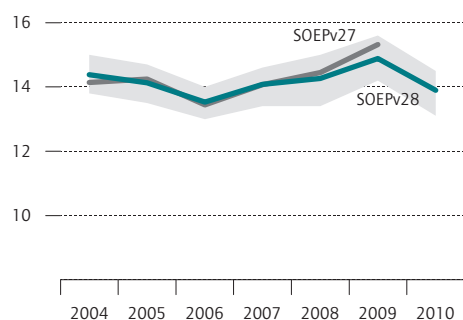
For income years 2004 to 2008, this revision only has a minor effect on measured income inequality and the poverty risk rate (see Figure 1). But for the 2009 income year, both the degree of inequality and the poverty risk rate were overestimated by almost three percent in the non-revised version where no account was taken of the current ownership rate. According to SOEP v27, the poverty risk rate in 2009 was 15.3 percent, while according to the data in SOEP v28 it is now 14.9 percent. The results do not differ significantly from each other in statistical terms, that is, they are not outside the statistical random error rate which is taken into consideration in any case when interpreting the results.

The use of random samples to estimate, for example, the median of income distribution will necessarily lead to random sampling fluctuations. The median income and the poverty risk threshold and rate derived from this can therefore only be determined to within a certain range. As well as taking confidence bands into account, which have a 95-percent probability of identifying the appropriate range of values, only clear differences should be interpreted as real changes. If one considers, for example, the poverty risk rate for the whole of Germany in the last decade, it shows that only the increase from income year 1999 to income year 2004 was statistically significant, so it can be assumed with great probability that the increase calculated from the SOEP sample actually took place. After 2004, it can

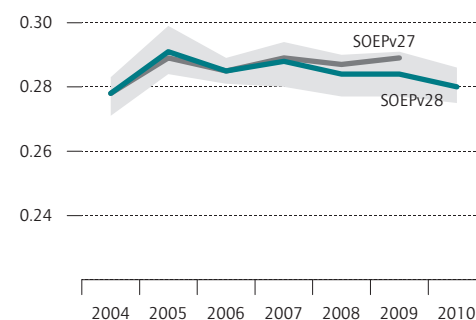
Figure 1

**Impact of Revised Data on the Poverty Risk Ratio<sup>1</sup> and Inequality****Poverty risk ratio**

Figures in percent

**Income inequality**

Gini coefficient



<sup>1</sup> People with less than 60 percent of median disposable income. Data on annual incomes gathered in the following year included the rental value of owner-occupied housing, demand-weighted in line with the modified OECD equivalence scale. The gray shading shows the 95-percent confidence bands.

Sources: SOEPv27 and SOEPv28, calculations by DIW Berlin.

be observed that the upper boundary of the significance band in 2004 was already higher than the lower boundary in subsequent years. Accordingly, this cannot be considered a significant increase in the poverty risk rate.

Compared to social reporting by the Federal Statistical Office based on the microcensus (see [www.amtliche-sozialberichterstattung.de](http://www.amtliche-sozialberichterstattung.de)) and the draft of the 4th Poverty and Wealth Report by the German government, the threshold at which a person is considered at risk of poverty is higher here (826 euros compared to 993 euros). This can be explained primarily by two factors: the microcensus asked about net monthly income—using income classes—in which typically irregular incomes such as investment income, Christmas or other bonuses are under-recorded, and also fluctuations in income streams during the year, for example, due to seasonal unemployment, cannot be adequately accounted for. In addition, the rental value of owner-occupied housing is not included in the microcensus. This notional, but highly relevant income component makes up an average of five percent in terms of disposable income.

Both these income concepts (current monthly income and previous year's income) are included in the SOEP to measure poverty in such a way that their development can be directly compared to one other. The boundaries of relative poverty based on monthly income are determined using a similar method to annual income, with two restrictions: irregular income components and "imputed rents" are not accounted for. Since monthly income is based on information coming directly from the household, these income figures are rounded much more than annual income comprising many individual components. However, the median and therefore the poverty risk threshold are sensitive to rounding effects.<sup>1</sup>

In SOEP's 28th data collection wave, 84 percent of monthly income figures are rounded to 50 euros. In order to prevent any jumps occurring in the poverty risk ratio, all households in the SOEP study that gave a rounded figure were allocated a normally distributed random value with a median of 0 and a standard deviation of 1.<sup>2</sup> This means, for example, the 333 values that were

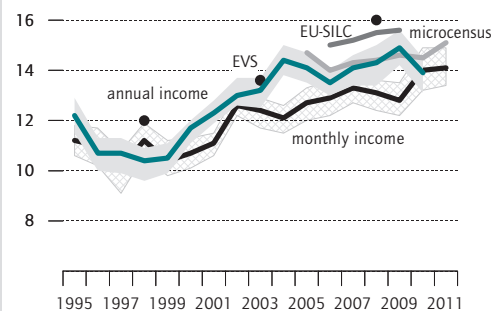
<sup>1</sup> J. Drechsler and H. Kiesl (2012), „MI double feature: multiple imputation to address nonresponse and rounding errors in income questions simultaneously.“ Paper presented at the FCSM Research Conference, Federal Committee on Statistical Methodology (FCSM), Washington, D. C., 12.01.2012.

<sup>2</sup> Coincidentally, the poverty threshold in the data for 2009 was a nominal 800 euros which in turn was given by 333 households. As a result, the poverty rate jumped from 12.3 to 12.8 percent. Had the poverty threshold been 801 euros, the rate would have been correspondingly lower.

Figure 2

### Poverty Risk Rates Based on the Different Data Sources

Figures in percent



The gray shading shows the 95-percent confidence bands.

Sources: Draft of the 4th Poverty and Wealth Report by the German government: *Lebenslagen in Deutschland* (2012). BMAS, monthly and annual income from SOEP: SOEPv28; EVS 1998: 3rd Poverty and Wealth Report by the German government, *Lebenslagen in Deutschland* (2008). BMAS, EU-SILC (2010): Press release by the Federal Statistical Office no. 362, October 17, 2012.

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exactly 800 euros are spread among the 796 to 803 euro range. According to the selected random distribution, the change is less than 0.5 euros in approximately 38 percent of cases; as a result, they remain at the original value of 800.

The draft of the 4th Poverty and Wealth Report by the German government (2012) and official social reporting have also provided results for the poverty risk rate from microcensus surveys, the Income and Expenditure Survey (EVS) and the EU-SILC European panel.<sup>3</sup>

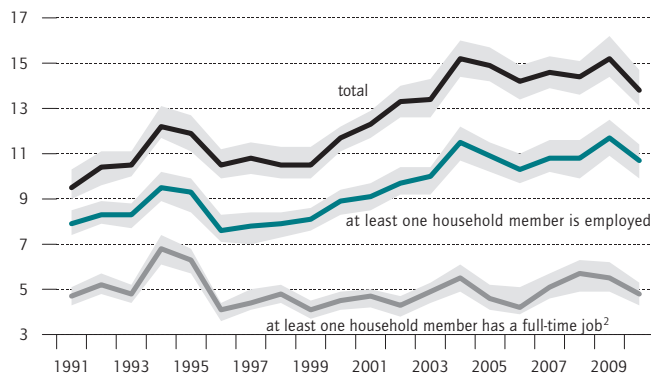
Figure 2 compares the five different sources for calculating the poverty risk rate. A direct comparison illustrates the differences arising from variations in income concepts, sampling methods, response rates, and statistical random error rates (the confidence bands for EU-SILC and EVS are not available, while the confidence band for the microcensus is extremely narrow due to the sample size). Despite clear methodological differences, the tendencies of these different measurements of poverty are largely congruent, that is, a significant increase in poverty risk up to around 2005 and since then it has remained constant.

<sup>3</sup> For a discussion of the advantages and disadvantages of each study, see also J.R. Frick and K. Krell (2011), „Einkommensmessungen in Haushaltspanelstudien für Deutschland: Ein Vergleich von EU-SILC und SOEP.“ *ASta – Wirtschafts- und Sozialstatistisches Archiv* 5 (3): 221–248.

Figure 8

**Poverty Risk Ratio<sup>1</sup> by Employment in Household**

Figures in percent



1 People with less than 60 percent of median disposable income. Data on annual incomes gathered in the following year included the rental value of owner-occupied housing, demand-weighted in line with the modified OECD equivalence scale.

2 In the previous year, mostly (6 months or more) in a full-time job. The gray shading shows the 95-percent confidence bands (see Box 3).

Source: SOEPv28, persons in households with members aged up to 65 years.

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Full-time employment significantly reduces the risk of poverty.

can be asserted that full-time employment reduces the risk of households falling into relative income poverty in the long term.

## Conclusion

Income inequality and poverty risk did not increase overall in Germany between 2005 and 2010. Recent results from the German Socio-Economic Panel Study (SOEP) even show a decline in the inequality of market incomes since 2005; however, it is not currently possible to draw any conclusions from SOEP data for the period after 2010. Improvements in the labor market situation have had a significant influence on the development of income inequality and poverty risk. Unemployment figures have fallen significantly since 2005, and the number of workers—including those paying social insurance contributions—has increased notably. However, when considering disposable income, that is, income after government transfers and net of direct taxes and social security, the picture is more mixed.

While in western Germany the development of inequality in disposable household income has declined slightly, it continues to rise in the eastern part of the country because of the added divergence of the income gap at the lower end. But overall the inequality of disposable

income in the east is still less than that of the west, in contrast to the relation in market income.

Nevertheless, income growth and the reduction of inequality in income distribution have not led to a significant decline in poverty risk. While in Germany overall 14 percent of the total population had to live on no more than 60 percent of median income in 2010, and were therefore considered at risk of poverty, poverty risk in the new Länder has steadily increased since 2006, and in 2010 it reached the 2005 record of 20 percent again.

Adolescents and young adults are still subject to an above-average poverty risk. Differentiated by type of household, single parents and young adults living alone aged up to 30 are particularly endangered with a poverty risk rate of almost 50 percent. Minor jobs or part-time work may only restrict poverty risk to a certain degree. In addition, the longer someone remains in what is frequently referred to as precarious employment, the greater the poverty risk in old age, because not only do they have minimal claims on statutory pensions but private or occupational pension insurance is normally not financially feasible because of the low income.<sup>24</sup>

Against this background, it is still too early to refer to a sustained decline in poverty risk in Germany, especially as there has been negative news recently about the labor market and economic development in Germany.<sup>25</sup>

But clearly Germany has succeeded in limiting the social and economic risks of the economic and financial crisis of 2009 to the extent that poverty risk did not increase. Although large numbers of jobs with reduced working hours did not prevent the poverty risk rate rising briefly in 2009, SOEP results indicate that during the recovery phase economic actors succeeded in applying the brake to the previously increasing inequality of income distribution.

Markus M. Grabka is a Research Associate at the German Socio-Economic Panel Study (SOEP) of DIW Berlin | [mgrabka@diw.de](mailto:mgrabka@diw.de)

Jan Goebel is Head of the Research Data Center at the German Socio-Economic Panel Study (SOEP) of DIW Berlin | [jgoebel@diw.de](mailto:jgoebel@diw.de)

Jürgen Schupp is Head of the German Socio-Economic Panel Study (SOEP) at DIW Berlin | [jschupp@diw.de](mailto:jschupp@diw.de)

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<sup>24</sup> See V. Steiner and J. Geyer (2010), "Erwerbsbiografien und Alterseinkommen im demografischen Wandel – eine Mikrosimulationsstudie für Deutschland," Policy Advice Digest, no. 55, DIW Berlin.

<sup>25</sup> See Federal Ministry of Finance (2012), Monatsbericht. [www.bundesfinanzministerium.de/Content/DE/Monatsberichte/2012/09/Inhalte/Kapitel-5-Wirtschafts-und-Finanzlage/5-1-konjunktorentwicklung-aus-finanzzpolitischer-sicht.html](http://www.bundesfinanzministerium.de/Content/DE/Monatsberichte/2012/09/Inhalte/Kapitel-5-Wirtschafts-und-Finanzlage/5-1-konjunktorentwicklung-aus-finanzzpolitischer-sicht.html), September 21; see also F. Fichtner et al. (2012), "Herbstgrundlinien 2012," Wochenbericht des DIW Berlin, no. 40.





Markus M. Grabka is a Research Associate at the German Socio-Economic Panel Study (SOEP) of DIW Berlin

## FIVE QUESTIONS TO MARKUS GRABKA

# »Slight decline in income inequality in western Germany«

1. Mr. Grabka, you have studied the development of income inequality in Germany. Have incomes in Germany increased or fallen overall in the last 20 years? Both increased and fallen. In the '90s, we had a stagnation of inflation-adjusted disposable income. In about 2000, there was a slight increase. Then disposable income stagnated up until around 2010 and we observed another increase in the last two or three years. So this means private households have more disposable income again.
2. How do the results differ between eastern and western Germany? If we look at the development of income inequality of market incomes first, we can see that income inequality in both parts of the country increased significantly between 1991 and 2005. Conversely, we see a significant decline from 2005 to 2010, primarily due to positive developments on the labor market. If we then look at the disposable income of private households, on the other hand, there are differences in income development between eastern and western Germany. Although inequality rose significantly in both parts of the country between 1991 and 2005, income inequality has also been declining in western Germany since 2005. In eastern Germany, income inequality has remained high.
3. Has income inequality in Germany spiked? There are indeed indications that since 2005, at least, income inequality seems to have spiked and we have observed a slight decline in income inequality up until 2010. However, the economy is currently on the brink of another downturn, so we have an element of uncertainty here because very positive developments on the labor market

could very well come to a standstill as a result of the euro crisis.

4. Has this changed the risk of poverty in Germany? In the '90s, the proportion of people with an income living below the poverty threshold was around eleven percent. Between 1999 and 2005, the risk of poverty in Germany as a whole increased significantly to between 14 and 15 percent. Since then, the poverty risk rate has remained at this level. For eastern Germany, it is clear that the overall risk of poverty was higher than in western Germany in all observation years and in 2010 almost one-fifth of the population in eastern Germany were at risk of poverty.
5. What age groups show the highest risk of poverty? When looking at the different age groups, we have noticed that, as expected, people who are middle aged, that is, between 35 and 55, are at lower than average risk of poverty because they are in gainful employment. After retirement, the risk of poverty increases slightly and an above-average poverty risk can be observed from the age of 75. However, young adults and adolescents are currently at the highest risk of poverty in Germany. One of the underlying causes is that young adults are staying in the education system longer. And here, we also have to take into account the "internship generation" and that young adults in particular are often working in precarious employment.

Interview by Erich Wittenberg.



# German Cities To See Further Rises in Housing Prices and Rents in 2013

by Konstantin A. Kholodilin and Andreas Mense

Over the past few years, prices and rents for flats went up in most German cities. This trend is expected to continue in 2013. Berlin, Hamburg, Munich, and Frankfurt am Main will still see the highest increases in property prices and rents. In these cities, housing prices are rising much faster than rents. By contrast, stagnating or even falling prices are forecast for the cities in the Ruhr area.

The role of the housing market in the everyday life of society is difficult to overestimate. Home rents and prices directly affect the standard of living of every person. Furthermore, the bubbles on real-estate markets are likely to trigger financial crises, which in turn spill over to the real economy. For these reasons it is very important to estimate and forecast home rents and prices. An initial step is to construct indices capturing the evolution of home prices and rent prices and then make forecasts based on this information. The present study contributes to this analysis.

However, the first problem is the lack of data on German property prices both at national and regional levels. Because prices stagnated for a long time, no real effort was made to establish long time series of regional housing price indices. In the recent years, the situation started to change.<sup>1</sup> The second problem is a lack of studies on forecasting the housing prices in Germany.<sup>2</sup>

The present study aims at addressing both of these problems. First, housing price and rent indices are calculated for 25 German cities. Second, a model for forecasting housing prices and rents is proposed.

## Home Prices and Rents in Many German Cities On the Increase Since 2007

The housing rent and price estimates used in the present study are based on data from the largest German real-estate portal, ImmobilienScout24. The advantages

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**1** K.A. Kholodilin and A. Mense, „Internet-based hedonic indices of rents and prices for flats. Example of Berlin,” DIW Berlin Discussion Paper, no. 1191 (2012).

**2** To the best of our knowledge, there is only one study forecasting real estate prices for different market segments in Germany: P. an de Meulen, M. Micheli, and T. Schmidt, „Forecasting house prices in Germany,” Ruhr Economic Papers, no. 0294, Rheinisch-Westfälisches Institut für Wirtschaftsforschung, Ruhr-Universität Bochum, University of Dortmund, University of Duisburg-Essen (2011).

## Box

**Method**

The flats vary significantly in terms of their structural and locational characteristics. Thus, in an initial step, hedonic regressions are estimated in order to compute quality-adjusted, comparable housing prices and rents. The hedonic regressions first estimate the effect on offer price or rent for flats of their size, type, and location. In a next step, the parameters are used to calculate quality-adjusted housing prices and rents of a typical flat. The features of a typical flat vary dramatically between the 25 cities (see table). In order to produce comparable results, the study uses the median of the following structural features: size, number of rooms, and housing type. Thus, the typical flat is identical in terms of its structural characteristics for all 25 cities. Namely, it is a three-room apartment located in the middle floors and having 75 square meters of total area. To allow for spatial heterogeneity within the cities, among other variables, hedonic regressions include dummy variables for zip code areas. In addition, prices and rents for a typical flat in the most expensive, cheapest, and median-priced areas of each city are computed.<sup>1</sup> The housing prices and rents for the median-priced residential areas are used as the representative values for each respective city.

The quality-adjusted prices and rents for flats in the 25 cities that were obtained from the hedonic regressions are used to make the forecasts. The study uses different dynamic forecasting models to extrapolate past developments into the future. Along with the dynamic models estimated for each city separately, the dynamic model estimated for all the cities simultaneously is employed. The latter also allows for spatial dependencies between neighboring cities. These dependencies can be explained by the spillover effects related, for example, to commuter movements and closer business relations between neighboring cities and resulting in similar trends of economic activity. In order to find the most reliable forecasting model, the study simulates out-of-sample forecasts within the dataset. On the basis of data from January 2007 to December 2009, housing prices and rents are predicted for the period from January 2010 to September 2012. As the actual property prices and rents for this period are

available, they can be compared to the forecasts, and hence the model producing the smallest forecast errors can be selected. The most reliable model has city-specific growth rates but the identical across all cities relationship between the past and the future. It also allows for the spillover effects between neighboring cities. This model is used in the third step to forecast prices and rents from October 2012 through September 2013.

Table

**Structural Characteristics of a Typical Flat**

	Flats for sale		Flats for rent	
	Number of rooms	Area in m <sup>2</sup>	Number of rooms	Area in m <sup>2</sup>
Augsburg	3	72.0	2	62.0
Berlin	3	81.9	2	67.5
Bielefeld	3	77.0	3	68.0
Bochum	3	78.0	3	64.0
Bonn	3	76.0	2.5	72.0
Bremen	3	70.0	3	63.1
Dortmund	3	75.0	3	64.6
Dresden	3	75.6	2	62.7
Düsseldorf	3	78.0	2	67.0
Duisburg	3	70.0	3	64.8
Essen	3	75.0	3	64.0
Frankfurt am Main	3	83.0	2.5	71.0
Gelsenkirchen	3	70.0	3	62.0
Hamburg	3	78.0	2.5	66.0
Hanover	3	73.0	3	66.5
Cologne	3	76.2	2	66.0
Krefeld	3	74.0	3	69.0
Leipzig	3	70.6	2	64.0
Mannheim	3	73.4	2	65.0
Mönchengladbach	3	76.0	3	70.7
Munich	3	75.0	2	66.2
Nuremberg	3	75.0	2	63.0
Stuttgart	3	76.5	3	69.5
Wiesbaden	3	84.0	3	71.0
Wuppertal	3	76.4	2	66.0

Source: Immobilienscout24, calculations by DIW Berlin.

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<sup>1</sup> Residential areas are demarcated approximately according to zip code area.

Table 1

# Selected Factors<sup>1</sup> Affecting Prices and Rents for Flats

In euros per square meter

	Area in m²	Normal apart- ment (Eta- genwohnung) compared with ground floor apartment	Cheapest	Most expen- sive	Number of obser- vations
			zip code area		
Flats for sale					
Augsburg	8.6	-28	-1,542	-	82,419
Berlin	8.1	-294	-1,457	1,677	432,803
Bielefeld	11.6	-101	-1,473	-	41,994
Bochum	7.1	-	-	975	40,651
Bonn	10.8	-114	-779	629	59,534
Bremen	10.5	-	-1,127	-	57,541
Dortmund	5.1	-22	-439*	712	73,982
Dresden	7.4	54	-	1,542	123,795
Düsseldorf	10.3	41	-1,290	1,265	133,878
Duisburg	7.0	-63	-	1,006	52,194
Essen	7.8	9**	-	1,286	90,421
Frankfurt am Main	11.5	-51	-1,265	2,396	148,244
Gelsenkirchen	2.4	41	-541	348**	24,480
Hamburg	10.0	26	-3,549	699	192,324
Hanover	8.8	-52	-1,033	-	89,871
Cologne	8.0	-172	-3,152	-	209,691
Krefeld	7.2	12*	-843	671	41,144
Leipzig	9.9	22**	-1,148	-	35,084
Mannheim	6.0	17**	-	1,176	61,539
Mönchengladbach	8.1	-75	-615	-	48,815
Munich	10.6	-316	-1,552	2,143	422,782
Nuremberg	7.7	84	-	2,523	114,371
Stuttgart	11.8	24	-	2,535	167,439
Wiesbaden	7.6	37	-	1,923	77,061
Wuppertal	5.8	-	-430*	623	77,154
Flats for rent					
Augsburg	-0.002	-	-1.48	1.04*	64,462
Berlin	-0.002	-0.68	-1.90	3.64	874,919
Bielefeld	-0.001	-0.14	-2.85	-	82,465
Bochum	-0.002	-0.05	-0.78*	2.77	90,274
Bonn	-0.011	-0.06	-2.01	2.29	123,434
Bremen	-0.005	-0.12	-1.74	3.18	109,694
Dortmund	-	-0.21	-	2.36	175,598
Dresden	-0.004	-0.15	-2.42	1.11**	455,375
Düsseldorf	0.008	0.13	-1.63	4.46	342,798
Duisburg	-0.001	-0.03	-2.15	1.14**	157,050
Essen	-0.003	0.03	-2.02	2.02	230,900
Frankfurt am Main	0.017	0.13	-4.89	5.26	349,884
Gelsenkirchen	-0.004	0.11	-1.76	-	97,382
Hamburg	0.015	-0.16	-5.29	3.88**	267,038
Hanover	-0.002	-0.06	-2.85	-	174,313
Cologne	-0.007	-0.12	-3.14	4.81	383,731
Krefeld	0.001	-	-	3.16	83,980
Leipzig	-0.006	-0.07	-2.48	-	334,509
Mannheim	-0.013	0.24	-1.77*	2.81	94,361
Mönchengladbach	-0.001	-0.06	-0.96*	1.39	98,742
Munich	-0.009	-0.36	-3.65	5.02	492,335
Nuremberg	-0.003	0.10	-3.22	-	109,705
Stuttgart	0.003	0.04	-3.77	3.19	165,300
Wiesbaden	-0.001	0.21	-3.34	3.79	155,481
Wuppertal	-0.004	0.03	-2.24	0.56*	161,820

1 Estimation results of a hedonic regression. Statistically insignificant parameters are not displayed. \* significant at the 5 percent level, \*\* at the 1 percent level, otherwise at the 10 percent level.

Source: calculations by DIW Berlin.

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Size and location in an expensive residential area, in particular, result in higher property prices and rents.

of these data are that they are very up to date and have a relatively wide geographic and temporal distribution.

This study uses data contained in Internet advertisements on flats offered for sale and for rent in Germany.<sup>3</sup> The data are monthly and cover the period from January 2007 to September 2012. About 2.9 million advertisements of flats for sale and 5.7 million advertisements of flats for rent are employed in the analysis.<sup>4</sup> This indicates that, in Germany, housing rental is far more common than home ownership.

The dataset used for this study comprises 25 German cities with a total of over 20 million inhabitants, which makes up 25 percent of the entire German population. The cities were selected both on the basis of their size and also on the number of real estate advertisements in order to ensure the representativeness of the data (see Table 1). Too few advertisements may result in excessive volatility of the housing price or rent indices.

Since home prices and rents vary dramatically depending on structural and locational characteristics of flats, the study uses hedonic regressions in order to make quality adjustments. The impact on housing prices and rents of structural features such as size, number of rooms, and property type (apartment, studio, loft, maisonette, etc.) as well as of locational characteristics (see box) is estimated separately for each city. In Berlin, for example, the offer price of a flat increases by 8.10 euros per additional square meter of living space, whereas in Gelsenkirchen the corresponding figure is only 2.40 euros.

In most cities, prices of flats have increased since 2007 (see Figure 1). Initially, the average price for owner-occupied flats in the 25 cities, examined in the study, had been stagnating, but then it started to rise at an ever accelerating pace. As result, from 2010 to 2012, the annual price increase attained 5.4 percent. This upward trend can be observed in majority of cities. It is particularly pronounced in Berlin, Dresden, and Munich. In Hamburg, the aforementioned price increase occurred slightly later. In ten cities, including Dortmund, Duisburg, and Wuppertal, prices stagnated or even went down.

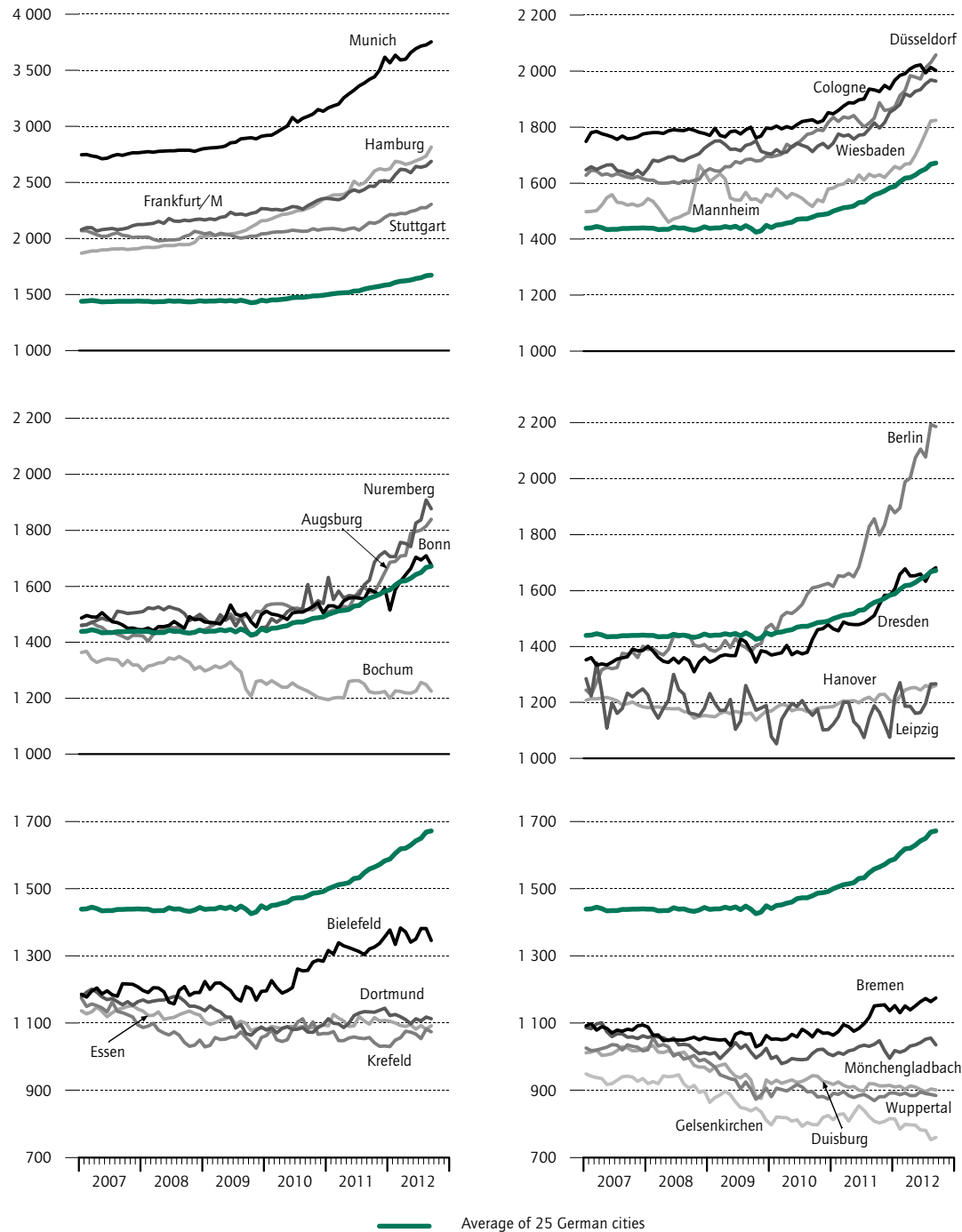
3 Data were provided by Immobilienscout24 as part of their „Transparency Campaign“, which aims at increasing transparency on the German real estate market. There are other online real estate portals but, based on its market share of approximately 30 percent, Immobilienscout24 has sufficiently representative data.

4 Data from surveyors' councils (Gutachterausschüsse) on actual house sale prices for every city considered in this study are not easily available. Therefore, offer prices are used. However, the trends identified in this study should apply also to the transaction prices and rents for flats.

Figure 1

### Prices for Flats in German Cities

In euros per square meter



Source: calculations by DIW Berlin.

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Cities with over a million inhabitants are booming, whereas the housing market in the Ruhr area is stagnating.

Increase of rents for flats was less dramatic (see Figure 2) with an average annual growth rate of 1.4 percent from January 2008 to September 2010, and 2.4 percent from October 2010 to September 2012. None of the cities analyzed experienced a drop in rents, and, in a few cases, for example, in Duisburg, Essen, and Wuppertal, rents remained more or less constant.

### Flats in Munich, Hamburg, and Berlin are the Most Expensive

In September 2012, housing prices in Berlin, Düsseldorf, Frankfurt am Main, Hamburg, Cologne, Mannheim, Munich, Nuremberg, Stuttgart, and Wiesbaden were significantly higher than the average in the cities studied. The most expensive of all is Munich, where property prices are twice as large as the average of 25 cities. In Berlin, they were around average up until the end of 2010, but have subsequently grown at a far higher rate. Since January 2007, the beginning of our observation period, prices for flats in Berlin have increased by 73 percent, which corresponds to around ten percent a year. In Hamburg and Munich, the annual price increase was 7.3 and 5.6 percent, respectively. The sharp rise in Berlin can be partially explained by the relatively low starting point for such a large metropolis.

The ratio between the quality-adjusted prices in the most and least expensive zip code areas—approximately capturing locational characteristics of the various residential areas—provides an interesting insight into heterogeneity of the regional housing markets (see Table 2). It is 4 to 1 on average, that is, comparable properties in the most expensive location cost four times as much as in the cheapest one. This ratio is highest in Hamburg at 11.2. In Duisburg, Cologne, and Nuremberg, the differences between the most expensive and the cheapest residential areas are also relatively big. Berlin is only slightly above the average with a ratio of 4.7.

In cities where housing prices are above average, rents are also higher than average. At the end of 2011, rents in Berlin reached the average level, which was around 7.00 euros per square meter. The highest rents are in Munich (12.30 euros) and Hamburg (10.90 euros). The smaller differences between the most expensive and the cheapest districts in terms of rents show that the rental housing market is much more homogeneous than the market for owner-occupied housing. There are also only slight differences between the cities here.

However, the differences between the cities are significant as far as the price-to-rent ratio is concerned. This is the ratio between the price per square meter and the

annual amount of rent. The ratio of 19—the average for all the cities studied—means, for example, that tenants will have paid the landlord the full price of the apartment after 19 years. This figure is highest in Berlin (25.6), Munich (25.4), and Hamburg (24.6). Property prices in these three cities have clearly outpaced the rents (see Figure 3). In the long run, there are two alternatives left for these cities to restore the market equilibrium: either rents should adjust upwards, or selling prices should fall again.

At the other extreme, there are Gelsenkirchen, Duisburg, Bremen, and Wuppertal, where it only takes 13 to 15 years for landlords to recuperate the price they paid for their flats by letting them out.

On average, during the last five years, prices for flats in the 25 cities have been increasing by 1.9 percent annually. At the same time, the rents for flats have been growing at an average rate of 1.6 percent a year. The spatial correlation for both housing prices and rents is strong. This means that market developments in neighboring regions are relatively highly interdependent. If one region is experiencing a boom, price and rent increases are also to be expected in adjacent areas.

### Growth in Property Prices and Rents Likely to Continue in Most Cities in 2013

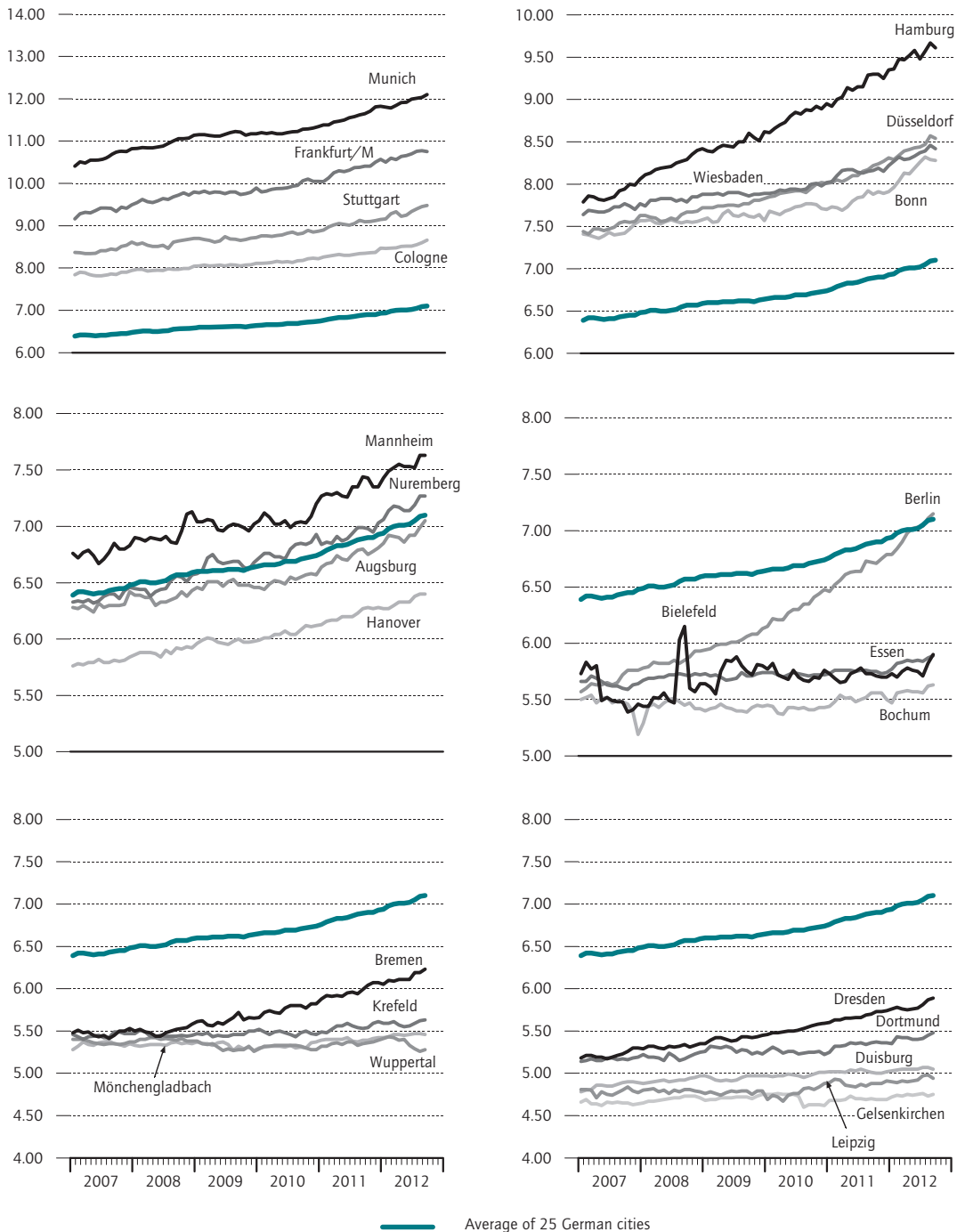
Using a dynamic panel model accounting for spatial dependence, this study estimated the future trajectory of prices and rents for the period from October 2012 through September 2013. A further increase in housing prices is predicted for 19 out of the 25 cities (see Figure 4). In five of these cities (Berlin, Augsburg, Hamburg, Munich, and Nuremberg), the increase will probably exceed ten percent. Prices will also rise dramatically in Dresden, with predicted growth of almost ten percent. The situation in Leipzig is different: prices of flats for sale there are only likely to go up slightly. Prices in cities of the Ruhr area will remain relatively constant. Essen, Bochum, and Krefeld are at the lower end of the scale, while a slight increase is possible in Gelsenkirchen, Duisburg, and Mönchengladbach. In Wiesbaden there has been a significant hike in prices since the beginning of 2012, this trend is expected to continue in the near future.

According to the authors' estimates, rents for flats will increase in virtually all the cities under investigation (see Figure 5), with the sole exception of Wuppertal. However, the growth might slow down in most cities.

Figure 2

### Rents for Flats in German Cities

In euros per square meter and month<sup>1</sup>



<sup>1</sup> Net rent excluding heating.  
Source: calculations by DIW Berlin.

The rent level is significantly above average in the Rhineland, the Rhine-Main area, and in the cities of Hamburg and Munich.

Table 2

**Level and Change of Prices and Rents for Flats**

	Population in 2009 in 1,000 persons	Price level in September 2012	Change from January 2007 to September 2012 in percent		Ratio between the most expensive and the least expensive zip code area	Price-to-rent ratio in years
			Total	Annual average		
Flats for sale						
Munich	1 320	3 755	36.7	5.6	2.7	25.4
Hamburg	1 778	2 844	49.9	7.3	11.2	24.6
Frankfurt am Main	668	2 779	28.1	4.4	4.2	21.2
Stuttgart	601	2 322	11.3	1.9	4.4	20.4
Berlin	3 435	2 241	72.5	9.9	4.7	25.6
Düsseldorf	585	2 089	25.9	4.1	4.3	20.0
Wiesbaden	277	2 032	18.5	3.0	2.5	20.1
Cologne	995	2 012	14.4	2.4	5.6	18.9
Nuremberg	503	1 877	28.4	4.4	5.7	20.8
Mannheim	312	1 815	21.9	3.5	2.3	19.4
Augsburg	263	1 814	26.4	4.2	2.0	20.7
Bonn	319	1 687	12.7	2.1	2.3	16.7
Dresden	513	1 686	24.3	3.9	2.1	23.5
Bielefeld	323	1 369	13.3	2.2	3.4	19.3
Bochum	377	1 246	-10.0	-1.8	2.8	18.4
Hanover	523	1 242	4.4	0.7	2.7	16.1
Leipzig	517	1 223	-1.5	-0.3	2.3	20.1
Bremen	547	1 122	7.9	1.3	3.5	14.9
Dortmund	582	1 113	-5.6	-1.0	3.1	16.9
Essen	578	1 092	-4.0	-0.7	3.8	15.4
Krefeld	236	1 067	-8.5	-1.5	4.9	15.8
Mönchengladbach	258	1 043	-4.7	-0.8	2.6	15.9
Wuppertal	352	892	-13.8	-2.5	3.7	14.0
Duisburg	493	866	-11.3	-2.1	6.2	14.3
Gelsenkirchen	261	748	-20.1	-3.8	5.3	13.0
Totalfor all 25 cities	16 615	1 679	12.7	1.9	3.9	19.6
Flats for rent						
Munich	1 320	12.32	15.9	2.6	2.0	
Frankfurt am Main	668	10.94	17.1	2.8	2.6	
Hamburg	1 778	9.62	23.3	3.7	2.5	
Stuttgart	601	9.47	13.3	2.2	2.1	
Cologne	995	8.89	10.2	1.7	2.4	
Düsseldorf	585	8.72	14.4	2.4	1.9	
Wiesbaden	277	8.43	10.3	1.7	2.4	
Bonn	319	8.41	11.6	1.9	1.7	
Mannheim	312	7.80	12.6	2.1	1.8	
Nuremberg	503	7.51	14.3	2.4	1.8	
Berlin	3 435	7.30	27.6	4.3	2.1	
Augsburg	263	7.30	11.8	2.0	1.4	
Hanover	523	6.41	11.1	1.8	1.6	
Bremen	547	6.29	13.5	2.2	2.0	
Dresden	513	5.98	13.3	2.2	1.8	
Essen	578	5.92	3.9	0.7	2.0	
Bielefeld	323	5.91	2.9	0.5	1.9	
Bochum	377	5.65	2.2	0.4	1.9	
Krefeld	236	5.62	3.2	0.5	1.7	
Dortmund	582	5.48	6.6	1.1	1.7	
Mönchengladbach	258	5.47	3.4	0.6	1.5	
Wuppertal	352	5.32	-2.2	-0.4	1.7	
Leipzig	517	5.06	2.7	0.5	1.7	
Duisburg	493	5.06	5.5	0.9	1.9	
Gelsenkirchen	261	4.80	2.0	0.3	1.4	
Total for all 25 cities	16 615	7.20	10.0	1.6	1.9	

Source: calculations by DIW Berlin.

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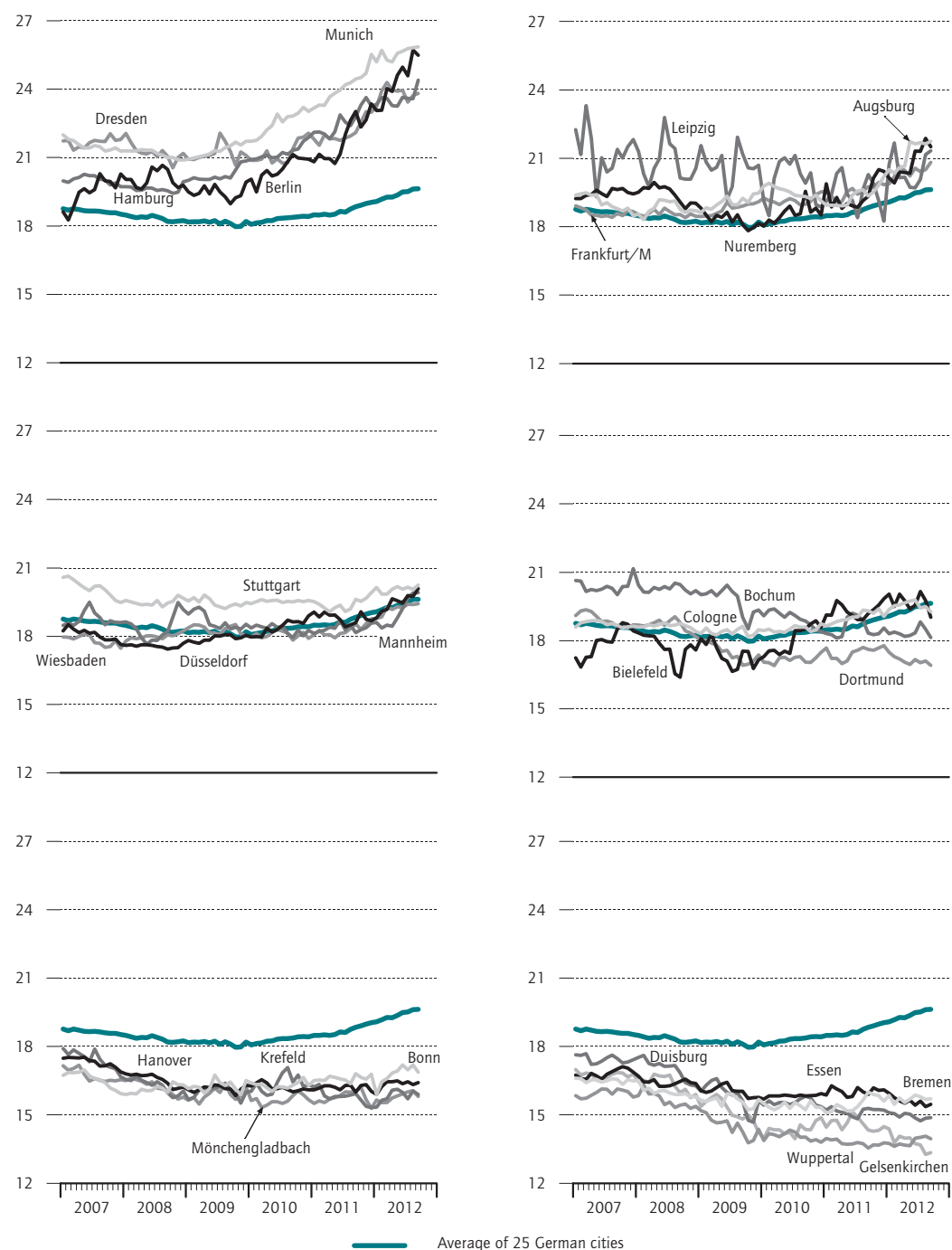
Munich is the city with the highest property prices and rents, while it is least expensive to live in the Ruhr area.



Figure 3

### Price-to-Rent Ratio

In years



Source: calculations by DIW Berlin.

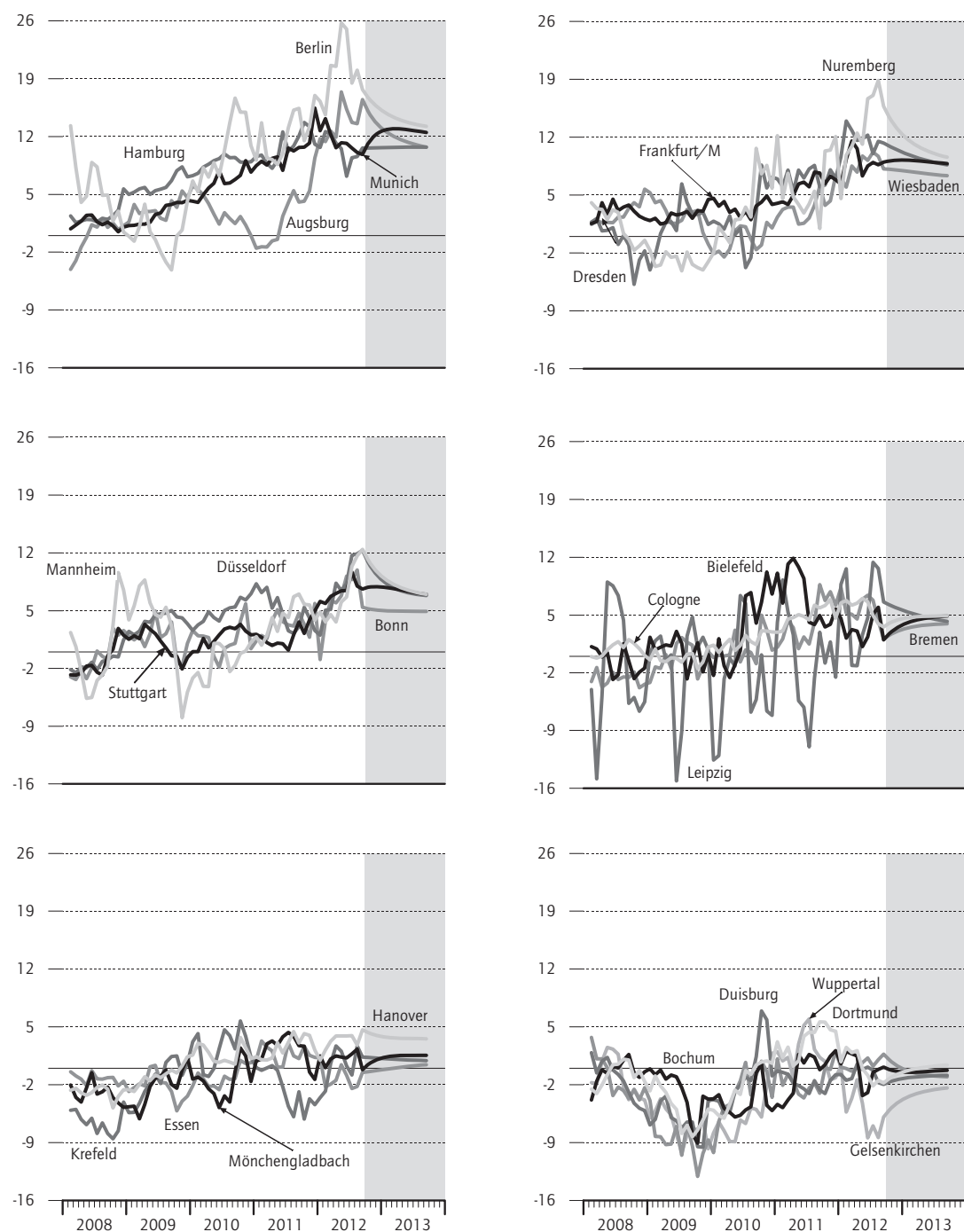
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The period of time until landlords have recuperated the prices they paid for their flats by letting them out is increasing to over 20 years in some cities.

Figure 4

### Forecasts of Prices for Flats

Change compared to the previous year, in percent



Source: calculations by DIW Berlin.

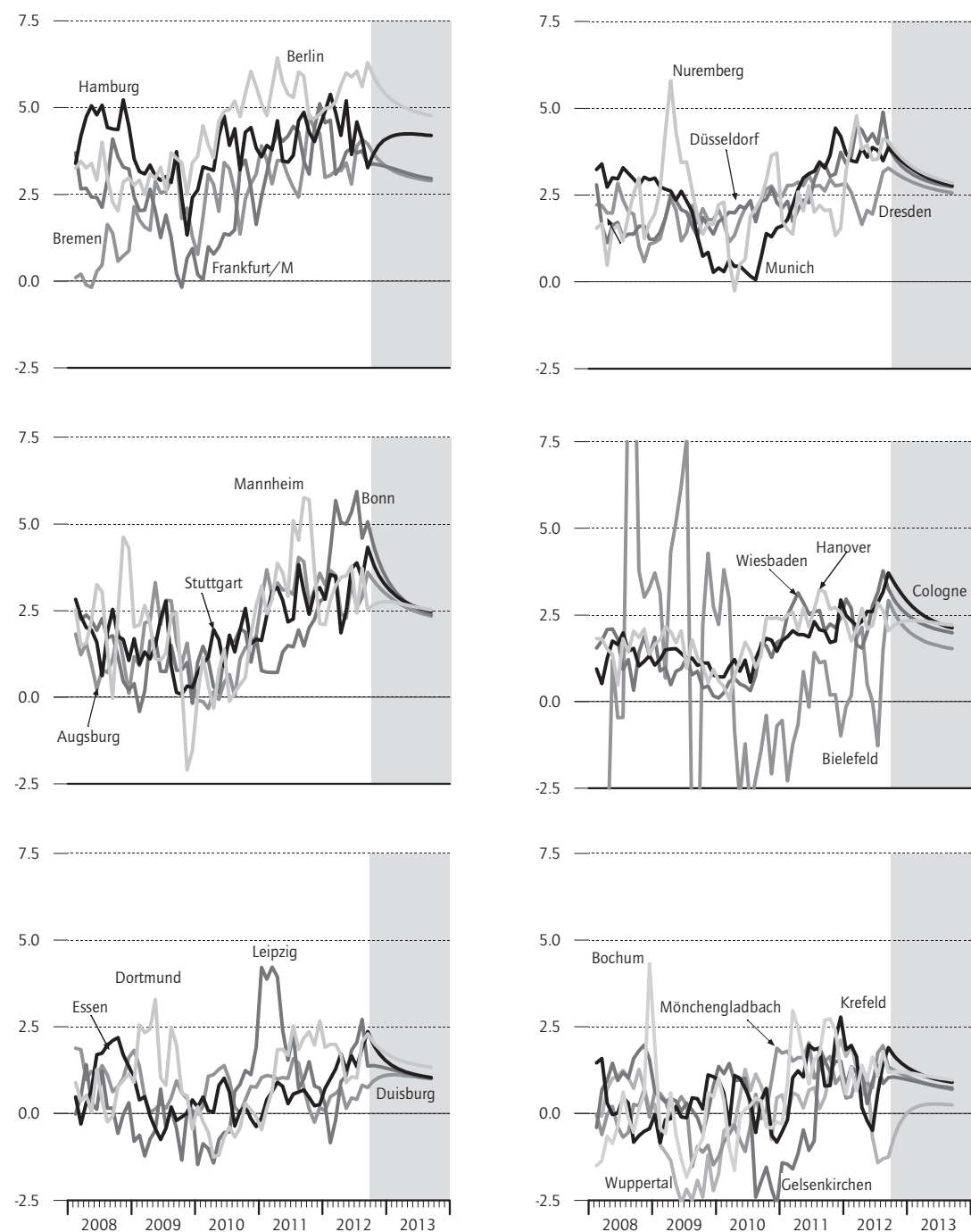
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The price increase is going to slow down in many cities.

Figure 5

### Forecasts of Rents for Flats

Change compared to the previous year, in percent



Source: calculations by DIW Berlin.

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Berlin and Hamburg have the highest growth rates, while the Ruhr area remains at the lower end of the scale.

On average, the prices for flats should grow twice as fast as the rents, although the situation varies substantially from city to city. In the Ruhr area, where, for instance, property prices are expected to fall in Bochum, Dortmund, Duisburg, and Essen, rents will either stagnate or rise. The largest absolute differences between the growth rates of prices and those of rents are expected for Augsburg, Munich, and Berlin. Price increases in these cities do not seem to be driven by proportional increases in rents, but by the expectations of future price increases. This can be regarded as a sign of strong speculation in these regional markets, when the prices drift apart from the levels that are supported by the fundamental factors. However, in order to be able to talk about ensuing speculative bubbles in certain German cities, the trends of the real-estate market must be examined in more detail.

### Conclusion

Prices for flats will continue to rise in most German cities in 2013. Rents for flats are likely to increase in virtually all cities. In some cities, property prices are increasing faster than rents, which may be the result of speculative tendencies. Although identification of the causes of the price growth acceleration is beyond the scope of the present study, the sharp increases suggest that the reason may well be the expectations to see even higher prices in the future rather than expectations of higher rental incomes. An obvious explanation can be the current expansionary monetary policy of the European Central Bank, which translates into an increase in the amount of money available and low interest rates for financing the purchases of real estate. Uncertainty about further developments in the euro area is also favorable to a general move towards tangible assets. However, the monetary policy is only the catalyst for the increase in property prices. One important factor is the growing housing shortage in many big cities, some of which are experiencing a large-scale migration at the background of the construction of new housing that has stagnated over the past few decades. The housing shortage is not reflected as much in rents as in property prices, since rent increases are restricted by law.

**Konstantin A. Kholodilin** is a Research Associate in the Department of Macroeconomics at DIW Berlin | [kkholodilin@diw.de](mailto:kkholodilin@diw.de)

**Andreas Mense** is a Research Associate in the Department of Economic Sciences at Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU)

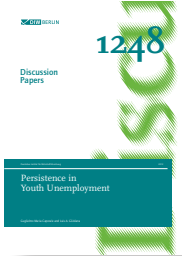
**JEL:** C21, C23, C53

**Keywords:** housing prices, housing rents, forecasting, dynamic panel model, spatial autocorrelation, German cities

Article first published as "Wohnungspreise und Mieten steigen 2013 in vielen deutschen Großstädten weiter", in: DIW Wochenbericht Nr. 45/2012.

Discussion Papers Nr. 1248/2012

Guglielmo Maria Caporale ; Luis A. Gil-Alana



## Persistence in Youth Unemployment

This paper examines the degree of persistence of youth unemployment (total, male and female) in twenty-four countries by using two alternative measures: the AR coefficient and the fractional differencing parameter, based on short- and longmemory processes respectively. The evidence suggests that persistence is particularly high in Japan and some EU countries such as Spain, Portugal, Ireland and Finland, where appropriate policy actions are of the essence. Specifically, active labour market policies are necessary to prevent short-term unemployment from becoming structural (long-term).

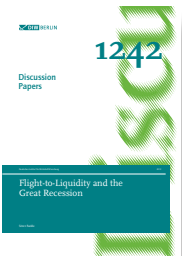
JEL-Classification: C22, J64

Keywords: Youth unemployment, persistence, fractional integration

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Discussion Papers Nr. 1242/2012

Sören Radde



## Flight-to-Liquidity and the Great Recession

This paper argues that counter-cyclical liquidity hoarding by financial intermediaries may strongly amplify business cycles. It develops a dynamic stochastic general equilibrium model in which banks operate subject to financial frictions and idiosyncratic funding liquidity risk in their intermediation activity. Importantly, the amount of liquidity reserves held in the financial sector is determined endogenously: Balance sheet constraints force banks to trade off insurance against funding outflows with loan scale. The model shows that an aggregate shock to the collateral value of bank assets triggers a flight to liquidity, which amplifies the initial shock and induces credit crunch dynamics sharing key features with the Great Recession. The paper thus

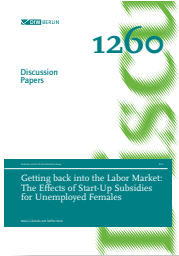
develops a new balance sheet channel of shock transmission that works through the composition of banks' asset portfolios rather than fluctuations in borrower net worth as in the financial accelerator literature.

JEL-Classification: E22, E32, E44

Keywords: real business cycles, financial frictions, liquidity hoarding, bank capital channel, credit crunch

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Discussion Papers Nr. 1260/2012  
Marco Caliendo, Steffen Künn



## Getting back into the Labor Market: The Effects of Start-Up Subsidies for Unemployed Females

A shortage of skilled labor and low female labor market participation are problems many developed countries have to face. Beside activating inactive women, one possible solution is to support the re-integration of unemployed women. Due to female-specific labor market constraints (preferences for flexible working hours, discrimination), this is a difficult task, and the question arises whether active labor market policies (ALMP) are an appropriate tool to do so. Promoting self-employment among the unemployed might be promising. Starting their own business might give women more independence and flexibility in allocating their time to work and family. Access to long-term informative data allows us to close existing research gaps, and we investigate the impact of two start-up programs on long-run labor market and fertility outcomes of female participants. We find that start-up programs persistently integrate former unemployed women into the labor market and partly improve their income situations. The impact on fertility is less detrimental than for traditional ALMP programs.

JEL-Classification: J68, C14, H43

Keywords: Start-Up Subsidies, Evaluation, Long-Term Effects, Female Labor-Force Participation, Fertility  
[www.diw.de/publikationen/diskussionspapiere](http://www.diw.de/publikationen/diskussionspapiere)

SOEPpapers Nr. 512/2012  
Holger Görg, Dennis Görlich



## Offshoring, Wages and Job Security of Temporary Workers

We investigate the impact of offshoring on individual level wages and unemployment probabilities and pay particular attention to the question of whether workers on temporary contracts are affected differently than workers on permanent contracts. Data are taken from the German Socio-Economic Panel (SOEP), linked with industry-level data on offshoring of materials and services inputs calculated from the World Input Output Database (WIOD). In manufacturing we find that temporary workers face a significant reduction in wages as materials offshoring increases, while permanent workers' wages are unaffected or even tend to increase. Offshoring of core activities generally also tends to reduce the probability of becoming unemployed, and more so for temporary than for permanent workers. By contrast, offshoring of services inputs does not have any statistically significant effects on either wages or employment probabilities in manufacturing. In the service industries, workers are affected in terms of employment probabilities from offshoring of services inputs only, although, in contrast to manufacturing industries, there are no statistically significant effects on individual wages from any type of offshoring.