

Capitalization of Central Government Grants into
Local House Prices:
Panel Data Evidence from England

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Abstract

We explore the impact of central government grants on local house prices in England using a panel data set of local authorities from 2001 to 2008. Utilizing strategic political considerations affecting grant allocation as a source of exogenous variation in grants, we find that grants have a sizeable positive and significant causal effect on local house prices. This effect is larger in locations in which housing supply is constrained by physical barriers. In relatively constrained locations grants are roughly fully capitalized into property prices. One implication of full capitalization is that local governments in England do not seem to waste grants. Another implication is that the English grant system may have important unintended distributional consequences.

JEL classification: H2, H3, H7, H81, R21, R31.

Keywords: local public finance, house prices, supply constraints, central government grants.

1 Introduction

Most countries have a system for allocating public funds from the central (or federal) government to regional and/or local jurisdictions and for redistributing revenues from higher to lower income areas. Reallocation of financial resources among jurisdictions is not just ubiquitous but also hugely quantitatively important. For example, in the UK ‘local authorities’ (local municipalities) receive roughly 60 percent of their funding from central government grants (the remaining funding comes from the council tax, fees and charges), making these local authorities highly dependent on central government decisions. Other more centralized European countries have similar reallocation schemes.

Although reallocation of higher level tax revenue to lower level jurisdictions may be comparably more important in more centralized economies, intergovernmental transfers are also hugely important in decentralized countries. For example, in the US, states’ school finance equalization formulas reallocate significantly more money between school districts than the federal government spends on Medicare or on all federal income support programs combined.

The allocation of central government grants is typically redistributive in nature. The grant allocation formulas are intended to help disadvantaged areas with a lower tax base (lower income), high demand for local public services and/or high costs of producing them. The actual grant systems are unlikely to meet this ideal since they are subject to political swings at national level and are based on imprecise estimates of cost functions and service needs. If fiscal grants for a particular area increase, for reasons other than an increase in production costs or demand for services (i.e., a windfall gain), a non-Leviathan local government has essentially two options. It can either increase service quality or decrease local tax rates (e.g., the property tax rate in the United States or the council tax rate in England). In both cases the area becomes more desirable and the demand for housing rises. To the extent that the supply side does not fully respond to the demand shock, the primary effect of the grant should be to increase local land values and, consequently, house prices. Thus, in areas with less than perfectly elastic housing supply, an *increase* in grants may mainly benefit existing property owners: homeowners and absentee landlords. The possibly unintended consequence is that the system essentially redistributes resources between typically well-off property owners (homeowners and absentee landlords) in different locations, rather than from the more advantaged (high income) to the more disadvantaged (low income) residents.

Despite these potentially important implications, little is known empirically about whether, under what conditions and to what extent intergovernmental transfers are capitalized into property prices. In this paper we shed light on these questions by exploring whether the reallocation of financial resources from the British government to local authorities is capitalized into house prices. Estimating the causal effect of grants on house prices is challenging since grants are allocated through formulae that include endogeneously determined characteristics of the local authority, such as age structure and ethnic composition of the population. To overcome these endogeneity issues and identify the causal effect of grants on house prices we employ an instrumental variable strategy. We utilize strategic political considerations affecting grant allocation at the national level as a source of exogenous variation in grants. Our results based on panel data (over a period of 8 years between 2001 and 2008) and local authority fixed effects as well as IV regressions suggest that an increase in the per-capita grant allocation indeed leads to higher house prices. Moreover, we find evidence on the positive dependence of the house price capitalization rate on physical constraints on housing supply (using elevation range measures).¹ Our core estimates imply that in relatively constrained locations, central government grants are roughly fully capitalized into property prices.

These findings may have a particular relevance in the light of the ongoing ‘credit crunch’ crisis. One consequence of this crisis is that public finances have come under enormous pressure in virtually all industrialized countries, not least in the United Kingdom. The crisis has also made it very transparent that public finances at all levels of government (national, regional and local) and housing markets are linked in complex and manifold ways. One consequence of the mounting pressure on public finances has been that governments across the globe are looking for novel and ingenious ways to raise additional revenue or cut spending to combat the growing budget deficits.

In the UK in particular, the political pressure to reduce the countries’ enormous public debt and deficit is very strong. At the same time, the incoming Conservative/Liberal Democrat coalition government under the leadership of David Cameron has fond plans to devolve central power to the local level. All these political pressures and intended policy reforms will likely impact in a fundamental fashion on the way the central government allocates resources

¹ We draw on earlier work by Hilber and Vermeulen (2009) who study long-term supply constraints in England. Hilber and Vermeulen find that house prices in England react more strongly to increases in household earnings in places that have tighter regulatory and physical supply constraints.

to local authorities over the coming years. These changes may well cause adjustment processes on local housing markets, which in turn may well have important distributional consequences. Our empirical findings that rely on past data imply that this is indeed likely.

2 Background, theoretical considerations and testable predictions

The question of whether – and to what extent – local public spending and/or local taxes affect house prices has been widely studied. In a seminal paper Oates (1969) suggested that property taxes and public school spending are at least partially capitalized into house prices.² Many subsequent empirical studies, whilst using better data, enhancing the methodology and making important qualifications, have largely confirmed this finding (see e.g. the survey articles by Chaudry-Shah, 1988, and Ross and Yinger, 1999; see also e.g. Palmon and Smith, 1998, or Hilber and Mayer, 2009, for more recent evidence). In a similar vein, Ihlanfeldt and Shaughnessy (2004) show that impact fees are fully capitalized into land values.

The impact of central government grants – or more generally intergovernmental transfers – on property prices has received much less attention in the literature. Wyckoff (1995) developed a simple model (with two communities and three income groups) to demonstrate theoretically that in the case of an urban area in which the central city is not large relative to the metro area, the welfare effect of intergovernmental aid (such as education aid) on poor voters should be expected to be completely offset by higher housing cost. While this model provides important insights it is not directly applicable to the British case where we are interested into whether central government grants are capitalized into local house prices.

In order to analyze the impact of grants on house prices, we can draw on literature on the capitalization of local taxes and expenditures – presuming that local governments use additional central government grants to provide additional/better local public services *or* cut taxes, i.e. we assume for now that grants are not wasted. As a useful point of departure, we study the implications of grants in the case of perfect substitutability of locations in a simplified setting along the lines of Brueckner (1979). Specifically, we consider a local

² Oates initially interpreted this finding as evidence in favor of the Tiebout (1956) hypothesis that consumer mobility and inter-jurisdictional competition lead to an efficient provision of local public services. The subsequent theoretical literature largely concluded that house price capitalization is merely consistent with the view that consumers ‘shop’ among local communities but does not provide a test for the Tiebout-hypothesis. Chaudry-Shah (1988), Ross and Yinger (1999) and Scotchmer (2002) provide comprehensive surveys on this topic.

government that finances the provision of local public services from a local property tax (in the UK: the council tax), with the objective of maximizing the value of its housing stock. Following the conventional bid-rent approach, households are freely mobile between locations, so that they bid for units until the utility from dwelling there equals what they can get elsewhere. As a consequence, both their marginal willingness to pay for local public services and the local property tax are fully capitalized into house prices. The local government should set the level of public expenditures such that the capitalized tax needed to finance a further rise in services would just offset the capitalized willingness to pay for them. This condition is equivalent to the Samuelson condition that the marginal willingness to pay for services should equal their marginal cost.

What would be the impact of raising the central government grant in this setting? We have assumed that the local government can spend the additional grant either on increasing spending or cutting taxes. However, when expenditure is set optimally, its choice has no implications for capitalization, since a marginal rise in expenditures and a marginal cut in taxes should then by assumption affect house prices in the same way. Hence, the same conditions that generate full capitalization of local public expenditures and taxes also yield full capitalization of central government grants. Furthermore, since migration ensures that households attain the same utility level before and after the change in grants, the willingness to substitute consumption of public services for other commodities remains unaffected. This implies that the Samuelson condition for optimal service provision is also unaffected. Public expenditure remains the same as before and the additional grant – in this setting – would be fully passed on to households by lowering the property tax.

It is important to emphasize that the result that grants are used to cut taxes is not crucial for capitalization to occur. Grants could increase spending if, for instance, land is owned locally³ or if grants are ring fenced. Indeed, empirical evidence suggests that the propensity to spend out of grants is much higher than what conventional theory can account for, an ‘anomaly’ dubbed the *flypaper effect*.⁴ In our stylized setting where local governments set the expenditure level that maximizes the value of the housing stock, this effect would be irrelevant as expenditures and tax cuts would have the same impact on prices. The spending

³ As long as an increase in grants is at least partially capitalized into higher house prices, the wealth of owner-occupiers will increase after a rise in grants, which in turn may affect their demand for local services.

⁴ The empirical work surveyed in Hines and Thaler (1995) finds propensities to spend out of grants ranging from 0.25 to 1. For recent evidence see e.g., Dahlberg *et al.* (2008).

propensity would only matter for large (non-marginal) changes in grant levels. Of course, this result is conditional on the assumption that local spending is chosen optimally. If local governments overspend, then a grant-induced rise in public expenditures raises house prices by less than a tax cut, so that there may be less than perfect capitalization.

One crucial assumption for obtaining full capitalization is the perfect substitutability of locations. If places are inherently different and households vary in their appreciation for these differences, then demand for living in a certain place becomes downward sloping. House prices reflect the valuation of the marginal resident, who may have a lower willingness to pay for services than infra-marginal households (see also Arnott and Stiglitz, 1979). Furthermore, the fact that the local housing demand curve is downward sloping introduces a role for supply conditions: capitalization will be stronger in places where housing supply is less elastic, either because of limited availability of developable land (physical supply constraints) or because of regulatory constraints on new residential development. Empirical support for the relationship between capitalization and supply constraints is found for instance in Hilber and Mayer (2009), Hilber and Vermeulen (2009) and Hilber (2010).

Our theoretical considerations have so far ignored the possibility that the additional financial resources are ‘wasted’, for example, by generating a more complex bureaucracy or by granting higher salaries to public sector workers (see e.g. the theoretical work by Filimon *et al.*, 1982, and Wyckoff, 1988). To the extent that this is the case a windfall type increase in grants would not make the location more desirable and would thereby have no impact on housing demand, leaving house prices unaffected. In the UK local authorities have little discretionary power in altering public sector wages, corruption is commonly perceived to be quite restrained and there is little evidence of bureaucratic excesses at the local level. Hence, we would expect that central government grants are by and large not wasted.

Based on the above theoretical considerations we can formulate two general, empirically testable predictions.

Prediction 1: An increase in central government grants in one local authority, all else equal, should increase house values in that location.

Prediction 2: The increase in local house values should be larger in local authorities in which housing supply is more constrained.

3 Central government grants in England

Even though the UK is regarded as a highly centralized country, local government accounts for about 25 percent of the public sector expenditure (CLG, 2009). The main source of income for local government is grants from the central government. Grants totaled some £93 billion in the fiscal year 2007/8 and made up roughly 60 percent of total local government income. Local council tax levied on residential properties is the second most important source of revenue with a 30 percent share. The remaining 10 percent is covered by various fees and charges. The size of local government, and consequently grant funding, has risen significantly over the past 10 years. Table 1 documents the evolution of grants in the 348 local authorities (LAs) included in the empirical analysis during the period between 2000 and 2008. Grants rose in real terms by 56.2 percent over the period and amounted to £1,654 per person in the fiscal year 2007/2008.

The data on grants used in this study is provided by the Chartered Institute of Public Finance and Accounting (CIPFA). With English data, the measurement of grants received by local authorities is not straightforward since the distribution of functions to different levels of local government varies across areas, and grants for different service blocks are paid to the level of government responsible for the block. Local authorities can be divided into four classes based on the structure of local government. The first class of LAs is London Boroughs that form the Greater London Area (GLA). In the GLA most services are provided at the LA level (by London's Boroughs) but the upper level GLA is responsible for some services, such as fire protection, police and transport. The second and third LA types are Unitary Authorities and Metropolitan LAs that have essentially a single-tier structure with only one level of local government responsible for all public services. However, in some Unitary Authorities and Metropolitan LAs, some functions take place at a strategic level through joint boards and arrangements. Typical services provided through joint boards are police and fire protection. The fourth group is LAs in non-metropolitan counties (so called 'shire counties') that have a two-tier structure. In non-metropolitan LAs the higher level county councils are responsible for much of the services, such as education, social services and waste management, and lower level district councils are responsible for other services, e.g. waste collection, housing and local planning. In non-metropolitan counties, roughly 25 percent of grants go directly to the LA and the rest go to the county authority. Our data includes 32 London Boroughs, 45 Unitary Authorities, 34 Metropolitan LAs and 237 non-metropolitan LAs. Table 1 shows that

London's Boroughs get the highest grants per capita and have seen the biggest increases in grants between 2000 and 2008. Metropolitan LAs and Unitary Authorities have higher grant-levels and they saw larger grant increases than non-metropolitan LAs.

Grants for each service block are paid to the authority responsible for the block. Since the distribution of benefits of upper level grants to lower level LAs is not known, we have apportioned grants for upper level authorities to LAs based on population. For some Unitary Authorities and Metropolitan LAs upper level grants may be missing since the data lack clear identifiers for participation in joint boards. Roughly 8 billion worth of grants to joint boards were not allocated to any LA and are missing from the analysis. The apportioning of upper level grants to LAs and missing grants may cause some measurement error in the grant variable which may lead to attenuation bias in the simple fixed effects estimates of the effect of grants on house prices. Our instrumental variables strategy (outlined below) will correct for the attenuation bias due to measurement error, in addition to correcting for the bias due to the possible endogeneity of grants.

The English grant system is fairly complicated and there have been several changes over the years, leading to substantial reallocation of grants across LAs. To avoid problems of comparability over time, the grant variable used in the empirical analysis includes all grants and we do not attempt to analyze differential effects of various types of grants. The two main categories of grants in the current system are so called Specific and Special Grants and the Formula Grant. Specific and Special Grants are distributed by individual government departments and currently make up more than 50 percent of all grants. Specific and Special Grants include more than one hundred individual items ranging from £29 billion to schools in the form of the 'Dedicated Schools Grant' to smaller items such as the 'Guns, Gangs and Knives' grant (£57 million) and the 'Rural Social and Community Program' grant (£334,000). The Formula Grant allocates funds to local authorities through formulae including population, social structure and other characteristics of authorities. The Formula Grant also includes a fiscal equalization component as the amount of grants is adjusted based on the council tax base. The equalization system does not lead to reverse causality between house prices and grants in a fixed effects setting since assessed property values that are used as the tax base are based on house prices in 1991 or 1993 and no reassessments have been made. Some of the specific and special grants are ring fenced which, at least in principle, means that LAs have to use the money to provide specified services, but it is not clear how ring fencing is enforced in practice. The Formula Grant is not earmarked even though it is

divided into several service blocks. CLG (2008 and 2009) provide a more detailed description of the grant system.

4 Empirical analysis

4.1 Data

We use panel data on 354 local authorities in England from 2001 to 2008. In the empirical analysis the sample size reduces to 348 as LAs with missing variables are dropped. The dependent variable in the regressions is a local house price index constructed using transaction price data obtained from the Land Registry. The price index is corrected for changes in the mix of dwelling types, but constant quality indices cannot be constructed since the house price data lacks detailed housing attributes. Hence, the price measure is imperfect and may increase standard errors but will not bias estimation. Hilber and Vermeulen (2009) describe the price data in more detail. The explanatory variable of interest is central government grants per capita received by the LA. The grant system, the construction of the grant variable and the underlying data source (CIPFA) were discussed in Section 3.

In addition to house prices and grants, the data include demographic and socio-economic indicators, indicators of physical constraints to new housing construction, and the number of council seats held by each party. The demographic and socio-economic variables are used as control variables in the regressions. They include male weekly earnings based on the Annual Survey of Hours and Earnings (ASHE) data, as well as the age structure of the population, the number of secondary school pupils, the number of non-white pupils, the number of pupils eligible for free school meals and the number of unemployment benefit claimants. All latter variables are derived from the Office for National Statistics (ONS). The measure of physical housing supply constraint used in this study is the altitude range defined as the difference between the lowest and highest point in the LA. The underlying elevation raster/grid data was derived from Land-Form PANORAMA DTM. Data on council seats held by different parties was derived from the BBC website. We use this data to construct our instruments for grants. Summary statistics for all the variables appearing in the regressions are given in Table 2.

4.2 Empirical specification

In order to test Prediction 1 that an increase in grants for a LA increases house prices, we first estimate Local Authority fixed effects models of the log of the house price index on grants

per capita and control variables. We use a semi-log specification since it is natural to assume that the proportionate effect of a one pound increase in grants is the same regardless of the level of grants. The basic model can be written as

$$(1) \quad \text{Ln}(P_{it}) = \alpha_t + \beta G_{it} + \lambda X_{it} + \gamma_i + \mu_{rt} + \eta_{kt} + u_{it},$$

where P_{it} is the house price index in local authority i in year t , G_{it} is total annual grants per capita received by the authority and X_{it} denotes other LA attributes affecting house prices. Local Authority fixed effects γ_i capture unobserved local authority attributes constant over time. We also include region-year fixed effects μ_{rt} to control for unobserved shocks that are common for the region and local authority type-year fixed effects η_{kt} to allow for differential shocks in more and less urbanized areas.

In order to test Prediction 2 that capitalization of grants varies with physical supply constraints, we interact constraints with grants. The ‘interaction model’ can be written as

$$(2) \quad \text{Ln}(P_{it}) = \alpha_t + \beta_1 G_{it} + \beta_2 G_{it} C_i + \lambda X_{it} + \gamma_i + \mu_{rt} + \eta_{kt} + u_{it},$$

where C_i is a measure of physical supply constraints. We use altitude range as a proxy for the ease of building new housing in the LA (see also Hilber and Vermeulen, 2009, and Saiz, 2010).⁵ Regulatory constraints are not included in the analysis since Hilber and Vermeulen (2009) find that they are endogenously determined, and the limited time period of grant data makes the instrumental variables strategy used in Hilber and Vermeulen (2009) unfeasible. Since altitude range is constant over time its main effect is included in local authority fixed effects and does not appear in the equation.

Estimating the effect of grants on house prices is challenging since grant allocation is based on LA attributes – such as the demographic composition – that are likely to be correlated with factors affecting house prices. Moreover, changes in the grant allocation policy may be affected by house prices or underlying determinants of house prices, which would imply that the grant policy is endogenously determined. Our first identification strategy is to estimate equations (1) and (2) by fixed effects panel regression including a flexible set of controls. In these regressions, identification is based on variation in grants within LAs over time, after

⁵ We have also experimented with an alternative (exogenous) proxy for the ease of building new housing, namely, the standard deviation of the slope (a measure of ‘ruggedness’). Our results are virtually unchanged when we use this alternative measure.

controlling for region-year and LA type-year fixed effects that control for unobserved region and LA-type specific shocks affecting grants and house prices. In addition, we include LA attributes that control for endogeneity due to changes in important demographic and socio-economic factors driving grants and possibly house prices. The LA attributes include variables that are associated with the burden of providing public services. Thus, if control variables adequately control for any increases in the burden, the coefficient of the grant variable should reflect the effect of a windfall type change in grants that is not accompanied by increases in production costs or service needs.

Even with a detailed fixed effects structure and a good set of controls, it is likely that issues related to the endogeneity of the grant policy itself remain. Moreover, the approximate apportioning of county level grants based on population and missing upper level grants for some LAs participating in joint boards leads to measurement error that can cause downward bias in the coefficient of grants. Attenuation bias due to measurement error is known to be magnified in panel data fixed effects estimation (Wooldridge, 2002). To fully address the endogeneity concerns and the possibility of attenuation bias due to measurement error in the grant variable, we employ an instrumental variable strategy, which we discuss below.

Instrumental variable strategy

The distribution of funds to different areas through the grant system is not only driven by changes in the demand for services and the costs of producing them. It is quite likely that political considerations play an important role. We propose an instrumental variable approach that utilizes the political considerations affecting grant allocation as a source of exogenous variation in grants. In the UK, the Labour party formed the national government over the period covered by the data. We argue that the Labour party may have used the grant system to allocate more money to areas where it dominates the local council. Moreover, areas where its dominance is marginal are likely to receive more attention than areas where Labour dominance is unchallenged. We use data on local council election outcomes to construct the following set of instruments for grants:

- Labour's absolute majority in the council (a dummy variable that gets the value one if Labour has more seats than Conservatives and Liberal Democrats together);
- The interaction of Labour's share of seats with the dummy variable for the absolute majority;

- Labour's share of council seats.

All else equal, Labour's absolute majority is expected to have a positive effect on grants as the central government uses the grant system to support the incumbent Labour council cabinet. However, as Labour's dominance becomes stronger and it has a clear majority, there is less need for support from the central government, and the interaction of the dummy for Labour's majority and Labour's share of seats is expected to have a negative sign.⁶ Labour's share of seats could also have an independent positive effect on grants if the Labour government truly cares about the wellbeing of Labour voters. Since we control for LA fixed effects the identification is based on changes in the above variables over time.

Naturally, support for Labour council cabinets is not the only reason why strong but not unchallenged Labour support could affect grant allocation. The Labour government may also have used the local elections as an indicator for the coming general elections and allocated grants to areas where it has strong but not unchallenged support in order to secure a seat in the parliament in the next general elections.

The formation of the council cabinet is a complicated process and it is not clear which number of seats gives a party the dominance in the cabinet. Hence, the definition of Labour's absolute majority variable is somewhat arbitrary. We argue that a 50 percent share of all seats would probably be an overly strict condition for dominance of the council whereas being the biggest party is perhaps too loose. Our preferred definition of majority based on having more seats than the two other main parties together also seemed to predict changes in grants better than other potential measures of majority.

The instrumental variables based on changes in Labour's seats are valid instruments if the changes in Labour's share of seats in the council affect house prices only through their effect on grants. We argue that other potential effects of changes in Labour's seats on prices are likely to be non-existent or miniscule. One potential concern about the instruments is that the political structure of the council may lead to adjustments in local public services and council taxes, which could in turn capitalize into house prices. According to Brueckner's (1979) model discussed in Section 2, marginal adjustments in the mix of council taxes and local public services do not affect house prices if the tax service bundle is close to the level that

⁶ We also examined the possibility of using a regression discontinuity design based on the discrete jump in grants when Labour gains majority, but the predictive power of the instrument was not sufficiently strong.

maximizes house values. Intuitively, if taxes and services in a LA are set at a level that maximizes house values, the marginal benefit from services equals the marginal benefit of private consumption and people are indifferent between small increases in taxes and services. By contrast, a windfall type increase in grants for one LA may have a big impact on local house prices as the costs are borne by the whole country while the benefits are local. Hence, the effect of a change in grants on house prices is of a different order of magnitude than the possible effect of a change in the combination of council tax and services due to a change in political composition of the council.

The instrumental variables strategy can also lead to inconsistent estimates if changes in Labour's share are correlated with other factors affecting house prices that are outside the model. We argue that the region-year fixed effects and authority-type fixed effects together capture most important regional price determinants, such as productivity and income shocks, that may be related to changes in Labour's support. Moreover, we also control for various local authority attributes that may be correlated with Labour support and could affect grants and house prices. With these control variables, the remaining variation in Labour's seats used to predict grants is likely to be exogenous variation due to random factors affecting electoral outcomes, such as the success of the election campaign and the advertising of local branches of different parties, quality of individual candidates and their success or failure in the campaign.

To the extent that the instrument reflects exogenous variation in grants, the instrumental variables specification estimates the effect of a windfall type change in grants that is not offset by a change in the burden of service provision due to changes in the need for services or production costs.

There is no single component of grants or type of adjustment in the grant allocation criteria through which we would expect the governing Labour party to support its local politicians. There are many ways in which the government can attempt to allocate more grants to LAs where it has marginal dominance. Firstly, the government can influence the sectoral budgets and favor sectors that are disproportionately important for LAs where its support is strong but not uncontested. Secondly, the government can put more emphasis on allocation criteria that are important for the strategically important LAs. Every year, the government makes numerous small adjustments to the formulae on which the allocation of grants is based and new Specific and Special Grants are introduced to finance various initiatives. We believe that

the implications of these adjustments for LAs with different political composition are carefully examined by the government before approval when the proposal is in preparation.

There is anecdotal evidence that the Labour government has modified the grant system in a way that benefits more urbanized areas where Labour's support is high. We have identified at least two specific reforms that point to this direction. The first is the modification of the so called area cost adjustment (ACA) factor of the Formula Grant, which is a scaling factor intended to reflect higher costs, mainly pay, in some areas. Before 2004 the ACA factor was quite rough and applied only to London and the South East. In 2004 the government introduced a more detailed classification of LAs and urban high cost areas outside the South East saw increases in their ACA factors. This happened at the expense of more rural areas where Labour support tends to be weaker. The second reform likely to benefit Labour strongholds is a change in the way the bulk of the specific and special grants are distributed. Before 2006 a lot of the specific and special grants were distributed based on population, but in 2006 the allocation was changed so that they were allocated similarly to the Formula Grant which accounts for demographic and socio- economic factors (including the aforementioned ACA). This reform benefited LAs with higher demand for services and higher costs, which also tend to be dominated by the Labour party. We think that there is reason to believe that the Labour government has influenced the allocation in several other and more subtle ways to channel grants strategically to LAs where the incumbent Labour county cabinet needs support. All these adjustments together provide the exogenous variation in grants that the instrumental variables approach utilizes.

There is significant variation within LAs over time in the instrumental variables as local elections are held more often than national elections. The frequency of elections differs because local authorities are organised in different ways. In some LAs all of the councillors are elected every four years while other LAs elect half of the councillors every two years. Finally, in some LAs a third of the councillors are elected every year for three years with no elections in the fourth year.

Maps 1 and 2 illustrate the relationship between Labour's support and grants. Map 1 shows Labour's share of seats in 2002 and Map 2 shows relative increases in grants per capita from 2002 to 2008. Areas where Labour's support is strong often got the largest increases. The first stage regressions reported in the next section show that the instrumental variables predict grants well, even in a fixed effects setting with a rather extensive set of control variables.

4.3 Results

Table 3 reports results for the base specification (equation 1) testing the Prediction 1 that changes in grants are capitalized into house prices. The first four columns show fixed effects estimates without instruments and the last three columns show the instrumental variables estimates. The coefficient on the grant variable gives the semi elasticity of house prices with respect to grants per capita in the fiscal year starting in April t-1 and ending in March year t. The units are £1,000. Also the control variables for demographic and socio-economic attributes of LA's are measured in year t-1 in order for them to better capture the LA attributes on which the allocation of grants is partly based. Earnings are measured in year t.

The first column of Table 3 reports results for a specification with LA fixed effects that capture time invariant unobserved LA characteristics and year fixed effects that capture shocks that are common for the whole economy. The coefficient on grants is positive but insignificant. In column (2) we include region-year fixed effects for ten regions and the coefficient rises to 0.04 and becomes significant at 10 percent level.⁷ Region-year fixed effects control for changes in the overall grant-levels over time in the region and other regional or nationwide factors, such as interest rates. Hence, the coefficient on grants is based on changes in grants that are higher or lower than the average increase in the region. In column (3) we add authority type-year fixed effects (three authority types⁸) to control for the fact that more urban areas may have experienced different price shocks than less urbanized areas during the time period. The coefficient increases further to about 0.06 and becomes significant at 5 percent level. In column (4) we add control variables that are likely to affect both grants and house prices. The results are roughly the same as in column (4) without controls. The coefficient of 0.06 implies that a one standard deviation increase (£490) in grants per capita leads to a 3 percent increase in local house prices.

The results in columns (1)–(4) of Table 3 suggest that grants have a positive, albeit relatively small, effect on local house prices. However, the fixed effect regression results may be biased if there are time-varying LA attributes missing from the model that affect local house prices

⁷ The regions are: East Midlands, East of England, North East, North West, Inner London, Outer London, South East, South West, West Midlands, Yorkshire and The Humber.

⁸ The authority type division used is: Metropolitan LAs and London Boroughs, Unitary Authorities, two-tier authorities (non-metropolitan LAs). Metropolitan LAs and Unitary Authorities are typically more urbanized than two-tier authorities.

and are correlated with changes in grants per person. The instrumental variables regressions reported in columns (5)–(7) of Table 3 address this endogeneity issue by utilizing the council election outcomes to construct instruments for grants as discussed in Section 4.2.

First stage regressions for the IV regressions in Table 3 are reported in Table A1 of the Appendix. Columns (1), (2) and (3) of Table A1 correspond to columns (5), (6) and (7) of Table 3 respectively. The three instruments have the expected effects on grants per capita in all the specifications and the magnitudes of the coefficients are plausible. Kleinbergen-Paap F statistics indicate that the instruments are strong and there is no reason to suspect weak instrument bias in the estimates. The coefficient on Labour's share of seats is positive and significant at the 10 percent level in column (1) but becomes insignificant in columns (2) and (3).⁹ The dummy variable for Labour majority is positive and highly significant in all the specifications. The estimated effect of Labour's majority on grants ranges from £185 per person in column (1) to £102 in column (3). The interaction term Labour majority \times the party's share of seats is negative and highly significant implying that when Labour's majority becomes more secure its positive effect on grants diminishes. For example in column (3) the coefficient of the interaction term implies that a ten percentage point increase in Labour's share in an LA which already has a Labour majority reduces the positive impact of the Labour majority variable on grants from £102 to £84 per capita.

The IV regressions in columns (5)–(7) of Table 3 give substantially higher estimates for the capitalization effect of grants than the simple FE regressions reported in columns (1)–(4). In column (5) which includes region-year fixed effects the coefficient of grants is 0.19 and significant at the five percent level. In column (6) we add LA type-year fixed effects and the coefficient becomes 0.3 and is significant. The inclusion of LA attributes as controls in column (7) does not seem to affect the capitalization coefficient, but the standard error increases as the instrument becomes weaker. Even after including the LA attributes the impact of grants is significant at the 10 percent level.

Supply constraints

In Table 4 we examine whether capitalization is stronger in local authorities in which housing supply is constrained by physical barriers, which are proxied by altitude range. The first three

⁹ We tested the robustness of the results for dropping the Labour's share of seats variable when it is insignificant and the results remained virtually unchanged.

columns show results for fixed effects regressions with different specifications and the last three columns show the instrumental variables estimates. The altitude range is standardized, such that the coefficient of the interaction term can be interpreted as the increase in the coefficient on grants if the altitude range increases by one standard deviation (171 meters).

In the FE regressions reported in columns (1)–(3) of Table 4, both the grant variable and its interaction with altitude range are positive and highly significant. The positive interaction term suggests that grants have a more pronounced effect on house prices when new construction is more constrained. The results are robust to changes in the specification. In all the FE regressions the coefficient of grants increases from roughly 0.08 to 0.11 when altitude range increases by one standard deviation. This implies that a one standard deviation higher altitude range is associated with an almost 40 percent higher capitalization rate. Columns (4)–(6) report the IV results for the supply constraint model. Grants per capita and its interaction with the altitude range are instrumented with the same instruments as in Table 3 and, in addition, their interactions with altitude range. As in Table 3, the IV coefficient of grants is much larger than the FE coefficient. The interaction term is positive and highly significant suggesting that capitalization is stronger in LAs with more constrained supply. The relative increase in the capitalization coefficient, when the altitude range increases by one standard deviation, is roughly 20 percent. The Kleibergen-Paap F statistics is rather low in columns (5) and (6) when more control variables are added to the IV specification, which indicates that the results may be biased if the instrument is even weakly correlated with omitted variables affecting prices. Overall, the results suggest that the capitalization rate is substantially higher if construction of new housing is constrained by physical barriers.

Capitalization rate

Next we quantify the results by calculating the capitalization rates implied by the grant coefficients in Tables 3 and 4. The capitalization rate of grants can be expressed as

$$(3) \text{ Capitalization rate} = (\beta * \text{average house value}) / (\text{average household size} * \text{£1,000}/r),$$

where β is the coefficient on grants and r is the discount rate. The term in the first parenthesis is the estimated average increase in house values when grants in an average LA go up by one unit (£1,000 per person). The second term is the present value of the one unit (£1,000) increase in grants for a dwelling with average household size. The average house value in our data is roughly £180,000 and the average household size in England was 2.4 in the sample

period. We calculate the capitalization rate with three different discount rates $r = 0.03$, $r = 0.04$ and $r = 0.05$.

Table 5 reports capitalization rates implied by the regression coefficients in Tables 3 and 4 with different assumptions on the discount rate. Panel A of Table 5 refers to base estimates reported in Table 3. Panel B is related to the supply constraint regressions in Table 4 and compares capitalization rate in a LA with low altitude range (= mean – standard deviation) with an LA with high altitude range (= mean + standard deviation).

In panel A of Table 5, capitalization coefficients implied by simple fixed effect regressions vary from 0.09 to 0.23, whereas the capitalization coefficients implied by the IV regressions vary from 0.42 to slightly above full capitalization. Yinger *et al.* (1988) point out that the appropriate discount rate is the real discount rate. The average real interest rate in the period between 2000 and 2008 calculated as the average UK banks' base rate less inflation is roughly 3 percent. Adding a 1 percentage point risk premium yields $r = 0.04$, which we believe to be our most sensible estimate of the discount rate. The IV estimates in columns (6) and (7) of Table 3 are our preferred estimates for the price effect of grants. Using these estimates for β and the discount rate of four percent yields a capitalization coefficient of nearly 0.9 suggesting that grants are almost fully capitalized. It should be noted that the capitalization rate is based on the assumption that the increase in grants is permanent. If there is uncertainty about whether the grant increase is permanent, the present value of the grant increase in equation (3) will be too high and the capitalization rate is underestimated. Hence the capitalization rate of 0.9 may well be a slight underestimate for the capitalization rate of a permanent grant increase. Thus, overall, the results suggest that grants may be roughly fully capitalized into prices. Full capitalization is consistent with the view that local authorities are perfect substitutes and the local housing demand curve is flat (see Section 2). The finding is, however, not conclusive since the confidence intervals for the coefficient on grants are quite broad.

Panel B reports capitalization rates implied by the supply constraint regressions. We have selected the fixed effects estimates in column (3) and the IV estimates in columns (5) and (6) of Table 4 to calculate the implied capitalization rates for low and high altitude range LAs. The fixed effects estimates and a discount rate $r = 0.04$ yield a capitalization rate of 0.16 for the low altitude range LA and 0.33 for the high altitude range LA. The IV estimates are substantially higher. The IV specification without LA attributes as controls (third and fourth

column of Panel B) imply a capitalization rate of 0.82 in less constrained LAs and 1.22 in more constrained places assuming $r = 0.04$. When LA attributes are added as controls (the last two columns of Panel B), the capitalization rate is 0.64 with low altitude range and 0.96 with high altitude range. The finding that capitalization rates are higher in more constrained LAs supports the view that LAs are not perfect substitutes and the demand for housing in a locality is downward sloping. Since the interaction of altitude range and grants is highly significant in all specifications, we are inclined to conclude that our data provides stronger support for the view that LAs are imperfect substitutes than for the alternative view that local housing demand is flat implying full capitalization everywhere.

Results for sub-samples (robustness checks)

The measurement issues due to missing grants for some joint boards may affect our estimates. Hence, we repeat our analysis only for non-metropolitan LAs for which all grants are included in the data. Furthermore, over the time period studied, the Greater London Area (GLA) saw the largest increases in grants and also house prices rose rapidly in the GLA. In order to test for the robustness of our findings to the exclusion of the GLA we repeat the analysis without the GLA. Results for the non-metro and non-GLA subsamples are reported in Appendix Tables A2 to A5.

Table A2 reports the results of the base model for the sample of non-metropolitan LAs and Table A3 shows the same results for the non-GLA sample. Overall, the capitalization coefficients are larger for the sub-samples than for all LAs. Grants are positive and highly significant even without instrumenting and the coefficient varies from roughly 0.1 to 0.3. The instrumental variables regressions give somewhat larger estimates than the FE regressions. Thus, the result that differences in grants are capitalized into house prices does not seem to be driven by the GLA. Table A4 reports the first stage regressions of the IV models for both the non-metro sample and the non-GLA sample. The effects of political variables on grants are very similar to those found for the whole sample. Table A5 examines the effects of physical supply constraints (altitude range) on capitalization. Panel A shows fixed effects and IV estimates for the non-metro sample and Panel B shows results when the GLA is excluded. The results are similar to those in Table 5 for the whole sample. The interaction of grant with altitude range is positive in all specifications indicating that places with more constrained supply have higher capitalization rates. However, the instruments are quite weak in the IV

specifications with a more detailed fixed-effects structure and control variables, and the IV results with altitude range interactions may therefore be somewhat biased for the subsamples.

5 Conclusions

Central government grants in the UK are designed to compensate local authorities for fiscal burdens associated with unfavorable demographic and socioeconomic population compositions. However, our instrumental variable estimates indicate that the grants are at least partially allocated to local authorities based on strategic political considerations, not merely on the basis of fiscal burden or costs of providing services. This source of exogenous variation in grants represents a windfall type of grant. Our empirical findings suggest that in locations in which housing supply is comparably constrained by physical barriers (mean of altitude range + one standard deviation), increases in this windfall type of grant are roughly fully capitalized into house prices, while in less constrained places (mean – one standard deviation) the extent of capitalization is still quite significant, in our central estimates: slightly over 60 percent. One implication of these findings is that local governments appear to use grants in ways that are valued by the marginal homeowner. They do not appear to spend the financial resources on self-interested bureaucracy.

The May 2010 elections in the UK generated a very significant political change. The new coalition government of Conservatives and Liberal Democrats (which replaced the outgoing Labour government that was in power for 13 years) is likely to enact major policy changes that will lead to a significant reallocation of resources from the central government to local authorities. Moreover, the political swing will likely lead to a reallocation of resources across local authorities. This reallocation of resources represents a windfall type grant independent of whether the new grant system is closer to the ideal of compensating for local burden or not. As a consequence, our findings imply that the changes at the local level will be capitalized into property prices.

What are the policy implications of these changes? Property owners (homeowners and absentee landlords) will either significantly gain or lose, depending on whether they live in local authorities that observe relative increases or decreases in grants. In contrast, assuming that windfall type grants increase rents as well as house prices, private renters should not be

affected by the changes (greater desirability is compensated by higher rents and vice versa).¹⁰ In other words, the grant system and changes in the allocation of grants generate substantial redistribution among property owners in different parts of the country, leaving (private) renters unaffected.

More generally, our findings imply that the British grant system has very substantial unintended consequences in that it generates massive redistribution of resources without helping the most disadvantaged individuals as well as the less fortunate in the most disadvantaged places. To illustrate this argument, consider for example an increase in the “Guns, Gangs and Knives” grant intended to help people living in disadvantaged areas / the inner city poor. Our findings imply that this increase in funding would increase house prices and rents in inner cities, which are largely populated by renters. Beneficiaries of the change are (the few) – typically comparably well-off – homeowners as well as – typically ‘absentee’ and well-off – landlords who own most of the inner city properties. Private renters would likely not benefit from the additional funding.

One policy implication of our findings is that it may be more effective and efficient to “help people rather than places”. In addition to the fact that the grant system has substantial unintended distributional consequences, these grants are financed at the national level, mainly with income taxes, which in turn are associated with significant deadweight losses. Our results suggest that lower income tax rates, less grant-induced redistribution but more direct help to disadvantaged people could achieve the same distributional outcome at potentially significantly lower cost. Such a reform could contribute towards lessening the fiscal pressures that have been mounting during the ongoing economic / public finance crisis.

¹⁰ Whether social renters are also subject to redistribution depends on whether social rents reflect changes in the desirability of a local authority or not. The weaker the inter-temporal correlation of social rents and private rents, the more affected social renters will be by the ‘redistribution lottery’.

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TABLES

Table 1
Evolution of grants in 2000's (in year 2008 pounds per capita)

Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	% change 2000 - 2008
England	1059	1112	1152	1317	1500	1562	1605	1655	1654	56.2
London Boroughs	1712	1794	1898	2222	2610	2660	2760	2848	2842	66.0
Metropolitan LAs	1134	1199	1237	1424	1636	1711	1746	1785	1778	56.8
Unitary LAs	1010	1061	1093	1236	1385	1456	1484	1532	1539	52.4
Non-metropolitan LAs	835	873	898	1010	1123	1176	1208	1250	1252	50.0

Table 2
Summary statistics for regressions

Variable	Mean	Std. Dev.		Min	Max
		overall	within		
ln(house price index)	7.467	0.229	0.185	6.581	8.567
Grants/pop (£1,000)	1.254	0.490	0.205	0.596	4.238
Ln(average male weekly earnings)	6.277	0.178	0.080	5.760	7.007
Age 16-29/pop %	16.9	3.9	0.581	10.7	36.8
Age 30-44/pop %	21.9	2.5	0.676	13.4	35.1
Age 45-64/pop %	22.5	2.4	0.303	12.6	27.7
Age 65 and higher/pop %	19.6	3.9	0.522	8.7	34.1
Secondary school pupils/1,000 pop	62.7	10.8	4.933	17.5	102.3
Pupils non-white/1,000 pop	5.4	8.0	2.484	0.1	55.7
Pupils eligible for free school meal/1,000 pop	34.1	29.5	11.342	1.1	358.0
Unemployment benefit claimants/1,000 pop	11.9	6.6	1.387	3.1	42.2
Altitude range (kilometers)	0.209	0.171	0.000	0.005	0.975
Labour's share of council seats	0.267	0.246	0.077	0	0.983
Labour has absolute majority	0.215	0.411	0.207	0	1

Table 3
Capitalization of grants

	Fixed Effects regressions				IV regressions		
Dep. Var ln(price)	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Grants/pop	0.019	0.041*	0.059**	0.061**	0.188**	0.295**	0.291*
	[0.019]	[0.024]	[0.027]	[0.027]	[0.076]	[0.115]	[0.155]
ln(earnings)				0.009			0.013
				[0.017]			[0.015]
Age 16-29/pop				0.006			-0.002
				[0.006]			[0.007]
Age 30-44/pop				0.014			0.004
				[0.010]			[0.010]
Age 45-64/pop				0.021**			0.007
				[0.008]			[0.011]
Age 65 and over/pop				0.001			0.002
				[0.008]			[0.006]
Secondary school pupils/pop				0.001**			0.001***
				[0.000]			[0.000]
Non-white pupils/pop				-0.003***			-0.006***
				[0.001]			[0.002]
Free school meal eligibility/pop				-0.001*			-0.001***
				[0.001]			[0.000]
Benefit claimants/pop				-0.007***			-0.008***
				[0.001]			[0.001]
Year fixed effects	YES	YES	YES	YES	YES	YES	YES
Local authority fixed effects	YES	YES	YES	YES	YES	YES	YES
Region*year fixed effects		YES	YES	YES	YES	YES	YES
LA type*year fixed effects			YES	YES		YES	YES
Kleinbergen-Paap first stage F					31.1	17.7	13.2
Hansen's J (p-value)					0.931	0.844	0.761
N	2446	2446	2446	2446	2441	2441	2441
R-sq, within	0.916	0.967	0.967	0.969	0.965	0.964	0.967

Robust standard errors in brackets

* p<0.1, ** p<0.05, *** p<0.01

Table 4
Capitalization of grants and physical supply constraints

	Fixed Effects regression			IV regression		
	(1)	(2)	(3)	(4)	(5)	(6)
Grants/pop	0.077*** [0.026]	0.086*** [0.028]	0.082*** [0.027]	0.278*** [0.089]	0.339*** [0.124]	0.266* [0.156]
Altitude range*Grants/pop	0.032*** [0.009]	0.032*** [0.009]	0.029*** [0.009]	0.067*** [0.016]	0.066*** [0.017]	0.053*** [0.016]
Year fixed effects	YES	YES	YES	YES	YES	YES
Local authority fixed effects	YES	YES	YES	YES	YES	YES
Region*year fixed effects	YES	YES	YES	YES	YES	YES
LA type*year fixed effects		YES	YES		YES	YES
Control variables			YES			YES
Kleinbergen-Paap first stage F				13.3	8.2	6.5
Hansen's J (p-value)				0.594	0.412	0.282
N	2446	2446	2446	2441	2441	2441
R-sq, within	0.968	0.968	0.97	0.965	0.964	0.968

Robust standard errors in brackets

* p<0.1, ** p<0.05, *** p<0.01

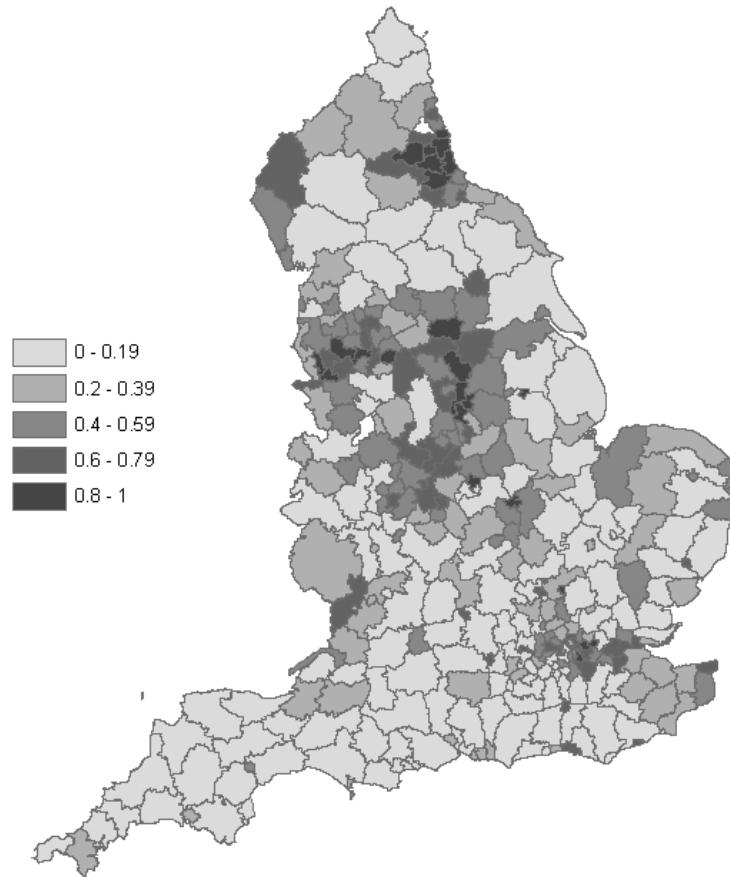
Table 5
Quantitative effects (capitalization rates with different assumptions)

<i>Panel A: base regressions</i>							
Table/Column	3/2	3/3	3/4	3/5	3/6	3/7	
Model	FE	FE	FE	IV	IV	IV	
Coefficient (β)	0.041	0.059	0.061	0.188	0.295	0.291	
Capitalization rate if r = 0.05	0.154	0.221	0.229	0.705	1.106	1.091	
Capitalization rate if r = 0.04	0.123	0.177	0.183	0.564	0.885	0.873	
Capitalization rate if r = 0.03	0.092	0.133	0.137	0.423	0.664	0.655	
<i>Panel B: altitude range regressions</i>							
Table/Column	4/3	4/3	4/5	4/5	4/6	4/6	
Model	FE	FE	IV	IV	IV	IV	
Altitude range*	Low	High	Low	High	Low	High	
Coefficient (β)	0.053	0.111	0.273	0.405	0.213	0.319	
Capitalization rate if r = 0.05	0.199	0.416	1.024	1.519	0.799	1.196	
Capitalization rate if r = 0.04	0.159	0.333	0.819	1.215	0.639	0.957	
Capitalization rate if r = 0.03	0.119	0.250	0.614	0.911	0.479	0.718	

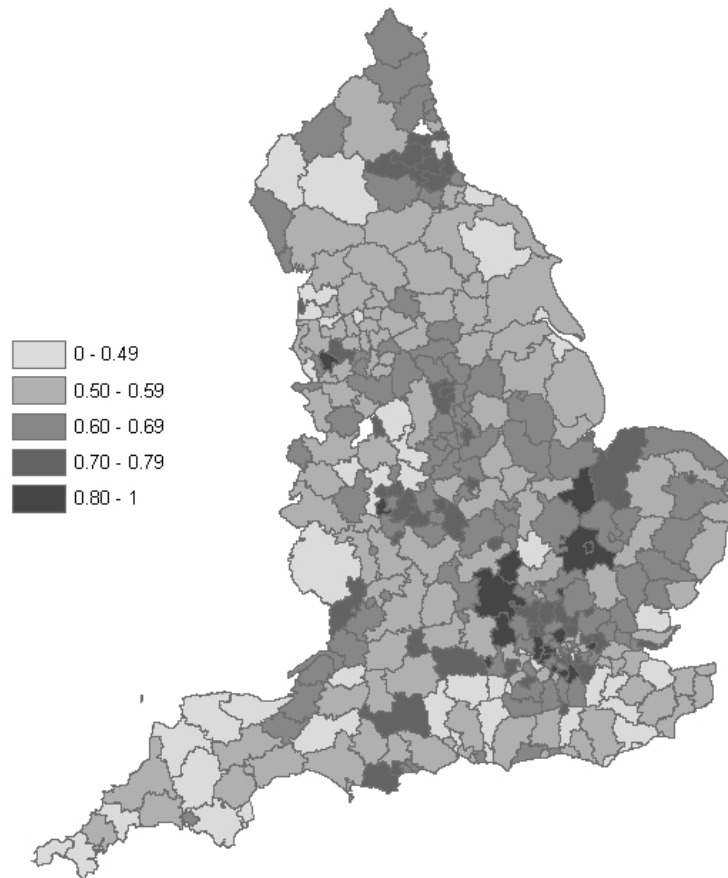
* Low altitude range = mean – std. dev. and high altitude range = mean + std. dev.

MAPS

Map 1
Labour's share of council seats in 2002



Map 2
Relative changes in grants per capita 2002 – 2008 (nominal)



APPENDIX TABLES

Table A1
First stage of IV corresponding to Table 3

Dep. Var grants/pop	(1)	(2)	(3)
Labour's share of seats	0.076*	0.048	0.039
	[0.042]	[0.035]	[0.026]
Labour's absolute majority	0.185***	0.128***	0.102***
	[0.034]	[0.029]	[0.021]
Labour's absolute majority*share of seats	-0.371***	-0.250***	-0.178***
	[0.063]	[0.055]	[0.040]
Ln(earnings)			-0.019
			[0.023]
Age 16-29/pop			0.038***
			[0.011]
Age 30-44/pop			0.063***
			[0.022]
Age 45-64/pop			0.060***
			[0.014]
Age 65 and higher/pop			-0.003
			[0.014]
Secondary school pupils/pop			-0.001*
			[0.000]
Pupils non-white/pop			0.009**
			[0.004]
Pupils eligible for free school meal/pop			0
			[0.000]
Unempl. benefit claimants/pop			0.001
			[0.002]
Local authority fixed effects	YES	YES	YES
Region*year fixed effects	YES	YES	YES
Authority type*year fixed effects		YES	YES
Kleinbergen-Paap first stage F	31.1	17.7	13.2
Hansen's J (p-value)	0.931	0.844	0.761
N	2441	2441	2441
R-sq, within	0.945	0.956	0.959

Robust standard errors in brackets

* p<0.1, ** p<0.05, *** p<0.01

Table A2
Capitalization of grants for non-metro sample (FE + IV)

Dep. Var ln(price)	Fixed Effects regression			IV regression	
	(1)	(2)	(3)	(4)	(5)
Grants/pop	0.332*** [0.065]	0.173*** [0.043]	0.155*** [0.040]	0.616*** [0.154]	0.388* [0.213]
Ln(earnings)			0.016 [0.019]		0.015 [0.017]
Age 16-29/pop			0.020*** [0.007]		0.017*** [0.006]
Age 30-44/pop			0.032*** [0.010]		0.027*** [0.009]
Age 45-64/pop			0.038*** [0.009]		0.032*** [0.008]
Age 65 and over/pop			0.015* [0.008]		0.018** [0.007]
Secondary school pupils/pop			0.001*** [0.001]		0.002*** [0.001]
Non-white pupils/pop			-0.009*** [0.003]		-0.011*** [0.003]
Free school meal eligibility/pop			-0.001** [0.001]		-0.001*** [0.000]
Benefit claimants/pop			-0.009*** [0.002]		-0.010*** [0.001]
Year fixed effects	YES	YES	YES	YES	YES
Local authority fixed effects	YES	YES	YES	YES	YES
Region*year fixed effects		YES	YES	YES	YES
Kleinbergen-Paap first stage F				25.8	13.6
Hansen's J (p-value)				0.463	0.207
N	1659	1659	1659	1659	1659
R-sq, within	0.929	0.967	0.971	0.962	0.969

Robust standard errors in brackets

* p<0.1, ** p<0.05, *** p<0.01

Table A3
Capitalization of grants for non-London sample (FE + IV)

Dep. Var ln(price)	Fixed Effects regression				IV regression		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Grants/pop	0.298*** [0.038]	0.082*** [0.028]	0.129*** [0.031]	0.123*** [0.029]	0.236*** [0.088]	0.419*** [0.148]	0.403** [0.199]
Ln(earnings)				0.007 [0.018]			0.006 [0.016]
Age 16-29/pop				0.01 [0.006]			0.004 [0.006]
Age 30-44/pop				0.023** [0.010]			0.015* [0.009]
Age 45-64/pop				0.032*** [0.008]			0.021** [0.010]
Age 65 and over/pop				0.006 [0.008]			0.012 [0.007]
Secondary school pupils/pop				0.001*** [0.000]			0.001*** [0.000]
Non-white pupils/pop				-0.006*** [0.002]			-0.009*** [0.002]
Free school meal eligibility/pop				-0.001** [0.001]			-0.001*** [0.000]
Benefit claimants/pop				-0.007*** [0.001]			-0.008*** [0.001]
Year fixed effects	YES	YES	YES	YES	YES	YES	YES
LA fixed effects	YES	YES	YES	YES	YES	YES	YES
Region*year fixed effects		YES	YES	YES	YES	YES	YES
LA type*year fixed effects			YES	YES		YES	YES
Kleinbergen-Paap first stage F					24.7	12.0	9.5
Hansen's J (p-value)					0.581	0.46	0.358
N	2222	2222	2222	2222	2217	2217	2217
R-sq, within	0.929	0.968	0.968	0.971	0.966	0.965	0.968

Robust standard errors in brackets

* p<0.1, ** p<0.05, *** p<0.01

Table A4
First stage of IV corresponding to Tables A2 and A3

	Non-metro LAs		Non-London LAs		
	(1)	(2)	(3)	(4)	(5)
Dep. Var grants/pop					
Labour's share of seats	0.002	-0.002	0.041	0.011	0.006
	[0.031]	[0.024]	[0.041]	[0.032]	[0.025]
Labour's absolute majority	0.065***	0.043**	0.148***	0.086***	0.073***
	[0.022]	[0.018]	[0.033]	[0.026]	[0.020]
Labour's absolute majority*share of seats	-0.165***	-0.110***	-0.304***	-0.172***	-0.128***
	[0.044]	[0.036]	[0.062]	[0.050]	[0.039]
Ln(earnings)		0.005			0.004
		[0.016]			[0.018]
Age 16-29/pop		0.011*			0.020***
		[0.006]			[0.007]
Age 30-44/pop		0.017*			0.024**
		[0.009]			[0.010]
Age 45-64/pop		0.019**			0.037***
		[0.008]			[0.010]
Age 65 and higher/pop		-0.015**			-0.022**
		[0.008]			[0.009]
Secondary school pupils/pop		-0.002***			-0.001**
		[0.000]			[0.000]
Pupils non-white/pop		0.008***			0.010***
		[0.002]			[0.003]
Pupils eligible for free school meal/pop		0.001			0.001
		[0.000]			[0.000]
Unempl. benefit claimants/pop		0.002			0.002
		[0.001]			[0.001]
Local authority fixed effects	YES	YES	YES	YES	YES
Region*year fixed effects	YES	YES	YES	YES	YES
Authority type*year fixed effects				YES	YES
Kleinbergen-Paap first stage F	25.8	13.6	24.7	12.0	9.5
Hansen's J (p-value)	0.463	0.207	0.581	0.460	0.358
N	1659	1659	2217	2217	2217
R-sq, within	0.972	0.972	0.938	0.956	0.964

Robust standard errors in brackets

* p<0.1, ** p<0.05, *** p<0.01

Table A5
Capitalization of grants and physical supply constraints (non-metro and non-London samples)

<i>Panel A: Metropolitan LAs excluded</i>						
Dep. Var In(price)	Fixed Effects regression			IV regression		
	(1)	(2)		(4)	(5)	
Grants/pop (t-1)	0.196*** [0.043]	0.165*** [0.039]		0.667*** [0.167]	0.324 [0.223]	
Altitude range*Grants/pop (t-1)	0.035*** [0.011]	0.028*** [0.011]		0.073*** [0.024]	0.049** [0.024]	
Year fixed effects	YES	YES		YES	YES	
Local authority fixed effects	YES	YES		YES	YES	
Region*year fixed effects	YES	YES		YES	YES	
LA type*year fixed effects						
Control variables		YES			YES	
Kleinbergen-Paap first stage F				9.1	4.8	
Hansen's J (p-value)				0.04	0.018	
N	1659	1659		1659	1659	
R-sq, within	0.968	0.971		0.962	0.97	
<i>Panel B: London excluded</i>						
Dep. Var In(price)	Fixed Effects regression			IV regression		
	(1)	(2)	(3)	(4)	(5)	(6)
Grants/pop (t-1)	0.123*** [0.029]	0.154*** [0.031]	0.139*** [0.028]	0.334*** [0.103]	0.483*** [0.167]	0.344* [0.203]
Altitude range*Grants/pop (t-1)	0.037*** [0.009]	0.035*** [0.010]	0.033*** [0.009]	0.071*** [0.017]	0.074*** [0.019]	0.058*** [0.017]
Year fixed effects	YES	YES	YES	YES	YES	YES
Local authority fixed effects	YES	YES	YES	YES	YES	YES
Region*year fixed effects	YES	YES	YES	YES	YES	YES
LA type*year fixed effects		YES	YES		YES	YES
Control variables			YES			YES
Kleinbergen-Paap first stage F				10.3	5.1	4.7
Hansen's J (p-value)				0.186	0.141	0.057
N	2222	2222	2222	2217	2217	2217
R-sq, within	0.969	0.969	0.971	0.966	0.964	0.97

Robust standard errors in brackets

* p<0.1, ** p<0.05, *** p<0.01