Journal of Economic Geography (2022) **22**, 1225–1246
Advance Access Publication 19 May 2022
https://doi.org/10.1093/jeg/lbac012

Spatial dynamics of post-crisis deleveraging

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Abstract

While the growth of household debt has been instrumental in the creation of the recent bubbles, debt disposal also plays an important role in shaping the scope and depth of busts. Much has been written about debt and leverage since the 2008 global financial crisis. Debt-downsizing, however, received little attention. Deleveraging has the potential to reinstitute stability but it can also create a drag on economic recovery. This paper investigates the spatial patterns of deleveraging for the first time in the context of English regions, Wales and Scotland based on a multi-level framework that should be applicable to countries and regions beyond these three countries. Using longitudinal household survey data and reconstituting space through this multilevel framework, we show that deleveraging has been highly uneven and short-lived across space and time. This outcome is shaped by three major factors: individuals'/households' socio-economic position, how their regions are affected by the boom-and-bust cycle and how governments' crisis management programmes take effect in each region.

Keywords: Unsecured debt, deleveraging, crisis, austerity, Britain
Date submitted: 22 September 2021 **Editorial decision:** 11 April 2022 **Date Accepted:** 20 April 2022

1. Introduction

The growth of household debt, especially subprime loans, played a major role in the 2008 global financial crisis (GFC). Political economy studies have linked the GFC to the process of financialisation, reflecting a shift in the regime of capitalist accumulation (Boyer, 2000; Froud et al., 2000; Stockhammer, 2004; Epstein, 2005; Krippner, 2005; Lapavitsas, 2013). While acknowledging the importance of the contributions of political economy perspectives, researchers of economic geography provided a compelling criticism of the tendency for neglecting the geographical embeddedness of finance:

> Financial transactions connect and blend different times, spaces and risks, transcending ideas about linear time and 'national' and 'offshore' jurisdictions. This appreciation of the changing forms and possible spatialities of capital have profound implications... (Martin and Pollard, 2018, 4)

This scholarship highlighted locational dynamics of finance and instability (Lee et al., 2009; French et al., 2011; Dymski and Shabani, 2017; Christophers, 2018). Examples include the geography of financial centres with the potential to create centre-periphery contradictions in regional development (Christopherson et al., 2013; Wójcik et al., 2018); geographically differentiated property markets (Lee et al., 2009; Aalbers, 2019), financial flows and regulation (French et al., 2009), 'redlining' and spatial segregation of access to finance by race, ethnicity, income and wealth (Wong, 1998; Wyly and Holloway, 1999;

Drentea and Lavrakas, 2000; Walks, 2016; Simone and Walks, 2019). Notwithstanding the growth of studies pointing to the importance of the spatial underpinnings of financialisation, from an empirical point of view, most research in this area focused on broad geographical contexts, especially countries, with little coverage of lower spatial scales such as regions, towns or neighbourhoods. The exception to this observation is the attention paid to financial centres such as London and the geographies of payday lenders (Graves, 2003; Burkey and Simkins, 2004a; Gallmeyer and Roberts, 2009).

This article is the first in investigating the dynamics of deleveraging through a comparative spatial analysis of non-mortgage debt (unsecured debt [UsD]) after the GFC in Britain. Deleveraging can play an important role in bringing debt levels to a sustainable path and re-establishing a more stable economic environment, but it can also bolster recessionary tendencies. Thus, gaining insights into the factors that influence patterns of debt reduction or disposal, following major economic downturns, is crucially important.

From a theoretical point of view, it is expected that the levels of de/leverage would display marked shifts in times of booms and busts. Debt reduction through asset fire sales is expected to lead to asset price deflation (Fisher, 1933). Governments can potentially counteract this sort of instability through lender of last resort actions and other economic interventions (Minsky, 1981a, 1981b). Importantly for this article, the limited number of contributions in this area has been crafted with a macroeconomic framework, focusing on businesses and corporations and their levels of leverage with limited insight into spatial deleveraging at the household/individual level. One of the aims of this research is to address this shortcoming in the literature.

Another contribution of the study lies in its development of a framework of analysis to sensitise debt dynamics and deleveraging to geography. Specifically, we emphasise disparities in the size of regional bubbles, spatial inequalities in the exposure to the GFC and locational variation in the impacts of crisis and austerity to reconstitute or reposition space with respect to initial conditions and the influence of booms and busts. Furthermore, we highlight socio-economic circumstances of individuals residing in unique locations. Particularly, attention is paid to the relationship between debt disposal and socio-economic inequalities, drawing upon the growing post-GFC literature in this area (Barba and Pivetti, 2008; Soederberg, 2014; Dagdeviren et al., 2020). The analysis is based on two major longitudinal household surveys: the Wealth and Assets Survey (WAS) and the UK Household Longitudinal Study (UKHLS).

The findings are compelling, providing crucial insights not only into the geographical constitution of booms and busts but also their spatially differentiated consequences. They show that the aggregate assessments pointing to homogenous patterns of deleveraging are misleading. Unlike the broadly scoped assessments of Fisher (1933), deleveraging and debt deflation in times of crisis are not inevitable but conspicuously punctuated by locational differences as well as the socio-economic circumstances of individuals. Minsky's emphasis on government interventions for liquidity and stability is illuminating. Here, we show that government interventions do not have uniform geographical impacts. On the contrary, different regions are affected in different ways. Thus, there is spatial variation in the extent to which policies for crisis management affect deleveraging and debt deflation. The evidence in this paper leads us to conclude that post-crisis policies sustained the bubble in the financial realm and dislocated the 'bust' to the real economy through austerity policies.

The article is structured as follows: the next section provides a review of the literature on deleveraging and proposes a framework for sensitising its dynamics with respect to

geography. This is followed by a discussion of data and methodology. The results and analysis are presented in the section on Geographies of Deleveraging of UsD before outlining the conclusions arising from the research findings.

2. Spatialising deleveraging in time of busts

Research in political economy highlighted the broader capitalist transformation as an underpinning factor for the GFC. Financial deregulation, rising inequality, growth of sub-prime mortgages, financial innovation such as asset-backed securities are some of the factors that are often identified as the major causes of the GFC by scholars of different convictions (Acharya et al., 2009; Rajan, 2010; Wisman, 2013; Stockhammer, 2015). These changes are argued to have led to a shift in the regime of accumulation, which frequently is conceptualised as financialised capitalism (Boyer, 2000; Stockhammer, 2004). Under the new regime, returns to shareholders are prioritised (Froud et al., 2000; Lazonick and O'Sullivan, 2000) and financial or rentier incomes have increased (Epstein, 2005; Krippner, 2005; Orhangazi, 2008; Onaran et al., 2011; Lapavitsas, 2013). These trends were accompanied by a colossal growth in household debt. Countries such as Greece and Ireland saw their household debt in proportion to gross domestic product (GDP) more than doubled in the lead up to the GFC. Household indebtedness in other countries such as Spain, Portugal and Italy rose more than 50% from 2000 to 2008.[1]

Borrowing/debt can play an important role in growth, productivity, asset and wealth creation and broader development. However, the bust manifested through the GFC reflected excessive risk-taking and over-indebtedness, resulting in financial distress and instability. In theory, such periods are expected to be followed by deleveraging. How did levels of indebtedness change after the crisis? Have economic units deleveraged in line with theoretical predictions? Recent literature on corporate debt highlight the emergence of the so-called 'zombie firms' that cannot meet their debt service obligations for prolonged periods of time but linger on with their operations for various reasons, including the weaknesses in bankruptcy laws (Adalet McGowan et al., 2017; Andrews and Petroulakis, 2019). Corporate tax literature points to the role played by the incentives associated with 'thin capitalisation' due to the deductibility of interest payments from tax base (Haufler and Runkel, 2012). Thus, rather than adopting a low debt—high equity/collateral strategy, corporations opt for thin capitalisation with high debt but low equity to fund their investment. Households can also vary debt levels through capitalisation or equity release other than direct borrowing or repayments.

Post-GFC studies indicate that the speed and scope of debt reduction have been rather slow in the aftermath of the 2008 crisis. There is some evidence that the interaction between deleveraging and economic policy creates self-reinforcing tendencies. Andrés et al. (2020), for example, show that fiscal consolidation increased the duration and depth of private deleveraging. Similar findings have been reported by Kuvshinov et al. (2016) for the Euro Area. In the USA, sluggish deleveraging is argued to have created a drag on economic recovery through its impact on aggregate demand (Mian and Sufi, 2011; Eggertsson and Krugman, 2012; Mian et al., 2013; Mason and Jayadev, 2014; Scott and Pressman, 2015; Seppecher and Salle, 2015; Kuvshinov et al., 2016).

1 Bank for International Settlement, BIS Statistics Explorer: Table F3.1

There are two primary sources in economic theory on deleveraging in times of crises (i.e. defined as a reduction in debt stock relative to cash flow, assets or income). The first is Fisher's (1933, 349) article on *Debt Deflation Theory of Great Depression* where he develops a macroeconomic perspective of debt-reduction in times of unsustainable financial balances. His analysis starts with an initial position of rising over-indebtedness of economic units. Rising leverage, in his view, is connected to additional sources of profits arising from new inventions and opportunities, feeding a shift in public psychology for high expectations of capital gains, which in some cases involve reckless borrowing or downright fraud. At some point, over-indebtedness causes panic amongst creditors or debtors and creates a vicious circle of debt liquidation, rising interest rates on unsafe loans and distress selling of assets. If this is accompanied by falling asset prices and declining net worth, deleveraging is expected to be rather slow with significant macroeconomic consequences for output, incomes, aggregate demand and prices.

The second source is Hyman Minsky. In a critical assessment of Fisher's article cited above, Minsky (1981a) elaborated on the importance of understanding the causes of over-indebtedness and the processes of refinancing debt. Underscoring different economic conjunctures, he argued that financial fragility is rooted in times of expansion when sustained growth and optimism lead to greater risk-taking (or lower margins of safety) and accumulation of debt (higher leverage). Distinguishing different forms of indebtedness[2] in connection to the financial and non-financial corporate sector, he highlighted how an instability triggering factor (e.g. an upward pressure on interest rates) can result in a spiral of deleveraging (Minsky, 1986). Viewing instability as inherent to capitalist development, he argued that its severity and impacts would depend on how the process is managed by governments. Indeed, governments had used lender of last-resort mechanisms and public spending to prevent a freefall in asset prices and constrain the extent of debt deflation on many occasions in the post-war period (Minsky, 1981b).

Even though there is much to learn from these approaches, a crucial shortcoming in these analyses from a theoretical point of view is the lack of explicit recognition that deleveraging is neither a spatially uniform response of economic units nor do policies for crisis management generate even consequences in different regions and locations. Furthermore, both Fisher's debt deflation theory and Minsky's financial fragility hypothesis focus on corporations and business interests rather than households. While we now know much more about the drivers of household debt build-up (Barba and Pivetti, 2008; Cynamon and Fazzari, 2008; Mason and Jayadev, 2014; Moore and Stockhammer, 2018), our understanding of debt disposal at micro level is very restricted.

In the empirical literature, there are two different categories of contributions to explain downward debt-restructuring. The first contains a small number of studies, focusing on the dynamics of deleveraging, mostly in the USA, in the aftermath of the 2008 crisis with little attention to locational dimensions and socio-economic differences at the household level. Many of these studies identify a significant reduction in levels of debt (Mian and Sufi, 2011; Eggertsson and Krugman, 2012; Mian et al., 2013; Mason and Jayadev, 2014; Scott and Pressman, 2015; Seppecher and Salle, 2015; Kuvshinov et al., 2016). Some find no significant deleveraging once housing-related foreclosures are excluded (Cooper, 2012).

2 That is, Hedge finance, speculative and Ponzi units. Capacity to carry debt and the margins of safety associated with these different financing positions declines as debtors move from hedge to Ponzi financing (Minsky, 1980).

Others argue that most of the aggregate deleveraging reflects the decline in new credits rather than reductions in existing debt (Bhutta, 2015). The second category of empirical literature pays attention to micro and spatial dynamics. Growth of household debt in these studies is characterised by multi-scalar processes, usually resulting in a regressive distribution with poorer households bearing higher levels of mortgage and credit card debt after controlling for age, life cycle and housing status (Walks, 2013, 2016). However, they provide little insight into potential reversals in patterns of indebtedness, resulting from a major shift in economic circumstances. Still, there is much to learn from these studies about how individuals obtain, manage and live with debt.

In this article, we aim to move beyond broader constructs of deleveraging and bring the spatial and micro level variations into focus for a more granular assessment. The overall argument of the paper is that, unlike the suggestion that 'debt deflation' (Fisher, 1933) or deleverage is inevitable following a crisis except where governments intervene to stem it (Minsky, 1981a, 1981b, 1986), aggregate patterns of deleveraging hide considerable variation across space and over time and the discrepancies are likely to depend on a range of spatially constituted factors, interacting with individuals' circumstances. Our proposition is that understanding deleveraging requires attention to economic space at five different levels.

The first level is related to spatial patterns of structural disparities: The extent to which different locations are affected by and respond to economic shocks depends on their initial positions with regards to factors such as relative economic development levels. Disparities in regional development may reflect historical factors (such as dis/advantages associated with resources endowments like coal in certain regions in Britain or the development of transport links) (Turnbull, 1987; Crafts and Mulatu, 2005) or more contemporary factors such as scale economies, agglomeration and knowledge spill-overs (Pinch et al., 2003; Kim, 2006; Martin and Sunley, 2006). Once established, economic disparities are likely to persist through path-dependence effects. Consequences of uneven regional development for patterns of deleveraging cannot be established a priori. Higher economic development in some regions may act as a cushion against the adverse consequences of crises and reduce the need for deleveraging. Alternatively, these wealthier regions may show greater exposure to the crisis and thus display higher levels of deleveraging. Similarly, regions with lower economic development may be less exposed, thus may have a limited need for deleveraging. It is also possible that a crisis deepens existing adversities in these regions and instigates higher deleveraging.

The second is the importance of spatial dimensions of economic booms: The role of financial centres and housing market developments in shaping socio-economic space in the last four decades probably represent archetypical examples. Financial hubs such as London and New York have not only been the powerhouses of global financial flows (Wójcik, 2013) but the main sources of spatial unevenness within and across regions with above average remuneration opportunities and financial returns to a small proportion of the elite, supporting other business activities and gentrification in surrounding areas (Smith, 1982; Florida and Mellander, 2010; Kallin, 2021). Mortgage debt is of course an important dimension of these interactions. Particularly, house prices influence spatial patterns of de/leverage as they display substantial variations, reflecting the local embeddedness of housing markets with differences in urban infrastructure, commuting facilities, quality of schools and crime rates (Case and Shiller, 2003; Martin, 2011; Köppe and

Searle, 2017). Beyond this, differences in sectoral agglomerations contribute to the emergence of variegated patterns of booms and thus indebtedness similar to the well-documented impacts of de-industrialisation in creating neighbourhoods of poverty, co-existing with districts/regions of wealth and gentrification (Weller and van Hulten, 2012; Kallin, 2021).

The third is about spatial exposure to and impact of the crisis: Variations in these areas are likely to depend on the presence and size of economic bubbles in different locations and their connections and proximity to national and international sectors of contagion. Dijkstra et al. (2015), for example, conceptualises space in terms of city, urban and rural regions and find that the GFC resulted in greater economic contractions in cities and remote rural areas while intermediate urban and rural towns were less affected. Palaskas et al. (2015) find that urban municipalities with better economic performance prior to the crisis in Greece experienced greater unemployment and welfare losses after the crisis in comparison to the towns characterised as laggards in the pre-crisis period. In a study of European cities, Capello et al. (2015) show that financial centres were hardest hit by the crisis and yet because of their territorial capital advantages, they were able to better adjust for recovery. In Italy, Lagravinese (2015) indicate that manufacturing regions and locations with greater temporary employment saw larger impacts in comparison to geographies with a greater share of service sectors and public employment. Here, we argue that such locational differences in terms of exposure to and impacts of the crises are also likely to influence the dynamics of deleveraging at micro and macro levels.

The fourth, how governments manage crises by employing different economic policies, is important: The choice of public policies would shape spatial deleveraging patterns in different ways. Increased public spending to protect employment levels can enable households to continue debt repayment and reduce the extent of the deleveraging. It can prevent defaults and non-performing loans in the financial sector. The more common response to the GFC was the use of monetary interventions coupled with fiscal austerity (Konzelmann, 2014; Fiebiger and Lavoie, 2021). Conventional fiscal policy support through increased public spending has been side-lined following some reflationary policies in the first year of the crisis in favour of quantitative easing. Accompanied by zero-bound interest rates as well as financial guarantees and bailouts to deal with liquidity crunch, post-crisis policies aimed to avoid a collapse in asset prices and the bankruptcy of troubled financial institutions (Sawyer, 2012; Blyth, 2013; Kelton, 2020). Much of the liquidity injections targeted financial institutions to keep them afloat rather than providing support to over-indebted households, individuals and credit constrained businesses. This policy context of the post-crisis period against the background of high household debt has had implications for the extent of deleveraging. For example, 'lender of last resort' actions are likely to have had different consequences in deprived towns with long-term economic stagnation than those with thriving businesses and communities before the bubbles burst.

Finally, socio-economic inequalities amongst individuals, residing in unique locations play a key role in spatially differentiated deleveraging: The conventional approach to debt acquisition and disposal is the well-known lifecycle theory (Modigliani, 1966) which led researchers to focus on *age* as a key factor for the acquisition and disposal of debt.

Sensitising the lifecycle with respect to location in the context of deleveraging is a way of acknowledging that there may be different outcomes associated with age in different regions. For example, in some regions, younger individuals may be less likely to deleverage than others due to better employment prospects. Furthermore, the lifecycle view ignores the debt dynamics associated with socio-economic inequalities. The income and wealth status of individuals and households is important for understanding the patterns of debt acquisition and disposal. This is why certain types of debt are used more predominantly by certain social groups. For instance, low-income households often have a greater proportion of their debt in the form of UsD. In the UK, ONS (2022) estimates show that UsD accounted for around 22% of the total debt held by the lowest income households (bottom 10%) surveyed between 2014 and 2016. In contrast, for the richest 10% UsD constituted only 4% of their total debt.

In this paper, we distinguish three different channels through which socio-economic inequality exerts influence on household de/leverage. One channel is related to the implications of socially interdependent consumption patterns for household debt. As an important element of living standards, consumption does not only depend on income or price levels but also has social and cultural dimensions. Veblen (1899) and Duesenberry (1949) are often credited for theorising consumption with reference to habits, social emulation and exhibition.[3] Contributions along these lines also exist in Bourdieu (1984) where debt-based property investment and consumption with 'distinct' design and styles are seen as ways of displaying and crossing class boundaries (Sparkes, 2019). In this view, debt can be a means of achieving some aspired living standard set by the wealthier classes or maintaining norms of living achieved in the past, following adverse changes in income levels. This motivation has been an important driver of the growth in household debt in the lead up to the GFC (Wisman, 2009; Stockhammer, 2015). Another channel is related to the regressive changes in the labour market and the welfare system that reduce the level of social benefits or affect eligibility. In the absence of adequate safety nets, borrowing for subsistence and basic needs presents itself as a lifeline to citizens in and out of precarious employment with low incomes (Marston and Shevellar, 2013; Soederberg, 2013; McCormack, 2019; Dagdeviren et al., 2020). Barba and Pivetti (2008), for example, argued that increasing household debt after the 1970s was a way for low-income households and wage earners to maintain their living standards in the face of stagnant or declining real wages, widening income and consumption inequality and the hollowing of the welfare state. Finally, financial exclusion of the so called 'unbanked' populations created a multi-tiered financial system in which high-cost fringe finance institutions such as payday lenders provide credit to the 'redlined' population (Dymski, 2009; Aitken, 2010). Such differences in interest rates and forms of finance (e.g. access to finance through mainstream banking versus pawnshops, money shops, doorstep lenders or payday lenders) associated with socio-economic inequality are likely to influence the patterns of de/leverage.

In what follows, we utilise this five-pronged framework for analysing geographically differentiated patterns of deleveraging in Scotland, Wales and the English regions after the 2008 crisis.

3 Veblen used the term conspicuous consumption to describe the influence of social status and emulation. Duesenberry developed the relative income theory/hypothesis to take account of socially interdependent consumption patterns.

3. Data and methodology

The empirical analysis in this paper is conducted in two steps. First, geographical dynamics of deleveraging are examined on the basis of administrative regions in Britain. Second, reconstituting these regions in line with the framework described above and using probability modelling, we test for the significance of location-specific factors for individual deleveraging.

3.1. Estimates of deleveraging

Leverage and deleverage are not only about increases or reductions in debt but also about the size of debt relative to things with which it can potentially be repaid. For households, this includes income and wealth. For companies, cash flow, assets and equity are considered. Minsky (1986, 262) defined corporate leverage 'as the use of other people's money to acquire assets' and expressed it as the ratio of borrowing to investment. In the empirical literature, leverage is defined and measured in different ways. These include debt to asset ratio or debt to net worth ratio (McCarthy and McQuinn, 2017), growth in debt stock (Kuvshinov et al., 2016; Bosch and Koch, 2020), newly acquired debt versus newly paid off debt (Bhutta, 2015), average debt repayments and proportion of debt holders reducing debt (Cooper, 2012). In the context of households, debt-to-income ratio (DIR) is the most commonly used measure of de/leverage (Mian and Sufi, 2011; Cooper, 2012; Scott and Pressman, 2015; Bosch and Koch, 2020).

Here, the extent of regional deleveraging of UsD, which excludes mortgages, is estimated by focusing on four measures:

a. Exits from UsD by households.
b. Decline in average UsD held by households.
c. Decline in UsD relative to income.
d. Reduction in individual debt stock.

Longitudinal household surveys have been used to establish the variegated patterns of debt reduction. Two primary sources of data have been used for examining regional patterns of deleveraging. The first is the WAS. The second is the UKHLS which includes individual financial data every five years. Some clarification is in order here. UsD in WAS is called financial debt. In both sources, UsD includes student loans, consumer loans, credit card debt and overdrafts as well as arrears on household bills, debt related to mail order and hire-purchase arrangements. The estimations here excluded individuals whose total UsD included student loans which are long-term with radically different repayment structures.

Using these two surveys has enabled us to overcome the shortcomings of one survey with the strengths of another. In particular, UKHLS provides a longer time span. WAS, on the other hand, is more detailed on financial indicators and it provides more reliable estimates of debt at the household level. However, WAS waves that were conducted before 2010 do not contain comparatively useful household income data for estimating DIRs.[4] UKHLS remedies this problem. One caveat with UKHLS is that debt is not consolidated at the household level in the database. The way personal debt for every

4 The only household income indicator in the earlier WAS waves is 'monthly income before or after tax'. This specification is rather loose and not helpful for comparative purposes.

individual in a household is reported made it difficult to estimate household level debt. In contrast, WAS provides debt data at the household level. Thus, estimates of exits from UsD and the decline in average debt held by households are based on WAS data. For everything else, UKHLS data have been used. It is important to note that data from these two sources were not mixed but used independently to calculate alternative measures of deleveraging. Thus, estimated indicators of deleveraging are consistent and comparable within themselves.

Each wave of WAS and UKHLS is conducted over a period of 2 years. The temporal dimension is interrogated using WAS and UKHLS results from 2006 to 2008, 2008 to 2010, 2012 to 2013 and 2016 to 2017 waves. These years are critical for this paper. The peak of the housing boom was flattened during 2005–2006. Thus, data for this period should reflect well the pre-crisis circumstances. The years from 2008 to 2010 mark the onset of the GFC and the Great Recession. Data for the period 2012–2014 reflect the compounding effects of public spending contraction following the initial rolling out of the austerity measures in 2010–2011. The period 2016–2017 saw a slow economic recovery. Therefore, in terms of the timeframe of analysis, we used survey data for 2006 and 2007 as a reference point to indicate the circumstances before the crisis. Then, survey data for 2013–2014 and 2017 are analysed against the reference year to explore the impacts of the GFC and the Great Recession.

Geographical distribution of deleveraging has been displayed using various tools, including the ArcMap version 10.8 software for regional maps of deleveraging based on the most recent UK boundary data for government office regions (ONS, 2019).

3.2. Testing for the significance of regional differences in deleveraging

A standard logistics model of the following form is used to test for the significance of the spatial basis of deleveraging.

$$P_{ij} = \Pr\ (D = 1 |\ X = x_{ij}),$$

where probability (P_{ij}) of deleveraging (D) is conditional on a set of factors (X) characterising individuals (i) and geography where they reside (j). The estimation model can be written as

$$\text{Log}\ \ (P_{ij}/1 - P_{ij}) = \beta_k x_{ij},$$

where β denotes coefficients on X variables, from 0 to k.

Alternatively, probability of deleveraging can be estimated in terms of the odds ratios:

$$P_{ij}/1 - P_{ij} = \exp\ \ (\beta_k x_{ij}).$$

Deleveraging indicator is a binary variable, distinguishing individuals who reduced their UsD stock after the GFC from those who did not. Main individual characteristic of interest for this article is the role of socio-economic inequality in de/leveraging. Indicators of age, gender, ethnicity, education status, household size, employment status (un/employed, full/part-time) and home ownership have been included to account for population heterogeneity. A four-point Likert scale has been used for reconstituting geographic variation based on the framework with five pillars which we described above. More specifically, as will be explained in more detail in the next section, regions have been ranked according to: (i)

their structural position, approximated by relative productivity levels; (ii) size of the regional bubbles, measured by growth of house prices in each region relative to average incomes prior to the crisis; (iii) exposure to the GFC based on relative contraction in regional Gross Value Added (GVA) from 2008 to 2009; (iv) impact of the GFC, reflected by the regional growth in unemployment and (v) the regional impact of austerity, proxied by relative growth gaps.

4. UsD and geographies of deleveraging

In contrast to the theoretical predictions that economic units would cut down on debt in response to economic or financial instability, the results here show considerable variation in deleveraging across space and time in Britain (Figure 1). When the extent of deleveraging is measured in terms of household exits from UsD, without exception, a significant proportion of households had paid off their UsD by 2014 in comparison to 2006.[5] At the peak of austerity, between 4% and 33% of the population exited the UsD market across the three countries in Britain (net of new entries). In the English regions, a greater proportion of households in the most populous and relatively better off regions such as the East of England, the South East and London went (unsecured) debt free. In contrast, the extent of deleveraging remained low in poorer regions such as the North East, the North West and Yorkshire. What is more interesting is that these trends have been reversed in later years as reflected by the data for 2014–2018 when new entries surpassed exits from UsD by a significant difference in all regions. Furthermore, the average amount of UsD held by households has been much higher in recent years than it was prior to the crisis in all regions, except for those in the South West and Scotland, as shown in the diagram on the right-hand side of Figure 1.

There is a possibility that this picture may be contaminated. More specifically, households may have been increasing debt with low-interest to cut down on high-cost borrowing. At an individual level, this kind of refinancing may be carried out in a variety of ways, including drawing on capital gains related to property values. The question is whether a sufficiently large number of households pursued such a strategy to affect the regional trends. The most straight-forward means of inspecting whether a notable recomposition in households' loan portfolios took place at the regional level is through a comparison of the changes in UsD against property-related debt. Therefore, growth in UsD amounts held by households is presented against the growth in total property debt in Figure 1 (the diagram on the right-hand side). Deleveraging through conspicuous debt-switching is not evident in Figure 1. On the contrary, in most parts of the country, both the UsD and property debt increased in terms of real values from 2007 to 2018. In Wales and the North East, the increase in UsD was accompanied by declining mortgage debt. The South West and Scotland are the only regions where capitalisation or debt switching of some form might have taken place. We also checked the correlation coefficient for UsD and property debt for households with both forms of loans and found a very low but positive correlation of 0.11 between these two types of debt.

5 Note that some of the deleveraging may be reflecting debt write-offs by financial institutions. However, the surveys do not contain information on this. In the past decade, UK financial institutions wrote off around 1–2% of total consumer credit (excluding student loans) they issued, according to the Bank of England (BoE, 2022). Thus, the data in the maps are unlikely to be distorted by a significant proportion as a result of bank-related write-offs.

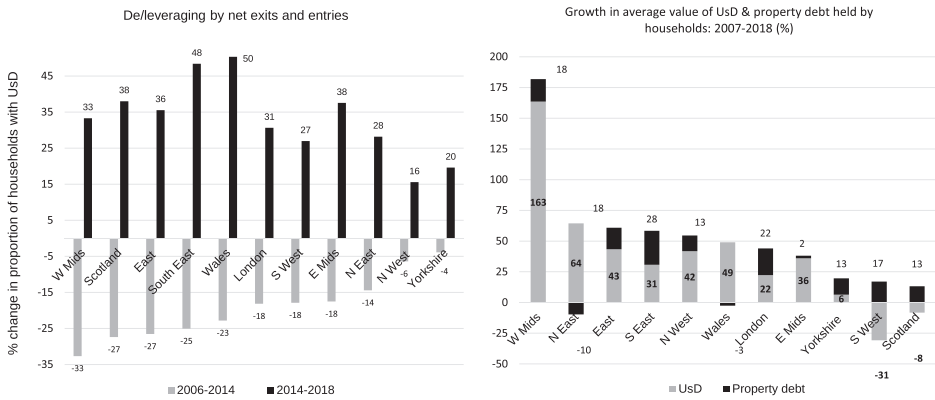

Figure 1. Household de/leveraging of UsD.
Source: Estimates are based on WAS Waves 1, 4, 6 and 7 (ONS, 2006–2018). The growth estimates for the USD and property debt are based on weighted and deflated data. ONS' regional GDP deflators have been used for deflation. Property debt reflects the outstanding value of mortgages on all household properties.

Temporal trajectories of economic cycles and spatial contingency are not the only factors that influence the dynamics of deleveraging. In the previous section, we discussed how differential debt burdens emerge, depending on households' socio-economic status. Especially, relative income levels (i.e. economic inequality) have implications for consumption and savings behaviour. Simply put, on low incomes, it is difficult to save and without saving, socially and materially necessary consumption beyond one's means is feasible by borrowing unless supported by other measures. This point is demonstrated in Figure 2 where DIRs are presented.

Stark differences are notable between the poorest, richest and middle-income individuals in Britain (Figure 2).[6] The poorest individuals were most vulnerable in terms of debt burden without exception over time and across countries as reflected by the darker shading in the top three maps in more recent years. In general, median DIR has been much higher for the lowest income groups (the bottom 20% income earners) and lower for the highest income groups (top 20% earners). In England, there is evidence of successive re-leveraging by the lowest income groups after the crisis while the middle income and richest groups in most regions deleveraged in the first phase of austerity only to re-leverage in more recent years. Like their English counterparts, the lowest income group in Wales increased leverage. London and, to some extent, the South East have been outliers. Prior to the crisis, the poorest debtors in London had exceptionally high leverage (median debt levels were around seven times larger than net monthly income) which was rebalanced by a remarkable deleveraging after the crisis.

A notable tendency is that regional differences in DIRs show diminishing propensity overtime. Indeed, the standard deviation for all three panels declined.[7] This is largely accounted for by a tendency of deeper deleveraging by regions that had high leverage pre-crisis. Starting from the bottom panel, the richer income groups had the highest DIR in

6 Here, we use 'middle income' as a statistical category rather than a category of social status.
7 From 167 to 71 for the top panel, from 59 to 34 for the middle panel and from 38 to 15 for the bottom panel.

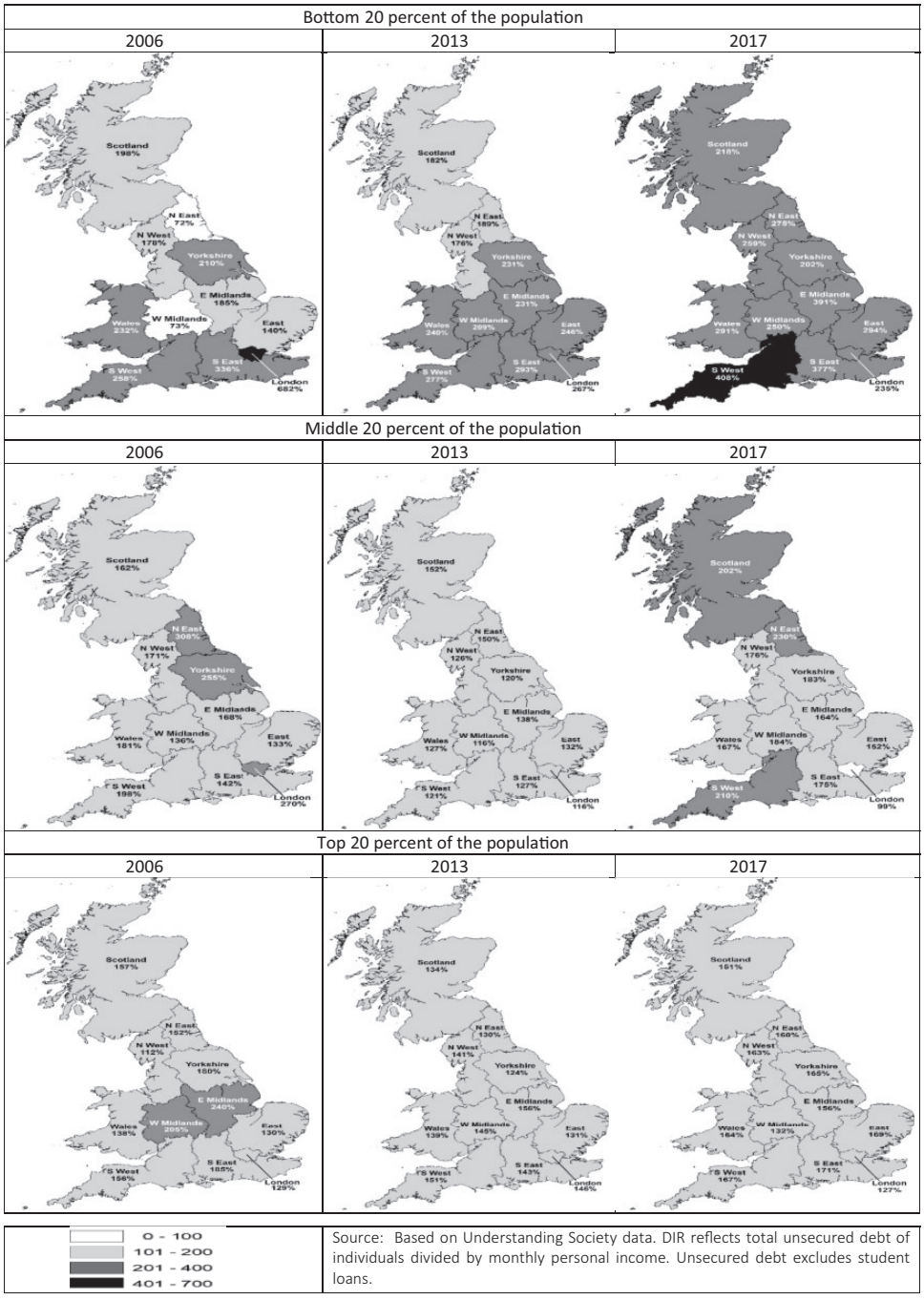

Figure 2. Geographies of de/leveraging (Median DIR, %).
Source: Based on Understanding Society data. DIR reflects total UsD of individuals divided by monthly personal income. UsD excludes student loans.

the Midlands, the South East and Yorkshire. These groups deleveraged to a greater extent, especially in the first phase of austerity. A similar tendency is observed in the DIRs of the South West, Yorkshire, London and North East in the middle panel. The top panel is slightly different. Here, diminishing differences are accounted for by two contrasting developments: deeper deleveraging in highly indebted regions (London and the South East) coupled with further re-leveraging by low-income households in the North East and West Midlands where lower DIRs prevailed prior to the crisis.

Having established a substantial regional variation in the extent of de/leveraging over-time and across different income groups, using alternative measures, let us move on and examine the factors that may account for these differences. In Section 2, we argued that the following factors are likely to influence patterns of deleveraging after a period of economic or financial instability: socio-economic inequality, structural differences in regional development, disparities in the size of regional bubbles prior to crises, the extent of regional variation in exposure to instability, the impact of crises on each region and how policy stance of governments takes effect in different areas.

Micro underpinnings of deleveraging, highlighting the socio-economic status of individuals residing in different geographies, have been measured with reference to income inequality. This is based on the expectation that changes in debt-financed consumption by lower income groups depend on how their living standards are affected in the post-GFC period. Income inequality captures several effects, including the effect of being on lower incomes, possibly with lack of savings and/or access to finance through high-cost lenders, resulting in borrowing to meet: (i) basic needs, (ii) unexpected spending needs, (iii) prevent a decline in living standards and (iv) keep up with the consumption behaviour of richer groups. Here, income inequality has been approximated by the deviation of individuals' income from the mean income of the top 10% earners, in line with relevant studies in the literature (Cynamon and Fazzari, 2008; Ryoo and Kim, 2014). Drawing on studies of indebtedness (Burkey and Simkins, 2004b; Prager, 2014; Hegerty, 2016; Simpson and Buckland, 2016), a number of control factors have also been used to account for the heterogeneity of population, including differences in life-cycle (age), gender, marital and ethnic status, education, employment and home ownership status and the year of de/leverage. Data on deleveraging and microspatial factors have been based on UKHLS.

Let us describe how regions have been reclassified to distinguish their place in the boom-and-bust cycle. Scotland, Wales and the nine English regions have been reconstituted, using the minimum, average and maximum levels for each indicator to position them in four quartiles (two quartiles below and two quartiles above the average) ranging from highest productivity to lowest productivity, from highest exposure to lowest exposure and so on. The relevant regional data are obtained from the Office for National Statistics (ONS). Maps under Online Appendix Figure 1 display full details of the data. Table 1 provides the regional rankings according to these figures. For s*tructural differences in spatial development*, we used comparative productivity levels (index of average value added per hour in each region) as a way of capturing cumulative effects of factors such as resource endowments, transport advantages, skill and knowledge differences and variegated agglomeration (Pinch et al., 2003; Kim, 2006; Martin and Sunley, 2006). Unsurprisingly, London and the South have the highest productivity and hence the highest rank in terms of structural position while Wales, North East, Yorkshire and the Midlands have the lowest rank.

Real estate and housing growth played a key role in the creation of the *bubble* prior to 2008 (Dokko et al., 2011; Martin, 2011). Although the fastest growth in house prices took

Table 1. Relative positions of regions with reference to the GFC and the austerity

Rank regarding:	Lowest rank (1)	Low-to-moderate rank (2)	Moderate-to-high rank (3)	Highest rank (4)
Structural position	Wales North East Midlands	North West Scotland South West Yorkshire	The East	London South East
Size of Bubble	London South East Scotland	North West	The East North East West Midlands Yorkshire	East Midlands South West Wales
Exposure to the Crisis	North West Scotland South West	South East Wales North East	The East Yorkshire East Midlands	London West Midlands
Impact of Crisis	London	West Midlands North West Scotland North East	Wales Yorkshire The East East Midlands	South East South West
Impact of Austerity	West Midlands South East	London The East East Midlands Wales	North West South West Scotland Yorkshire	North East

Note: See Online Appendix Figure 1 for actual data.

place during 2000–2004 across Britain, considerable regional differences existed before that period (ONS, 2021), reflecting variation in economic activity and income levels. Thus, we used growth in average regional house prices relative to regional per capita incomes during 2000–2004 to measure regional differences in the size of the bubbles by employing the same ranking method outlined above. Surprisingly, the East Midlands, South West and Wales experienced the greatest increase in house prices during that period relative to average income levels while London, South East and Scotland had lower growth of house price-to-income ratio.

Relative *exposure* of the regions to the GFC has been measured by the contraction in regional real GVA from 2008 to 2009,[8] placing London and the West Midlands at the top and the North West and Scotland at the bottom. A programme of austerity characterised the crisis management position of the British Government since 2010. The *impact of austerity* on regions has been assessed on the basis of what we term as 'growth gaps'. These growth gaps are approximated by the differences in average regional growth between 2002–2006 (before the GFC) and 2011–2015 (during austerity). By this measure, the North East had the highest growth gap under austerity, followed by the North West, Yorkshire. The lowest growth gaps were in the South East and the West Midlands.

8 Post-crisis, the greatest contraction in real GVA across regions took place almost invariably in 2009.

Although the regional ranking by structural differences is in line with expectations, in other respects, the positioning of regions, using the above methodology, yields fascinating results. The lack of a straightforward relationship between exposure to and impacts of the GFC is especially notable. In fact, some of the regions with the highest exposure weathered the effects of instability reasonably well. For instance, London has been one of the most effected regions by the crisis as reflected by the contraction in GVA in the immediate aftermath of the GFC. However, the impact of the crisis, measured by the rise in unemployment, has been the lowest in this city. It is also quite surprising that the size of the bubble was larger in the lagging regions such as the North East and Wales rather than the South East and London.

Let us move on and test for the significance of the regional factors and economic inequality for explaining geographical differences in debt reduction. The definition of variables used in the logistics regression and descriptive statistics for each variable can be found in Online Appendix Table 1. The results of regression estimation have been presented in Table 2. The probability of deleveraging (1) or re-leveraging (0) is given as odds ratios and their significance is tested by the t-statistics.[9] The findings are compelling and illuminating. A number of these warrant highlighting. First, patterns of deleveraging are clearly shaped by where individuals live and how their locations are affected by the GFC and the austerity. The findings in relation to the regional factors are statistically significant. Starting with the structural rank, the estimates show that the odds of deleveraging by individuals living in regions of higher economic development were higher than individuals located in regions with lower structural development. Accordingly, those who lived in Wales, North East and Midlands (the regions with the lowest productivity rank), were less likely to deleverage in comparison to those who lived in other regions. In contrast, those who lived in London (highest productivity) were most likely to deleverage compared to other regions. More generally, a one-point rise in the productivity rank of a region is associated with 8% increase in the odds of deleveraging by individuals, residing in that region.

Residents in regions with a greater bubble (represented by the growth in the ratio of average house prices to incomes prior to the crisis) were more likely to deleverage and this effect is significant. Regional exposure to the GFC was also significant for the probability of deleveraging. Individuals in regions with higher exposure to the crisis, as reflected by the contraction in GVA in 2009, were much more likely to deleverage than those with relatively lower exposure. For example, the odds of deleveraging for individuals in London, the most exposed region, were on average 1.11 times higher than the individuals living in the East of England or Yorkshire and 3.33 times higher than individuals living in the North West, Scotland and South West (the least exposed regions). Individuals living in the regions where employment levels fell more sharply were less likely to deleverage than those located in regions with limited impacts on the labour market. Furthermore, the regions that experienced greater adversity under austerity saw greater deleveraging. In general, the probability of debt reduction is 4% higher for every one unit rise in the rank of regions with respect to the impacts of austerity.

Secondly, the odds of deleveraging for those with lower incomes were lower than those who had higher incomes. The rate of deviation from the incomes of the top 10% earners ranges between 0 and 4.7 fold and those with the maximum deviation were 3.5 times less

9 Very few individuals had exactly the same level of UsD in different periods. For consistency in measuring deleveraging as a binary indicator of de/leveraging, these individuals have been excluded.

Table 2. Logit regression results for deleveraging

	Odds ratio	t-statistic
Regional indicators affecting deleveraging		
Structural rank	1.08***	2.55
Bubble size	1.02***	2.99
Exposure to crisis	1.11**	2.00
Impact of crisis	0.99**	−1.72
Impact of austerity	1.04**	1.90
Inequality	0.74***	−2.69
Control variables		
Age	1.00	0.62
Un/employed	1.57	0.55
FT or PT if employed	0.83**	−1.96
Household size	0.94**	−1.83
Gender	1.13**	1.77
Marital status	0.93	−0.79
BAME	0.81**	1.77
Education	1.08***	2.50
House owner	0.99	−0.93
Year of de/leveraging	0.72***	−4.99
Other information		
Number of observations	4312	
$F(16, 4298)$	23.5	
Prob>chi^2	0.000	

Notes: See Online Appendix Table 1 for descriptive information and statistics. (**) denotes statistical significance at 5% and (***) at 1%.

likely to deleverage. This finding is in line with the theoretical position outlined in Section 2. It confirms the prediction that prioritising debt reduction over maintaining minimum or relative standards of living has been difficult for the lower income groups.

Finally, the estimates in relation to control variables for individuals' socio-economic status shed further light on the matter. Age does not seem to have a significant relationship with the probability of deleveraging after controlling for locational and socio-economic factors. Those who were unemployed were more likely to deleverage than those who were employed albeit this effect is insignificant. Amongst those who were employed, the odds of deleveraging were lower for full-time than part-time employees. The employment effects reinforce the findings on the relationship between income and debt. That is, lower incomes implied by unemployment or part-time employment resulted in a lower tendency of deleveraging. Interestingly, the odds of deleveraging were 13% higher for males than females. This may be reflecting gender differences with respect to the initial level of indebtedness (e.g. men may have a greater propensity to hold debt or they may hold higher debt levels) and the ability to repay. Black and ethnic minority individuals were more likely to deleverage than white individuals. Several factors may be related to this finding, including cultural differences, leading BAME population to be more risk-averse and cut down debt more significantly than others. Alternatively, income and employment effects of the GFC and austerity may have been more adverse for black and ethnic minority individuals. The level of education seems to have played an important role in the probability of debt reduction after the crisis. Those with higher levels of education were more likely

to cut down on UsD than others. This may be reflecting earning differentials, enabling those with better educational status to repay debt more easily than others. It is also possible that this may be reflecting labour market effects if those with lower education status were more likely to become unemployed after the crisis. The probability of deleveraging was higher for individuals with greater household size than those with fewer household members. Marital status or homeownership did not seem to have played a significant role in the likelihood of deleveraging. Unsurprisingly, in general, the odds of deleveraging were higher at the peak of austerity in 2013 than later in 2017.

5. Discussion and conclusions

Research on deleveraging in response to economic or financial shocks has been sparse despite the importance of the topic with implications for economic recovery via consumption (demand) and growth. The earliest contribution by Fisher (1933) in this area provides a stylised macroeconomic perspective, viewing it as almost inevitable given market players' expected reactions to instability. While agreeing with Fischer about the tendency for deleveraging and potential debt deflation, Minsky (1981a, 1981b) emphasised how governments, using various instruments, can prevent a freefall of asset prices and keep financial institutions afloat in times of instability. A small number of empirical studies in this area, mostly focusing on the USA, are also macroeconomically oriented and they reach mixed conclusions.

This article makes several important contributions to this literature. First, unlike the existing studies, it focuses on household and individual deleveraging, departing from the fact that household debt has been an important factor in the creation of the bubble leading up to the GFC (Barba and Pivetti, 2008; Cynamon and Fazzari, 2008; Moore and Stockhammer, 2018). The findings showed that deleveraging through household exits from UsD was widespread across all parts of Britain but this was a short-lived phenomenon. The reversal of this tendency in recent years more than counterbalanced the initial decline in debt holding. The average amount of debt held by households rose in real terms in most parts of Britain since 2008. The rise in average UsD held by households in most regions is not surprising given the fact that post-crisis policies have not addressed the root causes of the rising household debt such as stagnation of incomes, earning inequalities, the rolling back of the welfare state (Barba and Pivetti, 2008; Finlayson, 2009; Wisman, 2009; Soederberg, 2013; Dagdeviren et al., 2020). Hence, lower income households continued to rely on debt while others have deleveraged temporarily only to go back into higher leverage afterwards. These findings raise questions about whether this form of temporary and short-lived deleveraging may cause further instabilities in the future.

Second, the findings display a close relationship between income inequality and patterns of de/leveraging. Geographical mapping of the data clearly shows successive re-leveraging by the lowest income individuals after the crisis in comparison to middle income and richer groups after the crisis in all regions, except for London. From the point of view of social justice, this evidence highlights how the most disadvantaged social groups have been taking greater risks, increasing stock of UsD they hold relative to their income, most likely to meet basic needs and maintain standards of living rather than building up wealth and assets. This tendency has become even more acute under austerity and in recent years.

Third, unlike macroeconomic studies, this study shows that deleveraging is a highly uneven and geographically differentiated process. This process is not straightforward but dependent on the interactions between individual circumstances and the state of the regions pre- and post-crisis with respect to differences in structural position, size of the bubbles,

exposure to and impacts of the crisis and how government policies take effect in different areas. For example, both London and the East of England had high exposure to the crisis and yet there was an overall reduction in the levels of leverage in the former region while the latter underwent a re-leveraging phase. Similarly, West Midlands and Yorkshire had a similar structure, bubble size, exposure and impact but their de/leveraging patterns have been quite distinct. Thus, it is difficult to explain why regions with similar conditions end up with disparate pathways of de/leveraging without considering the interactions between individuals' circumstances and relative positions of the regions in relation to the level of economic development and varying impacts of the crisis and austerity.

Fourth, contrary to the uniform conclusions reached by macroeconomically oriented studies, the evidence in this article shows that government interventions take effect in different ways across regions. Structural differences in London in terms of productivity and diversity of economic activities enabled the city to weather the effects of austerity measures relatively lightly as reflected by the lowest growth-gap it had in comparison to other regions despite having the highest exposure to the crisis. Partly because of this, and partly because households in London were more indebted in the pre-crisis period, significant deleveraging took place in this region both in terms of reduction in UsD stock and exits, especially at the peak of austerity. Fiscal consolidation had the greatest effect on the North East in terms of the growth gap it generated and this is despite the fact that the region had low exposure to the crisis. Public spending cuts further depressed the limited economic dynamism in the North East. Liquidity support in the form of quantitative easing, targeting mostly financial institutions, bypassed this already economically depressed region. Thus, unlike London, the stock of UsD in the North East increased after the crisis with sustained re-leveraging.

Reflecting on the relationship between crises and deleveraging and what it means for recovery and stability, government policies in the form of quantitative easing, zero-bound interest rates and rescuing banks have prevented widespread bankruptcies in the financial sector and averted collapse of asset prices. These measures offered no protection to those with low income and precarious employment. It is questionable if the financial bubble has truly burst given the extent of re-leveraging in recent years or the lack of decline in house prices. Regional growth of house prices certainly slowed down but never displayed any negative change since 2008. Arguably then another bout of financial fragility may not be a too distant possibility. Quantitative easing for the corporate sector and austerity programme for the public sector may have prevented a significant bust in the financial sphere, but they have been utterly counter-productive for broader economic recovery as shown by the regional growth gaps.

Supplementary material

Supplementary data for this paper are available at *Journal of Economic Geography* online.

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