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Regional Economic Divergence and House Prices: A Comparison of Germany and the UK

Benedikt Blaseio and Colin Jones

Graduated MSc Student and Professor respectively in The Urban Institute, School of Energy, Infrastructure, Geoscience and Society, Heriot-Watt University, Edinburgh
The rise of multinational companies, rapid information exchange and availability, and the liberalisation of trade and capital flows since 1980 are frequently associated with the term globalisation (Gordon, 1999). In turn globalisation has led to the economies of developed countries converging in terms of cyclical interdependency and national income in recent decades (Kose et al., 2008, Jones et al., 2017). Yet within countries arguably the opposite has been occurring with regional economies diverging, “with output and wealth increasingly being concentrated and cross-regional disparities apparently widening” (Farole, 2013: 2010).

The purpose of this paper is to develop insights into this process by examining the differential trend of regional wealth divergence within two developed countries in the context of the housing market. Germany and the UK are chosen for the comparative analysis. Both countries experienced periods of consistent economic growth from the early 1990s until the global financial crisis. However, the two countries experienced very different recent housing cycles: whereas UK real house prices rose substantially from the mid-1990s through to the global financial crisis in Germany house prices were stable, partly as a result of the ramifications of reunification in 1990 (Jones, 2012a; Westerheide, 2012). The two countries also have very different tenure patterns: in the UK the majority of households are owner occupiers while in Germany the majority are tenants. The opposing time patterns of house prices and the economic growth, together with distinct tenure patterns, make the UK and Germany particularly interesting for the research of cross-national of spatial house price patterns and trends.

The focus is on regional house price inequality as an outcome and the underlying dynamics are assessed by five hypotheses:

_Hypothesis 1:_ The regional concentration of skilled human capital has led to increasing regional house price inequality.

_Hypothesis 2:_ Due to Germany’s polycentric urban system and the more equal dispersion of skilled human capital there is a lower degree of regional house price divergence than in the UK.

_Hypothesis 3:_ With greater regional migration immobility than in Germany regional house price inequality is increasing at a faster pace in the UK.

_Hypothesis 4:_ In the UK the greater volatility of house prices means that regional house price divergence is also more volatile than in Germany.
These hypotheses frame the structure of the paper. The next section examines the relationship between the economics of regional agglomeration and migration mediated by the housing market. The subsequent section explains the existence and dynamics of regional house price inequality and market adjustment constraints. These stages represent the theoretical foundation for the paper. The following two sections compare the urban systems and the housing systems in Germany and the UK. These sections explain why the two countries differ in the degree, pace and volatility of regional house price inequality and justify the comparative hypotheses. At this point, the housing market data from the UK and Germany used in the study is described together with the essential research method. The results section then verifies the hypotheses postulated in the two previous sections based on house price data from 1991 to 2015. In this way the paper considers the extent of regional house price inequality and hence wealth inequality in the UK and in Germany. The concluding section relates the empirical findings back to the theoretical underpinnings of the paper.

Regional Agglomeration, Migration and the Housing Market

The New Economic Geography has pointed to the concentration of skilled human capital, ensuring lower probability of unemployment, higher wage rates, leading to higher regional population densities in one or a few regions within a country (Krugman, 1991, 2011). The fundamental drivers of this regional agglomeration within countries has been increasing returns to scale of spatial concentration of skilled human capital, creating knowledge spillovers and inter-firm linkages (Sassen, 1991; Venables, 2005; Glaeser and Saiz, 2003). The result is that economic growth focuses in specific localities within a country, and is cemented through what Myrdal (1957) referred to as circular causation. The concentration of skilled human capital and positive economic growth attracts more labour to the high paid jobs and skills-intensive firms that are willing to pay higher wages for access to the skills (Chen and Rosenthal, 2008). Spatially concentrated human capital also arguably facilitates entrepreneurship, i.e. the creation of new jobs (Audretsch and Feldman, 2004). The continuing agglomeration occurs because of the reinforcing impact of a skilled workforce.

Venables (2005: 8) predicts that this regional wealth divergence will be reflected by “prices of immobile factors [that] will be high in regions with good market access”. Indeed Piketty (2014) revealed a great surge of wealth inequality within the developed countries since the 1970s.
Piketty sees this as the consequence of the growth of global capital markets since 1980 that has led to the liberalisation of capital movements across developed countries (Piketty, 2014).

Globalization has also brought a shift to the informational economy promoting large cities as loci for efficient face-to-face information exchange (Hall, 2009). It has also seen the interlocking of the economies of ‘global cities’ based on financial services that has wrought a commonality to commercial real estate cycles (Barras, 2009, Jones, 2013). Additionally, the rise of multinational companies and the rapid exchange and availability of information have increased the likelihood of regional competition across national borders (Gordon, 1999).

The role of regional migration is more complex, and this aspect of the dynamics of the regional circular causation of spatial concentration has some ambiguities. Regional migration is a key part of the process but certainly in the UK it is weak. Population immobility is one of the main causes for structural unemployment in peripheral regions (Valletta, 2013). The propensity to move varies with age and level of education. Analysis by Plane (1993) and Greenwood (1997) suggests that migration propensities peak during the early to mid-twenties and then decline steadily with a slight upturn at retirement age in some countries. Greenwood (1997) also finds that migration propensities increase with each additional year of education. His findings demonstrate that an average US college student studying for five years is 1.9 times more likely to migrate than a college student studying for one to three years, and 2.3 times more likely than a high school graduate. Growe’s (2010) study of the spatial affinity of skilled human capital in Germany also shows that most knowledge-based professions are overrepresented in core cities and highly urbanised districts but not in rural areas. Thus, it is important to note that skilled human capital is more mobile than unskilled workers.

The housing market can cause an impediment to these labour market adjustments through its tenure structure and regional variations in house prices. The housing market itself shapes the mobility of population. The affordability of housing determines the recruitment and retention of key workers, especially for that part of labour who are on national pay scales and earnings that do not fully reflect the differences in regional (rental) house prices (Jones and Watkins, 2008; Fingleton, 2008). According to Blanchflower and Oswald (2013), high homeownership regions have a lower population mobility, as (i) selling a house is a riskier venture and involves higher transaction costs than simply the cancellation of tenancy and (ii) the demand for renting
housing space in regions with high homeownership rates is relatively lower, therefore making it more difficult to let in one place and rent somewhere else.

Ortalo-Magne and Rady (2002) also show that homeowners in prosperous regions are exposed to higher immobility as they want to benefit from expected future capital gains. In the UK for example the gulf in house prices between peripheral and southern regions means that there are substantial barriers for owner occupiers to moving into London or the South East because households will not be able to afford a home of an equivalent standard even with a large salary increase. Looking at it from migration in the other direction Bover et al. (1989) also argue that labour is dissuaded from migrating to peripheral UK regions from the South East of England because of the difficulties created by differential house prices/trends will constrain their ability should they ever wish to return.

Regional migration is not just potentially smothered by house price differences. In the 1980s Hughes and McCormick (1981) and Minford et al. (1988) identified the restrictive role of public sector housing. This housing is allocated primarily administratively within individual localities, and households wishing to regionally migrate within the sector face substantial barriers. This aggregate influence has been reduced in the UK with the demise of this tenure through subsidised sales to sitting tenants and minimal new building (Jones and Murie, 2006). The most flexible tenure is private rented housing many of whose tenants are young professional adults, the most mobile group in society. In countries such as Germany with a high proportion of the stock in the private rented sector the barriers to regional migration should be less. Similarly the rise of private renting in the UK since the millennium has arguably reduced obstacles to regional labour market adjustments (Ronald and Kadi, 2017).

**Understanding Regional House Prices**

The regional concentration of high level economic activity as noted above is shaped by the housing market, creating constraints on labour mobility, but it also has consequences for the housing market. The more mobile skilled human capital seeks to move to the region offering the highest utility but this is combined with the absence of the adjustment that unskilled workers or retirees out-migrate in substantial numbers. It means increased demand pressure on house prices/rents in prosperous regions and the reverse in declining regions (as they experience no in-migration).
There have been a range of studies that have examined statistical relationships between regional house prices in the UK without an explicit modelling of the causal dynamics although it is implicitly inter-regional migration. The latest of these studies are Holly et al. (2011) and Hudson et al (2018). Even without substantial regional migration Meen (1999) argues that there will be differential regional house price patterns linked to internal demand and supply influences and balances. On the demand side income is a crucial factor. Holly and Jones (1997) results suggest that disposable income is the central driving force behind real house prices in the UK. In contrast, Annett (2005) shows that while real income per capita is not the central determinant it is still a significant variable for house prices in Germany. The regional employment rate also has a positive effect on housing demand in a number of ways. First, as more people become employed, the demand for more living space increases and/or the newly employed labour decides to start a ‘new’ household, i.e. average household size decreases (Schnure, 2005; Egert and Mihaljek, 2007). Furthermore, a higher employment rate strengthens the employees’ bargaining power, leading to overall higher incomes (Rivera-Batiz, 1988; Blanchard and Oswald, 2013). The great accumulation of highly skilled human capital and capital funds in the Silicon Valley is an extreme example of this circular causation (Storper and Scott, 2009). Unsurprisingly, average house prices in the Silicon Valley are the highest in the US (Picchi, 2014).

At the same time there are supply constraints on new housing development. Glaeser et al. (2006) notes the following effects: First, positive shocks to regional human capital productivity will have little impact on new construction, and because the number of houses does not increase significantly regional house prices must rise. Second, higher wages lead to higher regional tax income, leading to improved regional amenity levels, and thus driving the circular causation noted above. These conditions are exacerbated by the view that political decision-making in planning always favours the existing residents, and a strong sentiment of nimbyism, new development not in my backyard. Evans (2003) summarises the issues,

“Where incomes and employment are high in southern England people will support and accept restrictions which, if nothing else, are seen as helping to maintain the value of their houses. Faced with rising house prices they may sometimes complain that their children can afford to buy less housing than they could at the same age, but this is a minor complaint made as they congratulate themselves on their own successful investment in housing. On the
other hand, in areas where incomes are lower and unemployment higher, plans have to be more flexible to permit the economic development that every local politician wants in his or her constituency” (Evans, 2003: 198-199).

In similar vein there are a number of more recent studies that have highlighted this continuing important role of planning constraints on the housing market (Cheshire, 2013; Hilber and Vermeulen, 2015). Bramley (2003) has argued that planning restrictions contribute to gross house price disparities between regions and that these price effects have major implications for the distribution of wealth.

Nevertheless house building will be higher in growth regions. In addition building labourers will tend to migrate from regions of low construction activity (with already low concentration of human capital) to regions of high construction activity (with already high concentration of human capital) (Fingleton, 2008, Saks, 2008). Firms will also not locate to regions of low construction activity, as “after all, firms in a region cannot expand employment without new homes to house new workers” (Glaeser et al., 2006: 88). Eventually, low regional construction activity leads to out-migration and lower house prices, while regions with high construction activity will experience increased population growth and thus higher house prices. Fingleton (2008) therefore concludes that higher regional housing supply leads to higher (not lower) regional house prices. Overall these arguments can be summarised by the following hypothesis.

**Hypothesis 1:** The regional concentration of skilled human capital has led to increasing regional house price inequality.

**The Urban Systems in the UK and in Germany**

A key question of the New Economic Geography is how far the tendency toward geographical concentration will proceed. Krugman (1991) states that the answer depends on the underlying parameters of the spatial economy. Cities as the centre of skilled human capital accumulation arguably function as the ‘motors’ of any economy (Krätke, 2007). So drilling down analysis of the urban systems of the UK and Germany provides insights to the extent of regional house price disparities.
In the UK, the rather centralistic structure has helped London to develop into a prominent ‘global city’, and a mega city-region (Hall, 2009). The Greater London Area is functioning not only as a corporate service centre of the national economy, but also as a primary locational centre for international, global firms in Europe. The metropolitan region of London has the highest absolute concentration of skilled employees in Europe (Krätke, 2007). In contrast in Germany, the federal, polycentric structure has led to a more equal dispersion of skilled human capital. The functional division of Germany suggest seven cities with important functional specialisation (Growe, 2010; Spars and Naismith, 2012). Germany’s urban system has no single nucleus but several industry-focused regional centres.

Table 1 provides comparative profiles of the urban systems in the two countries. It shows that 51.5% of the population in the UK reside in the largest 180 cities (measured by population size of administrative areas) compared to 40.1% in Germany. This again indicates the more rural geographical dispersion of Germany as identified by Spars and Naismith (2012). More striking, however, are the differences in the population dispersion across the 180 largest cities in each country measured by the coefficient of variation. Based on this parameter it can be concluded that the UK population (living in the largest 180 cities) is nearly twice as much ‘unevenly’ spaced compared with Germany.

The regional concentration of skilled human capital is therefore more dispersed in Germany compared to the UK, which means the impact of the circular causation is less in Germany than in the UK. In turn, this should mean that regional house price inequality in Germany is lower than in the UK. This is expressed in the following hypothesis.

**Hypothesis 2**: Due to Germany’s polycentric urban system and the more equal dispersion of skilled human capital, there is a lower degree of regional house price divergence than in the UK.

**Housing System Differences between the UK and Germany**

The rationale behind hypothesis 2 is that the underlying geography of inequality within the housing market varies across countries dependent on the degrees of concentration of spatial economic activity. In this section the focus is on the differences in the housing markets in Germany and the UK in terms of stock, tenure, and the pace and volatility of house prices.
In common with many Western countries from the middle of the 1990s the UK experienced the beginnings of a significant upturn in house prices. The international nature of the boom can be partly traced to the development of global capital markets and the issue of mortgage backed bonds to international investors. House prices accelerated into full boom in the early 2000s and continued until a sudden end with the global financial crisis in the last quarter of 2007. The long upswing saw real prices rise by 173% in the UK. Germany together with Japan were outliers from this international price upswing. In fact Germany experienced a long downward movement in real house prices from 1994 to 2008 which saw a real fall of 26.5%. The reasons for these differences lie partly because of the reunification of the country and a declining population (Westerheide, 2012).

Over eight years from the end of 2007 the average Eurozone real price fall was 11.5% masked by a rise of 22.5% in real prices in Germany which had not participate in the boom. Its economy had also not suffered severely as others in the aftermath of the global financial crisis. In contrast the UK saw GDP per capita falling and house prices decline by 5.2% in real terms by the second quarter of 2015 (Jones et al., 2017). These different market trajectories are underpinned by variations in the availability of mortgage finance, tax and subsidies and supply balances (Jones, 2012b). Together with the distinct urban systems these differentials contribute to regional house price inequality (year-on-year) following divergent paths in the UK and in Germany. There are also other factors at work.

The UK’s housing stock relative to the total population is approximately 20% lower than in Germany so the average household size in the UK is 20% larger. Part of the reason may be differences in the nature of the stock. Apartment buildings make up a large part of the total housing stock in Germany, while in the UK semi-detached and terraced housing predominates. Semi-detached houses are purpose-built for families of up to 6 residents (Park, 2017). The English Housing Survey (DCLG, 2011) indicates that the average size of an apartment and of a semi-detached house is 50.0m² and 87.4m² respectively. The tenure structure of the two countries is also very different with owner occupation in Germany much lower than the UK, 52.4% compared with 64.8% in 2011. At the same time the proportion of private rented housing in Germany is 39.6%, more than double that in the UK (17.1%) (Eurostat, 2014).

Regional household mobility within the owner occupied sector is likely to be lower in the UK than in Germany for a number of reasons. Higher household sizes in the UK establish higher
barriers for demographic mobility and the rentability of spacious houses is lower than of flats, which leads to a ‘house-lock’ effect (Valleta, 2012). There are also the differences in the urban system between the two countries noted earlier and the greater barriers to regional mobility in the UK that means that lower-income households do not out-migrate. This facilitates regional house price inequality and suggests the following hypothesis.

**Hypothesis 3:** Given the UK is exposed to a higher population immobility than in Germany, then it is expected that regional house price inequality is increasing at a faster pace in the UK.

Not only have house prices in the UK grown much faster than house prices in Germany since the 1990s as noted above they have also been more volatile. Indeed the UK had the fourth highest house price volatility between 1970 and 2010 out of 21 OECD-countries. As a result UK house price growth was 1.6 times more volatile than in Germany that displayed the lowest degree of volatility (Voigtländer, 2014). Within these fluctuations Jones and Watkins (2008) draw attention to the changing regional house price relativities through house price cycles in the UK. The ‘gap’ between house prices in the north and south widens at peaks of the house price cycle in 1988 and 2002-03 and similarly narrows in downturns. Such a phenomenon is unlikely in Germany partly because much of the housing stock is owned by private landlords and other long-term oriented investors. In addition, it is plausible to assume that private landlords prefer to invest near their domicile, because they will have better market knowledge and can manage and monitor their investments efficiently. These factors create a stabilising force in Germany. This results in a more regionally dispersed investment environment and thus reduces the pressure on regional house price divergence. These arguments support the final hypothesis.

**Hypothesis 4:** In the UK the greater volatility of house prices means that regional house price divergence is also more volatile than in Germany.

**Data and Research Methods**

The empirical analysis is based on annual house price trends from 1991 to 2015 in Germany and the UK. There can be problems with international comparisons of housing systems and house price trends because for example data is compiled differently, but the statistics from both countries in this study are comparable (Jones, 2012a). In Germany, house price datasets are not publicly available online, but are aggregated and sold by different private companies such
as GEWOS or Bulwiengesa AG. The independent consulting company Bulwiengesa AG provided aggregated regional house price data since 1990 for the study. The data set included yearly house price data for the sixteen different states in Germany from 1990 to 2015. Housing is subdivided into two types, flats and terraced houses.

This house price data from Bulwiengesa AG RIWIS was in the form of actual house prices in nominal terms. The house prices of the flats and terraced houses were translated into real house price indices using the Consumer Price Index (CPI) provided by the Statistisches Bundesamt (Destatis, 2017a). An annual national average price was calculated (1991=100) by weighting each state’s average by its proportion of national households each year. The household proportions were accessed online on the website of the Statistisches Bundesamt (Destatis, 2017b).

For the UK Nationwide’s House Price Indices were utilised. These are based on transactions funded by the building society, one of the largest mortgage providers in the UK. The data are publicly available in the form of aggregate regional house price indices for the 12 different administrative regions of the UK, as well as a national average house price. The dataset covers 1991 to 2015 and differentiates between flats and terraced houses at a regional level (lowest level of disaggregation). The choice of flats and terraced houses is because they are quite standardised house types (reducing price variations) while at the same time it is expected that they will follow general market trends. It also enables a disaggregated view of the housing system that is more meaningful than simple averages (see Hudson et al., 2018). The similar data granularity of both datasets therefore provides for meaningful comparative analysis, although ideally more spatially disaggregated data would have been preferable.

The house price data from Nationwide is available in the form of an index in nominal terms and was translated into real house price indices using the Consumer Price Index (CPI) provided by the Office for National Statistics (ONS, 2017). A national index was formulated by weighting the regional indices using the yearly regional household proportions accessed from the Office for National Statistics (ONS, 2015). Unfortunately, the flats price index was incomplete with 18 house price data points out of 325 data points. The missing values were interpolated by applying the house price growth rates of the regions in question from the Nationwide real house price index, including all property types. As the missing values
represent only 5.5% of the total data for flats and were not consecutive or focused in a particular region the ultimate time series has not been biased.

The measure of spread used to define regional house price inequality is the coefficient of variation (CV) (Bellù and Liberati, 2006). The complete formula is as follows, where variables differ according to the country:

\[
CV_t = \frac{1}{\mu_t} \sqrt{\frac{\sum_{i=1}^{n} P_{it} (x_{it} - \mu_t)^2}{n - 1}}
\]

where \( CV_t \) is the variation of coefficient at time \( t \) (where \( t = 1991 \) to 2015), \( \mu_t \) is the average house price at \( t \), \( n \) is the number of regions in the country (where \( n = 12 \) for the UK or 16 for Germany), \( i \) is the region, \( p_{it} \) is the proportion of households (%) in region \( i \) at time \( t \), and \( x_{it} \) is the indexed real house price in region \( i \) at time \( t \). The analysis is differentiated for house types, flats and terraced houses, in both countries. In the next section each hypothesis is assessed in turn.

**Results**

**Hypothesis 1:** The regional concentration of skilled human capital has led to increasing regional house price inequality.

To recap the fundamental argument for this is because the spatial concentration of skilled human capital provides advantages in effectivity and efficiency in form of increasing returns to scale, which drives *regional population growth* in one region at the price of other regions. Within the two countries this demonstrated by the regional patterns of economic activity and house prices. The southern regions in the UK (London, South East) and in Germany (Bavaria, Baden-Württemberg) have the highest house prices. These regions also have the highest concentration of skilled human capital (Bennett et al., 1999; Growe, 2010).

While there is a substantial difference in house price growth noted above between the two countries a common trend of increasing regional house price divergence within the two countries is shown in Figures 1 and 2. This pattern of divergence applies to flats and terraced houses. These trends support the hypothesis that house price inequality is increasing (albeit
with some cyclical influences) in both these developed countries, irrespective of such underlying parameters of the housing market.

Quantifying the relationship by means of the correlation coefficient on the basis of the CVs of the UK and Germany from year 1991 to year 2015 reinforces this finding. The trends of regional house price divergence (CV) correlate strongly in both countries for both types of housing space. It can be concluded that the increase in regional house price divergence is most likely independent from house prices and irrespective of any underlying parameters of the housing market. In other words it does not matter if average national house prices increase or decrease at a fast or at a slow pace, in the long-term rising regional house price divergence sustains.

**Hypothesis 2:** Due to Germany’s polycentric urban system and the more equal dispersion of skilled human capital there is a lower degree of regional house price divergence than in the UK.

The argument underpinning this hypothesis is that regional house price inequality is higher in the UK because of its centralistic urban system and lower in Germany because of its polycentric urban system. Figures 1 and 2 clearly display this pattern for both types of housing space. In fact, regional inequality as measured in the coefficient of variation is in the UK on average (between the years 1991 to 2015) 111.75% higher for flats and 106.33% higher for terraced houses than in Germany. These findings support Hypothesis 2.

**Hypothesis 3:** With greater regional migration immobility than in Germany regional house price inequality is increasing at a faster pace in the UK.

The regional house price inequality timelines in Germany and the UK follow different paths. This is demonstrated by the correlation coefficients for the growth rates of the Coefficient of Variations (CV Growth year-on-year) between the countries given in Table 2. It shows correlation coefficients of around zero for both types of housing space. In particular the average rate of divergence, measured by growth rate of CV, for both flats and terraced houses increases in Germany and the UK between 1991 and 2015. Table 3 also demonstrates a higher pace of regional house price divergence in the UK than in Germany for both types of housing.
Thus, it can be concluded that the results in Table 3 support the Hypothesis 3. Interestingly, while terraced houses exhibit higher regional house price inequalities in both countries the pace of divergence is lower. The lower inequality for flats in both countries may be that a greater proportion of flats are owned by investors, and are therefore less prone to regional economic instabilities (Eichholtz et al., 2014).

**Hypothesis 4:** In the UK the greater volatility of house prices means that regional house price divergence is also more volatile than in Germany.

The basis of this hypothesis is that regional house price divergence occurs at a steadier pace in Germany, while in the UK regional house price divergence is more volatile with phases of divergence (in times of booms) and phases of convergence (in times of downturns). This volatility is set within the overall trend of divergence. To assess this hypothesis the research calculates the standard deviation of the annual CV growth rates from 1991-2015 as set out in Table 4. The results show there is a clear difference in the standard deviations of regional house price divergence of the two countries, irrespective of the type of housing space. Hypothesis 4 is therefore endorsed.

**Conclusion**

The paper develops a conceptual explanation as to why regional house price disparities are widening within developed economies through the concentration of skilled human capital, and how such trends could be different in countries. In particular the paper develops a framework of hypotheses to explain why countries differ in the degree, pace and volatility of regional house price inequality and to what extent this trend affects the spatial distribution of wealth. Germany and the UK are chosen for the comparative analysis because while they are both advanced economies and have experienced similar recent economic growth they have very different urban and housing systems, as well as housing market trends.

The empirical findings are limited to two countries but the analysis based on annual house price data from 1991 to 2015 tests five specific hypotheses. First, increasing regional house price inequality is found in both Germany and the UK, as hypothesised from the regional concentration of skilled human capital. Second, a lower degree of regional house price divergence is found in Germany compared to the UK as expected from Germany’s more...
polycentric urban system. Third, the growth of regional house price inequality has followed different (but increasing) paths in the two countries. In fact regional house price inequality is increasing at a faster pace in the UK as anticipated given its greater regional migration immobility than in Germany. Finally, the study finds that regional house price divergence is also more volatile in the UK than in Germany.

In terms of the contribution to theory it is clear that while, following the New Economic Geography, the driving force for regional concentration of economic activity and hence house prices and wealth lies in circular causation the underlying parameters of the housing market have an influence. The lower regional migration in the UK compared to Germany has significantly impacted on the pattern of regional house price divergence.

The problem of increasing regional house price inequality seems to be an unstoppable process due to circular causation supported by the housing system, albeit to various degrees in different countries. This is true even though information communication technologies have led to the diminution of the importance of location and long term regional policies have supported decentralisation. However, regional convergence last happened in the UK over the twenty five years from the Second World War (Mackay, 2003), and then in a manufacturing dominated economy. To envisage a return to regional convergence would require at the very least an unlikely step change in the resources and approach to spatial policies. Regional migration/housing market barriers too are also unlikely to fundamentally change. The one potential possibility is a reframing of the inter-urban transport systems such as the building of high speed rail systems that could relax regional economic constraints, and permit long distance commuting. In the UK such a rail system is currently planned to be built over the next twenty years starting with a link between London and Birmingham to be opened in 2026 (HS2, 2018). Any potential fundamental change is therefore many years in the future.
Table 1 Largest 180 cities measured by population size in the UK and in Germany

<table>
<thead>
<tr>
<th>Population figures</th>
<th>UK</th>
<th>Ger</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Population (TP)</td>
<td>65,110,034</td>
<td>82,175,684</td>
</tr>
<tr>
<td>Population in largest 180 cities</td>
<td>33,506,162</td>
<td>32,952,595</td>
</tr>
<tr>
<td>%TP in largest 180 cities</td>
<td>51.5%</td>
<td>40.1%</td>
</tr>
<tr>
<td>Mean Population in largest 180 cities</td>
<td>186,145</td>
<td>183,069</td>
</tr>
<tr>
<td>Standard Deviation of largest 180 cities</td>
<td>653.60</td>
<td>328.94</td>
</tr>
<tr>
<td>Coefficient of Variation</td>
<td>0.35%</td>
<td>0.18%</td>
</tr>
</tbody>
</table>

Source: Brinkhoff (2017), based on latest official estimates from the Office for National Statistics (UK) and the Statistisches Bundesamt (Germany) in 2015

Table 2 Correlation Coefficients of Indexed Real Prices and Coefficient of Variations (CVs) for Flats and Terraced Houses between UK and Germany

<table>
<thead>
<tr>
<th>Correlations of Flats (UK vs. Germany)</th>
<th>Correlations of Terraced Houses (UK vs. Germany)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indexed Real Flat Prices</td>
<td>CVs, Growth (y-o-y)</td>
</tr>
<tr>
<td>Coefficients of Variation (CV)</td>
<td></td>
</tr>
<tr>
<td>-0.47</td>
<td>+0.79</td>
</tr>
<tr>
<td>-0.07</td>
<td>+0.07</td>
</tr>
</tbody>
</table>

Table 3 Average Annual Growth Rates of Regional House Price Inequality measured by the Coefficient of Variations (CVs) for Flats and Terraced Houses (1991-2015)

<table>
<thead>
<tr>
<th>Average annual growth rates of CVs</th>
</tr>
</thead>
<tbody>
<tr>
<td>UK</td>
</tr>
<tr>
<td>Germany</td>
</tr>
<tr>
<td>Flats</td>
</tr>
<tr>
<td>Terraced Houses</td>
</tr>
<tr>
<td>+3.16%</td>
</tr>
<tr>
<td>+2.52%</td>
</tr>
<tr>
<td>Flats</td>
</tr>
<tr>
<td>Terraced Houses</td>
</tr>
<tr>
<td>+2.30%</td>
</tr>
<tr>
<td>+1.32%</td>
</tr>
</tbody>
</table>

Table 4 Standard Deviation of the Coefficient of Variations (CVs) for Annual Growth Rates of Flats and Terraced Houses (1991-2015)

<table>
<thead>
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Figure 1 Regional Price Inequality of Flats in Germany and the UK

Figure 2 Regional Price Inequality of Terraced Houses in Germany and the UK
References


