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Evaluating the effect of grant on affordable housing supply in England using a quasi-experiment

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ABSTRACT

England suffers from an undersupply of affordable housing, in particular the social rented tenure. Long term there has been a decline in government capital grant for new social rented supply, which makes a 2018 policy change that provided additional grant in areas of 'high affordability pressure' a notable exception. In this paper, we evaluate the causal effect of the policy change on affordable housing starts in 2019/20. Using a fuzzy regression discontinuity design, we estimate the effect of the policy to be 0.71 additional social rented starts per 1,000 dwellings in a local authority, and the effect was notably strong on homes delivered by housing associations. We find no effect on social rented starts by local authorities, or affordable housing starts irrespective of tenure. The study contributes empirical evidence on how supply-side subsidies interact with their institutional context and provides a methodological contribution by adopting a quasi-experimental design.

KEYWORDS: Social housing; new supply; policy evaluation; grant; subsidy

Introduction

In England, social renting represents a form of affordable housing that is targeted on those deemed in priority need. Social rent advocates suggest it could help improve affordability, reduce homelessness and expedite the supply of new housing more generally (Bramley, 2018; Letwin, 2018). Nonetheless, chronic undersupply has resulted in a substantial backlog of unmet housing need.

In this context, a common demand from affordable housing providers is an increase in government capital grant to subsidise new social rented supply (National Housing Federation (NHF), 2019). Yet, whether capital grant

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will be effective is ultimately an empirical question as the efficacy of subsidy is contingent upon policy design and its interaction with features of the wider institutional context (Yates and Whitehead, 1998). In the English context, relevant factors influencing the impact of capital grant include: longterm declines in grant generosity (Milcheva, 2020); a lack of available land (Ball et al., 2022); and the capacity of delivery partners—housing associations (HAs) and local authorities (LAs)¹—to utilise available grant (Gibb, 2021).

Despite the importance of empirical evidence on the efficacy of capital grant in context, there are limitations with existing studies. There is limited evidence on whether capital grant leads to additional affordable housing in England as studies lack a relevant counterfactual. We address this research gap by evaluating a 2018 policy change that made additional capital grant available for social renting. As the additional grant was only available in a selection of localities deemed to be in 'high affordability pressure', we adopt a quasi-experimental design to compare delivery between eligible and ineligible areas. We also disaggregate supply by delivery partner by comparing HA and LA supply. We answer the following research questions:

- 1. What effect did the additional capital grant have on affordable housing and social rented starts-on-site?
- 2. What effect did the additional capital grant have on social rented delivery via a) housing associations and b) local authorities?

The paper's contribution is to provide causal evidence as to the efficacy of capital grant on new affordable housing supply, whilst providing insight into the importance of institutional context. We estimate the effect of the policy to be 0.71 additional social rented starts per 1,000 dwellings in a local authority, and the effect was notably strong on homes delivered by HAs. We find no effect on social rented starts by LAs, or affordable housing starts irrespective of tenure.

Literature review

The effectiveness of subsidies for affordable housing

By design, affordable housing is provided at a price below its market equilibrium value and some form of subsidy is necessary for delivery. Yet, affordable housing models vary in terms of the extent and form of subsidy (Gibb, 2018, p. 9). Subsidy may be either supply-side at the point of provision, or demand-side at the point of consumption. The various supply side interventions intended to reduce the costs of housing provision include low-cost or public land provision, low-cost or publicly guaranteed finance, planning concessions and capital grant for construction costs (Gibb, 2018, p. 9–10).

The efficacy of different forms of subsidy in stimulating new affordable housing supply represents an important agenda for research and policy. Yates and Whitehead (1998) argue that the efficacy of affordable housing subsidies is ultimately a context-dependent empirical question. Their call came in direct response to a theory proposed by Galster (1997), suggesting demand-side subsidies would more effectively increase the supply of quality affordable housing than supply-side subsidy. His argument proceeded that demand-side subsidies allow households in the affordable housing submarket to exercise greater choice, such that they will move from the lower to higher quality affordable housing submarket, and that private landlords will increase supply in the higher quality submarket accordingly.

Yet the point raised by Yates and Whitehead (1998) is that the efficacy of affordable housing subsidies is contingent upon their interaction with myriad factors within the institutional setting. In the English context, the ability of low-income households to exercise choice between submarkets is in practice undermined by the residual character of English social security policy and gaps in eligibility for demand-side housing assistance for certain households (Stephens, 2020). Furthermore, England's discretionary planning system and speculative land market can restrict the supply of land for, and economic viability of, affordable housing (Ball et al., 2022). These factors contribute to demand for submarket rental housing far outstripping supply in England, and reduced choice for low-income households (Stephens, 2020).

In addition to context-dependency, the effect of subsidies on supply can be thwarted by policy design. In England, an influential government review argued that because affordable housing and private ownership are not direct substitutes, increasing the share of affordable housing on new developments can speed up the occupation of new homes, in turn catalysing the supply of new homes overall (Letwin, 2018). Moreover, modelling of hypothetical affordable housing programmes suggests that capital grant may be the most cost-effective funding mechanism in the long term due to the subsidy being upfront, in contrast to the ongoing subsidy required to support either demand-side rent assistance or the interest paid on private finance (Lawson et al., 2024). However, in practice capital grant for affordable housing in England is awarded to developers and delivery partners in periodic bidding rounds (see below), and evaluations of capital grant delivery in England suggest this can inflate development costs by causing spikes in demand for land (SQW, 2022). This feature of policy design, within a context of restricted land supply, could theoretically reduce the effect of grant on new supply and its cost-effectiveness (Milcheva, 2020).

Affordable housing delivery in England

The English case underlines that the effect of subsidies on supply is an empirical question that must consider both policy design and the

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embeddedness of subsidies within an institutional context. In this section, we discuss the institutional setting for delivering affordable housing in England, and existing empirical research on its effectiveness.

In England, *affordable housing* is an umbrella term for submarket housing. The largest source of affordable housing is *social renting*, a housing tenure for households in priority need where rents average around 50% of market rents (Wilson & Barton, 2022). Yet the tenure has been in long-term decline in terms of absolute size since the 1980s, in large part due to right-to-buy (RTB) sales (Wilson & Barton, 2022; see below). Also of note are *affordable rent*—a tenure introduced in 2011 that charges rents up to 80% of market rates—and *shared-ownership*—a form of low-cost homeownership in which occupants own a stake in the home and pay the remainder in rent to a social landlord.

New affordable housing is funded through a variety of mechanisms, but the largest source of government subsidy is through the Affordable Homes Programmes (AHPs). AHPs are periodic programmes in which capital grant for construction costs is released by central government and bid for by delivery partners. The primary delivery partners are HAs, who are providers of affordable housing on a (typically) non-profit basis. But also eligible for funding are LAs, for-profit HAs and consortia formed of affordable housing providers and private developers (Homes & Communities Agency (HCA), 2016). Outside London the allocation of AHP to delivery partners is overseen by Homes England—a public body acting on behalf of central government—and by the Greater London Authority (GLA) within London.

We identify three trends that impact the efficacy of AHP capital grant in stimulating affordable housing supply: the declining generosity of capital grant over the long term; the incorporation of capital grant within a financialised, cross-subsidy funding model and the influence of policy on the capacity of delivery partners.

The post-war period was the highpoint of new social rented supply, during which period funding was primarily in the form of supply-side capital grant (Gibb, 2018). Capital grant for construction costs has declined in generosity since the 1980s. In 1988, capital grant covered on average 75% of the construction costs of a scheme, and while this declined to around 40% in 2008, this still amounted to £60,000 per home in absolute terms (Milcheva, 2020). The aftermath of the great financial crisis initiated a period of governmental austerity in England, through which central government cut capital grants to £20,000 per home, around 14% of scheme costs (ibid.).

Consequently, delivery partners became increasingly reliant upon private finance and cross-subsidy from private sales to fund development. Access to finance was supported by governmental guarantees of the debt raised by HAs, and the establishment of a regulatory regime that provided assurance to lenders by scrutinising HA financial viability and risk management (Goulding, 2018). In addition, both Homes England and the GLA have recently intervened to reduce land costs by taking a more proactive approach to land assembly and acquisition (Falk, 2018). Thus, there has been an expansion of forms of subsidy that aim to reduce development and financing costs, which are viewed as enablers of the ancillary aim of providing more affordable homes per pound of capital grant (Milcheva, 2020).

The reduced pot of AHP capital grant was restricted largely to affordable rent and shared-ownership between 2011 and 2018, both to promote homeownership and allow affordable housing providers to borrow against more profitable tenures (Goulding, 2018; HCA, 2016). In this context, planning obligations placed upon developers to designate a proportion of new developments towards affordable housing were an important source of new supply (Crook, 2020). Such obligations are known as Section 106 (S106), and while S106 accounted for just under 50% of new affordable housing in 2017/18, it is also pro-cyclical by virtue of being reliant upon private development (Crook, 2020).

The capacity of different delivery partners has shifted alongside these changes in the funding model, most notably for HAs and LAs. From the late 1970s to the end of the 1980s the role of LAs as major deliverers of new housing was effectively ended by central government imposing restrictions on LA borrowing which constrained their ability to finance new development—although such restrictions were lifted in 2018—and the introduction of the RTB (Gibb, 2021; Wilson & Barton, 2022). RTB is a policy that provides a substantial discount for sitting occupiers of social housing to purchase their home. The UK national government elected in 2024 is committed to allowing LAs to retain 100% of RTB sales receipts, but historically LAs have had to pay a percentage of the receipt to central government, which surveys of LAs suggest has been a 'severe impediment' to new LA supply (Perry et al., 2020). LAs have also provided evidence to national government that RTB disincentivises housebuilding due to the imposition of a three-year deadline to spend receipts—now extended to five-years—which often elapses during the initial stages of development (Housing, Communities and Local Government Committee (HCLGC), 2020, p. 48–49). The survey evidence of LAs further suggests that the long-term decline in their funding and role as developers, exacerbated by austerity, has contributed to a loss of skills (Perry et al., 2020). One LA explained they 'had not had an in-house new-build team for many years, and the skillset would have to be sourced again if it were to be re-established' (Perry et al., 2020, p. 13).

By contrast, a more amenable policy and institutional environment, relative to LAs, has supported HAs in becoming the main recipients of AHP grant in recent decades. As their capital expenditure does not count as public sector debt HAs have not been subject to the same borrowing restrictions as LAs, and a policy of stock-transfer from LAs to HAs to fund stock investment made HAs the largest providers of affordable housing by the mid-2000s (Pawson and Mullins, 2010). The previous national

government aspired to extend RTB to HAs, but the policy was not implemented beyond small-scale pilots (Wilson & Barton, 2022). Furthermore, the constraints experienced by LAs in terms of skills contrast with the emphasis among HAs on in-house development capacity during the 2010s. Several organisational mergers in the HA sector were intended to boost their borrowing capacity for development (Marsh, 2018). And large HAs, such as London & Quadrant (L&Q) and Clarion, established subsidiary organisations in commercial development and land acquisition to afford them a steady pipeline of new homes and the ability to act as a 'master developer' (L&Q, 2019; Marsh, 2018). Nonetheless, HA borrowing capacity has been negatively impacted in recent years due to inflation and increased expenditure on their homes to improve building safety (Apps, 2024).

Evaluations of English affordable housing delivery note that this funding model has enabled the continued delivery of affordable homes in the context of austerity. However, this has been achieved *via* higher rents—prioritising affordable rent over social rent—and tying new supply to pro-cyclical private development (Crook, 2020; Gibb, 2021). Gibb's (2021) comparative research evaluating the English AHPs post-2010 and their Scottish counterparts concludes that the Scottish programme, supported by higher levels of capital grant per home than in England, addressed more unmet housing need by delivering proportionately more social rented homes. Government evaluations have criticised AHP for failing to adequately meet demand for rental housing in areas of high need such as London and the Southeast of England (National Audit Office (NAO), 2022; SQW, 2022).

Although existing evaluations highlight several issues with the current funding model, they have limitations in evidencing how effective interventions could be in stimulating new supply. Existing evidence tends to focus on Homes England's procedural management of AHP, and so sheds little light on whether capital grant provides homes that are additional to the counterfactual scenario in which AHP is absent (e.g., NAO, 2022). Or the evidence relies upon comparative analysis that is inevitably confounded by comparisons across contrasting institutional contexts (e.g., Gibb, 2021). It is difficult to say with confidence whether the increased capital grant for social rent that supported supply in Scotland would have similar effects in England, given that in Scotland RTB has been abolished and LAs have historically retained a larger role in affordable housing provision than in England (Stephens, 2020). There is a gap in empirical research that considers the causal effect of subsidy in relation to a relevant counterfactual, and that highlights the features of the institutional context that underpin the effectiveness of capital grant.

2018 Social rent policy change

Given this background, a 2018 policy change that increased capital grant for social rent was notable for representing a symbolic break from this long-term policy trajectory. In October 2017, then Prime Minister Theresa May announced additional funding to supply social rented housing in England. The government announced a 'new generation of council houses to help fix our broken housing market' (May, 2017). But at the time of the announcement the details were scarce on the extent of additional funding, how it would be allocated, and to whom (Birch, 2017).

The detail became clearer in June 2018 when Homes England's budget was increased by £1.67bn and a target set of delivering 12,500 social rent homes (Homes England, personal communication, 7 March 2023). The budget and target were assigned to a specific iteration of the AHP—the Shared Ownership and Affordable Homes Programme (SOAHP) 2016-21. Moreover, the additional grant funding for social rent was only available in areas of 'high affordability pressure' (Homes England, 2018). Government defined high affordability pressure as a local authority where weekly private rents were at least £50 more expensive than social rents in 2016/17 (Homes England, 2018). The list of eligible authorities was fixed to those above the threshold according to 2016/17 data, preventing authorities from becoming eligible during the programme as rents inflated (Homes England, personal communication, 7 March 2023). The justification was to target scarce resources in areas of greatest housing need (Homes England, 2018; NAO, 2022, p. 8; SQW, 2022).

Under the policy, delivery partners could bid for capital grant to fund social rent in eligible local authorities *via* two paths. Firstly, they could bid for grant on a scheme-by-scheme basis, which were evaluated by Homes England according to their value for money and likelihood of delivery (HCA, 2016; SQW, 2022). The second path was *via* a Strategic Partnership (SP). SPs were set up by Homes England in July 2018 to award a select number of delivery partners capital grant for an entire development programme rather than single schemes (Milcheva, 2020). The majority of SPs are HAs (Homes England, 2021a). As of March 2021, 65.1% of the social rented homes funded through SOAHP 2016-21 were *via* SPs (Homes England, 2021b).

The SOAHP 2016-21 was extended to 2023 due to the pandemic, and the allocation rule for social rented grant remained in place throughout the programme.² Developments in ineligible authorities could still receive grant for social rent, but they would not receive more than would otherwise be provided for affordable rent, and so ineligible authorities received no additional grant to incentivise social renting. Nor was the usage of additional capital grant mandatory in eligible authorities (Homes England, 2018). By March 2021 Homes England had provided £4.21 billion in funding across SOAHP 2016-21 in totality, with 103,580 homes delivered with grant support, of which 15,397 were social rent (Homes England, 2021b). Table 1 shows the average grant per home by tenure and by region as of March 2021.

The 2018 policy change provides a unique opportunity to analyse the efficacy of capital grant on affordable housing delivery. The policy allows for a comparison of the effect of capital grant between localities within the same national context i.e., local authorities eligible and ineligible for

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	Low-cost			All programme
Region	homeownership	Affordable rent	Social rent	average
East Midlands	32,050	38,252	46,050	36,293
East of England	32,736	37,323	64,390	39,736
North East	36,263	35,866	52,850	36,231
North West	32,008	38,117	55,409	36,620
South East	80,304	38,238	56,643	39,189
South West	33,443	36,174	64,151	38,103
West Midlands	30,721	38,808	50,267	37,399
Yorkshire and The Humber	33,919	38,485	58,701	37,519
England	33,018	37,818	57,580	37,497

Table 1. SOAH	P 2016-21	average	grant	by	tenure	and	region.
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Source: Homes England, 2021b.

social rented grant. The policy also focused capital grant on a social rented tenure that had previous been undersupplied, allowing us to evaluate whether this had a catalytic effect in producing additional affordable housing supply overall (Letwin, 2018). Finally, whether the additional social rented grant had differing effects on HAs and LAs can shed light on how supply-side subsidies interact with an institutional context that has historically privileged certain delivery partners.

Materials and methods

To analyse the effect of capital grant on affordable housing and social rented delivery we adopt a quasi-experimental research design. Specifically, we use a regression discontinuity design (RDD) to estimate the causal effect of additional grant on supply. RDD is used in instances where a policy comes into effect at some point along the distribution of a known variable—in RDD parlance the known variable is the *forcing variable*, and the point at which the policy is in effect is the *cutoff*. In our case, the policy treatment is the funding of social rented housing with additional capital grant. But as the usage of social rented capital grant was non-mandatory, we expect the policy to act as an incentive that encourages take up of grant in eligible authorities to increase new supply.

Consequently, we seek to evidence three steps along the causal pathway. Firstly, that the policy increased the probability social rented capital grant was utilised in eligible authorities. Secondly, that there is a jump in the relationship between the forcing variable and outcome at the cutoff. Thirdly, that there is no evidence for competing explanations of this jump at the cutoff other than the policy. As such, our unit of analysis is local authorities, the forcing variable is the affordability gap between private and social rents in 2016/17,³ and the cutoff is the £50 threshold whereby social rented grant became available.

The type of RDD applied in empirical analysis is dependent upon the design of the policy. As is common in settings where a policy provides a

non-mandatory incentive, we apply a *fuzzy RDD* (see details below). Fuzzy RDD relies upon the probability of treatment increasing above the cutoff, meaning that eligible authorities will have greater exposure to treatment due to variation between authorities exogenously caused by the policy (Oldenburg et al., 2016). This can be demonstrated empirically by estimating the increased probability that capital grant was utilised in eligible authorities (see intention-to-treat estimator below).

As the eligibility for social rented capital grant was determined according to affordability pressure in 2016/17, it is not randomly distributed across all local authorities. However, the distribution is as-if random at the specific point where grant becomes available—the £50 cutoff (Cunningham, 2021). RDD rests upon a *continuity* assumption; regardless of whether the forcing variable is related to the outcome, in the absence of the policy the relationship between the forcing variable and the outcome would appear smooth around the cutoff. By contrast, if the additional grant policy has an effect on supply, we should expect to see sudden jumps in the relationship between the forcing variable and outcomes at the £50 point (Imbens & Lemieux, 2008).

Furthermore, Cunningham (2021) states that 'continuity [...] explicitly rules out omitted variable bias at the cutoff itself'. The differences between local authorities with, say, a £49 or £50 value on the forcing variable are trivial with respect to potential confounding variables. This underpins the assumption that capital grant allocation is 'as-if random' at the cutoff. In practice it should be empirically demonstrated that this assumption is reasonable and there is an absence of competing explanations for jumps at the cutoff. Thus, it is commonplace for RDD estimates to be accompanied by a range of robustness checks.

The estimand in fuzzy RDD is the local average treatment effect (LATE), which is 'local' in two senses. Firstly, RDD estimates the effect of capital grant on housing delivery for local authorities *located at the £50 cutoff*. Secondly, the LATE is restricted to the subpopulation of *compliant* authorities only (Imbens & Lemieux, 2008; Lee & Lemieux, 2010). As the use of capital grant to deliver homes is non-mandatory, the policy's effectiveness relies on providers complying with the policy in their respective localities. In simple terms, the causal effect rests upon a comparison between (a) new supply in eligible authorities where social rent grant was accessed and (b) new supply in ineligible authorities where social rent grant was not accessed. As such, we estimate the rate of housing that would be delivered if we could hypothetically shift the cutoff to make one additional local authority eligible, and providers in that authority complied by accessing the grant.

Sequential outline of methods

Firstly, to operationalise our quasi-experimental design we construct the forcing variable. The forcing variable is the gap between weekly private and social rents in a local authority in 2016/17 (Homes England, 2018).⁴ Homes England constructed the forcing variable using 2016/17 data from the Valuation Office Agency (VOA) and the Statistical Data Return (SDR). The VOA data provides average monthly private rents, which we convert to weekly rents. The SDR provides mean weekly social rents by local authority and social housing provider, and the number of homes in each authority by provider. We produce a weighted mean social rent per local authority, weighted by the number of homes per authority. Thus, we reconstruct the forcing variable by taking the difference between our calculated average weekly private rents and social rents, and we ensure its accuracy *via* a manual check against Homes England's list of eligible authorities (Homes England, 2018). Table 2 outlines the variables included in our models, alongside summary statistics.

Variable	Description	Mean/proportions	Standard deviation
Homes England capital grant for social rent	Treatment variable. Binary indicator for whether social rented starts funded with capital grant in a local authority are greater than 1 (equals 1 if grant funded starts are >1). Source: DLUHC: Live table 1011S	69.8% = 0 (<i>n</i> = 194) 30.2% = 1 (<i>n</i> = 84)	
Social rent starts	Outcome variable. Social rent starts-on-site in 2019/20 per 1,000 existing dwellings in each local authority. Sources: DLUHC: Live table 1011S; DLUHC: Live table 125	0.23	0.45
Social rent starts by HAs	Outcome variable. Social rent starts-on-site by HAs in 2019/20 per 1,000 existing dwellings in each local authority. Sources: DLUHC: Live table 1011S; DLUHC: Live table 125	0.17	0.39
Social rent starts by LAs	Outcome variable. Social rent starts-on-site by LAs in 2019/20 per 1,000 existing dwellings in each local authority. Sources: DLUHC: Live table 1011S; DLUHC: Live table 125	0.03	0.11
Affordable housing starts	Outcome variable. Affordable housing starts-on-site in 2019/20 per 1,000 existing dwellings in each local authority. Sources: DLUHC: Live table 1011S; DLUHC: Live table 125	2.51	2.09

Table 2. Summary of variables.

(Continued)

Variable	Description	Mean/proportions	Standard deviation
Affordability	Forcing variable. Difference	64.98	37.48
pressure in 2016/17	between weekly private rents and weekly social rents in a local authority in 2016/17. Sources: SDR 2016/17; VOA 2016/17.	0.000	57.10
Private developer starts	Covariate. Private developer starts-on-site in 2019/20 per 1,000 dwellings in each local authority. Sources: MHCLG Open Data on permanent dwellings started by district and tenure; DLUHC: Live table 125	5.47	3.34
Private sales	Covariate. Private sales in 2019/20 per 1,000 dwellings in each local authority. Sources: ONS: House price statistics for small areas; DLUHC: Live table 125	34.24	4.6
Earnings	Covariate. Median earnings in each local authority in 2019/20. Source: ONS Annual Survey of Hours and Earning.	31,291.56	4,162.39
Households total	Covariate. Total number of households in each local authority in 2019/20. Source: ONS: 2018-based household projections	69,783.81	48,477.94
Households change	Covariate. Change in the total number of households in each local authority over a five-year period prior to 2019/20. Source: ONS: 2018-based household projections	2,551.26	2,071.65
Existing social housing supply	Covariate. Existing rented social housing supply as a percentage of total dwelling stock in a local authority in 2019/20. Source: ONS: Subnational estimates of dwellings by tenure	15.05	4.92
Professional and financial employment	Covariate. Employment in professional and finance industries as a percentage of total employment in each local authority in 2019/20. Source: ONS: Business Register and Employment Survey	0.16	0.04
Over 65s percentage	Covariate. Percentage of population aged 65 or over in each local authority in 2019/20. Source: ONS: Estimates of the population for the UK	0.21	0.04

Table 2. Continued	Continued.
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Note. Covariates are scaled to range between 0 and 1 in our modelling, but unscaled for summary statistics presented in this table.

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Secondly, we calculate outcome variables for social rented and affordable housing delivery. Data is taken from *DLUHC Live table 1011S*, and we calculate:

- 1. The rate of social rent starts-on-site per 1,000 existing dwellings
- The rate of social rent starts-on-site by HAs per 1,000 existing dwellings
- 3. The rate of social rent starts-on-site by LAs per 1,000 existing dwellings
- 4. The rate of affordable housing starts-on-site per 1,000 existing dwellings

The first outcome measures social rent delivery regardless of delivery mechanism, therefore including privately funded and nil-grant S106 starts to ensure the policy delivers additional supply. Outcomes two and three disaggregate by the provider type. And outcome four is the sum of all affordable housing tenures, assessing whether the policy resulted in additional affordable housing overall. Scaling each outcome to a rate per 1,000 existing dwellings ensures the results are not influenced by local authorities with large populations. We produce a binary treatment variable, which measures whether capital grant was used to deliver social rented homes in a local authority,⁵ denoted as D_i in the equations below. This binary variable equals 1 if social rented delivery funded by capital grant in a local authority is greater than 0 (see Table 2).

In our third step, we identify any sudden jumps in our outcome variables. We estimate the LATE using a 2SLS model (Lee & Lemieux, 2010). The first stage models the *probability* of social rented homes being delivered with the aid of capital grant. This is also known as the intention-to-treat (ITT) estimator, and it provides evidence that the availability of grant above the cutoff has led to greater exposure to the treatment among eligible authorities. We estimate equation (1):

$$D_{i} = \gamma_{0} + \delta Z_{i} + g(\widetilde{X}_{i}) + u_{i}$$
⁽¹⁾

Where: D_i is the binary treatment variable for the *i*th local authority, δ is the ITT effect, Z_i is a binary variable for whether a local authority is grant eligible that is used as an excluded instrument to predict $D_{i'} g(\tilde{X}_i)$ is the functional form of the forcing variable centred at the cutoff, and u_i is an error term. Z_i is a valid instrument that produces exogenous variation in D_i as it is significant—eligibility for social rent capital grant increases the probability grant will be used to deliver social rented homes, which we can empirically demonstrate *via* the ITT. Yet it also feasibly meets the assumption of the exclusion restriction—the effect of authorities being eligible for social rented grant can be assumed to only effect the delivery of new homes *via* the take up of grant.

The second stage regression is given in equation (2):

$$Y_{i} = a_{0} + \tau \widehat{D}_{i} + f\left(\widetilde{X}_{i}\right) + \varepsilon_{i}$$
⁽²⁾

Where: τ is the LATE, \widehat{D}_i is the predicted probability of grant being accessed from equation (1), $f(\widetilde{X}_i)$ is the functional form of the forcing variable and mirrors the form specified in equation (1), and ε_i is an error term.

Further covariates may be included in equation (1) and (2) to reduce covariate imbalance and to improve precision (Imbens & Lemieux, 2008). We estimate the LATE by fitting a quadratic function to the forcing variable within a window of observations close to the cutoff—said window is known as the *bandwidth*—which has been shown to outperform alternative parametric models that fit higher order polynomials across the full range of data (Gelman & Imbens, 2014). We adopt Imbens & Kalyanaraman's (2012) data-driven algorithmic method for bandwidth selection that minimises an approximation of the mean squared error (hereby the 'IK optimal bandwidth'). For ease of interpretation we adopt Lee & Lemieux's (2010) recommendation of giving equal weight to all observations within the bandwidth.

The different stages of the planning, design and construction process mean there is an inevitable time-lag between policy announcement and schemes starting on-site (Ball et al., 2022). Moreover, the 2020/21 financial year was an outlier due to the pandemic reducing construction activity. Consequently, the analysis focuses on outcomes in the 2019/20 financial year. London authorities are excluded as they are funded *via* the GLA. A further five authorities were excluded as they were the outcome of the consolidation of smaller authorities in 2019, and it was not possible to retrospectively calculate their forcing variable value for 2016/17.⁶ For the models excluding covariates n=278, and each observation is a local authority.

We estimate the LATE with additional covariates outlined in Table 2 (to aid interpretation all covariates are scaled to range between 0 and 1). We include the rate of private developer starts and private sales to account for pro-cyclical affordable housing delivery (Crook, 2020). As new supply should be positively associated with population growth, we control for the total number of households and the change in the number of households. To account for the capacity of existing dwellings to meet housing need we include existing social housing supply as a percentage of total dwellings as a covariate. Prior research suggests that both affordability and housing supply are related to the strength of local economies and demand for labour (Drayton et al., 2024). Thus, we control for median earnings and the percentage of employees in professional and financial industries—a proxy for demand for high productivity labour-assuming that both are positively associated with increased housing need and supply. Finally, we control for the percentage of households of retirement age, expecting it to be negatively associated with supply given prior evidence that housing tends to be more affordable in older regions (Meen, 2018, p. 48). Missing observations for the models with covariates were removed using listwise deletion (n=266).

In our final methodological step, we justify our inferences and assumption of continuity by conducting several robustness checks. We estimate the LATE with different functional forms specified for the forcing variable. We estimate the LATE for each outcome variable in the year prior to the policy announcement—2016/17—which ensures that there was no jump at the cutoff prior to the policy. We check for effects on variables that should be theoretically unaffected by the policy—known as a placebo test—as any sudden jump at the cutoff within a placebo test could indicate there are competing explanations for the LATE. We use median earnings in 2019/20 as a placebo outcome. Furthermore, we use fictitious cutoff points in the forcing variable as placebos, with fictitious cutoffs at the median value in subsamples either side of the genuine cutoff (£34.67 below the cutoff, £75.65 above the cutoff) (Imbens & Lemieux, 2008). We test the sensitivity of the LATE to different specifications of the bandwidth by visualising the LATE across a range of bandwidths increasing by increments of 0.1 (Lee & Lemieux, 2010). Finally, we test for potential manipulation of the forcing variable by conducting the McCrary test (McCrary, 2008). The McCrary test looks for discontinuities in density of the forcing variable at the cutoff, and failure to reject the null hypothesis indicates the forcing variable is unlikely to have been manipulated. We report results of robustness checks in the replication data provided with the Data Availability Statement.

Results

Figure 1 displays the distribution of the forcing variable across local authorities. Importantly, it shows that there is a high density of observations around the cutoff suggesting no manipulation of the forcing variable. This is further supported by the results of the McCrary test, which are non-significant (see replication data).



Figure 1. Density of the forcing variable, affordability gap by local authority in 2016/17.

Social rent starts

The left panel of Figure 2 visualises the relationship between the forcing variable (x-axis), social rent starts (y-axis) and utilisation of social rent capital grant. For visual clarity, points are average delivery within local authorities across ± 5 wide bins (Lee & Lemieux, 2010). Points are coloured by whether capital grant was actually used to deliver social rented housing in the authority (i.e., D_i in equation (1)), with orange being where grant was used and green where it was not. The orange regression line represents the conditional mean social rented delivery in eligible and compliant authorities. The left panel of Figure 2 reveals two things. Firstly, the larger proportion of orange points above the cutoff suggests availability of capital grant increased the probability of treatment. Secondly, there is a clear jump between regression lines suggesting a potential causal policy effect (note this plot is purely to aid intuition, the actual LATE estimated using 2SLS in Table 3 will differ).

These inferences are supported by our model results. The ITT estimate is 0.446, indicating that the policy increased the probability of capital grant take up by 44.6 percentage points in eligible authorities (see replication data). Table 3 displays the LATE estimates for the four outcomes of interest with robust standard errors. In the social rent starts model excluding covariates, the LATE is estimated at 0.67 social rent starts per



Figure 2. Social rent starts 2019/20. Left panel: social rent starts by affordability gap and grant funding 2019/20, London local authorities excluded. Right panel: LATE sensitivity to different bandwidths with 95% confidence interval, blue point is IK optimal bandwidth.

	Social rent starts		Social rent starts by HAs		Social rent starts by LAs		Affordable housing starts	
	Covariates: N	Covariates: Y	Covariates: N	Covariates: Y	Covariates: N	Covariates: Y	Covariates: N	Covariates: Y
	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)	Est. (SE)
LATE	0.671	0.713	0.648	0.680	-0.050	-0.035	0.189	-0.382
	(0.179)***	(0.202)***	(0.163)***	(0.190)***	(0.039)	(0.038)	(0.885)	(1.068)
Forcing variable	0.001	8.14E-05	-0.001	-0.001	0.002	0.002	0.021	0.030
-	(0.002)	(0.002)	(0.001)	(0.002)	(0.001)*	(0.001)*	(0.009)*	(0.014)*
Forcing variable ^ 2	5.44e-05	7.97E-05	2.985E-05	2.756E-05	2.778E-05	3.895E-05	-1.65E-04	3.567E-04
-	(5.246E-05)	(5.055E-05)	(2.566E-05)	(2.819E-05)	(2.388E-05)	(2.358E-05)	(2.694E-04)	(3.859E-04)
Private developer		-1.439E-05		0.152		-0.006		4.744
starts		(0.174)		(0.149)		(0.055)		(1.060)***
Earnings		0.099		0.203		-0.026		-2.224
-		(0.198)		(0.191)		(0.038)		(0.954)
Households total		-0.363		-0.661		0.140		-0.279
		(0.361)		(0.334)*		(0.077)		(1.514)
Households change		-0.067		0.225		-0.102		-1.117
-		(0.257)		(0.248)		(0.046)*		(0.983)
Private sales		0.577		0.137		0.070		2.876
		(0.318)		(0.311)		(0.059)		(1.583)
Existing social		0.422		0.238		0.099		1.199
housing supply		(0.169)*		(0.167)		(0.068)		(0.847)
Professional and		0.170		-0.028		0.106		0.665
financial		(0.191)		(0.154)		(0.057)		(0.803)
employment								
Over 65s percentage		0.148		0.061		0.075		-0.598
		(0.164)		(0.139)		(0.033)*		(0.804)
Intercept	-2.284E-04	-0.509	-0.047	-0.304	0.037	-0.086	2.361	0.932
	(0.039)	(0.186) **	(0.036)	(0.178)	(0.012) **	(0.049)	(0.299) ***	(0.984)
Ν	278	266	278	266	278	266	278	266
IK optimal bandwidth	40.38	41.11	50.89	54.21	29.38	29.10	40.09	36.86

Table 3. 2019/20 outcome variables.

Fuzzy RDD estimates (Est.) and robust standard errors (SE). p < 0.05, p < 0.01, p < 0.01, p < 0.001.

1,000 dwellings (p < 0.05). When controlling for covariates, the LATE is similar at 0.71 starts per 1,000 dwellings (p < 0.05). To convert these estimates into their original scale we multiply the estimates in Table 3 by the quotient used to derive the rate per 1,000 dwellings. This figure can be interpreted as the number of social rent homes started in an eligible and compliant LA due to the policy. In the case of the model including covariates, this figure is 58.70 homes.

The right panel in Figure 2 shows the sensitivity of the LATE to different bandwidths. Figure 2 suggests that the estimate in Table 3 is stable across a range of bandwidths, and that estimates remain positive and statistically significant. We take these findings as indicative of the policy having an effect on social rented starts.

These findings suggest that the core objective of the 2018 policy change was met i.e., to provide additional social rented housing in eligible local authorities (Homes England, 2018; NAO, 2022). Moreover, the total amount of social rented delivery across the SOAHP 2016-21 will likely be higher than we are able to capture in our cross-sectional design, and annual rates of delivery may increase in subsequent years as providers incorporate social rent into their programmes. As the LATE applies only at the cutoff, our methods cannot say definitively whether an additional 58.70 homes would be delivered in authorities across the entire range of the forcing variable. However, if we make the simplifying assumption that 58.70 homes are delivered in each of the 58 eligible and compliant local authorities, the policy would deliver 3,405 homes in 2019/20. As such, it is plausible that the policy could meet its target of 12,500 additional social rented homes over the remainder of the SOAHP 2016-21.

Social rent starts by HAs

Figure 3's left panel visualises the forcing variable, capital grant access and social rented starts by HAs 2019/20. Figure 3 again suggests a potential causal effect from treatment due to the jump at the cutoff. The LATE estimate excluding covariates in Table 3 is 0.65 social rent starts per 1,000 dwellings (p < 0.05). And including covariates the estimate is 0.68 (p < 0.05). This latter estimate is equivalent to 56.20 social rented starts by HAs in an eligible and compliant authority. The right panel in Figure 3 shows the LATE is consistently positive across the range of potential bandwidths, providing assurance of a causal effect. These findings suggest that the policy had a strong effect on HA new social rented supply, with 95.7% of the total increase in social rented delivery attributable to HA starts. These results are consistent with our theoretical expectations as to how the institutional context privileges certain delivery partners.



Figure 3. Social rent starts by HAs 2019/20. Left panel: social rent starts by HAs by affordability gap and grant funding 2019/20, London local authorities excluded. Right panel: LATE sensitivity to different bandwidths with 95% confidence interval, blue point is IK optimal bandwidth.

Social rent starts by LAs

By contrast, the left panel in Figure 4 shows that social rented starts by LAs were lower than by HAs. There is only a small gap between eligible and ineligible complaint authorities in delivery, suggesting there is little to no causal policy effect. Table 3 provides support for the inference of no effect. Regardless of whether covariates are included or not, the results suggest a very small and non-significant effect for social rented starts by LAs. Figure 4 shows the LATE for LA social rent starts fluctuates between a negative and positive estimate across the range of bandwidths and is consistently non-significant.

Although we cannot say definitively why there was no effect on LA starts-on-site, existing evidence suggests that countervailing factors—RTB, existing capacity and skills within LAs—undermined the potential policy impact (Perry et al., 2020). This suggests that the effectiveness of capital grant is contingent upon the capacity of delivery partners to utilise available subsidy.

Affordable housing starts

Figure 5's left panel presents affordable housing starts by the forcing variable and treatment status. In Figure 5, there is a small gap between



Figure 4. Social rent starts by LAs 2019/20. Left panel: social rent starts by LAs by affordability gap and grant funding 2019/20, London local authorities excluded. Right panel: LATE sensitivity to different bandwidths with 95% confidence interval, blue point is IK optimal bandwidth.



Figure 5. Affordable housing starts 2019/20. Left panel: affordable housing starts by affordability gap and grant funding 2019/20, London local authorities excluded. Right panel: LATE sensitivity to different bandwidths with 95% confidence interval, blue point is IK optimal bandwidth.

eligible and ineligible compliant authorities at the cutoff, but there is also uncertainty due to the large proportion of authorities above the cutoff in which affordable housing was delivered without social rented grant. In Table 3, the model for affordable housing starts excluding covariates estimates a small LATE of 0.19 starts per 1,000 dwellings, and this result is non-significant. The model including covariates produces a negative estimate for the LATE, which is statistically nonsignificant. Furthermore, Figure 5 shows the LATE fluctuates between negative and positive depending on bandwidth and is consistently non-significant.

These findings suggest the policy did not produce more affordable housing overall relative to the counterfactual scenario of no social rented grant. They also align with notion that, in the English context, a less generous subsidy model is capable of delivering similar rates of affordable housing to more generous programmes, but at the expense of higher rents (Gibb, 2021). Moreover, it is consistent with the suggestion that the efficacy of capital grant in stimulating overall affordable housing supply is constrained by factors such as the supply of suitable land (Ball et al., 2022).

In the model including covariates in Table 3, affordable housing starts are positively associated with the rate of starts by private developers, and the effect is large at 4.74 affordable housing starts per 1,000 dwellings. This illustrates that affordable housing delivery is pro-cyclical as it is tied to activity in the commercial construction sector and S106 planning obligations. By contrast, the rate of social rented starts was unrelated to private developer starts. This suggests that increased capital grant for social rent provided an effective counter-cyclical stimulus to housing supply, although new social rented supply remained lower in absolute numbers than new affordable rent and shared-ownership.

Robustness checks

The results reported above were robust to all checks undertaken. The LATE estimates for placebo tests and pre-treatment tests were all non-significant. The LATE estimates using alternative functional forms of the forcing variable are similar in magnitude and statistical significance (see replication data).

Conclusion

The findings of our study present the 2018 policy change providing additional capital grant for social rent as a qualified success, with our fuzzy RDD estimates suggesting the additional grant stimulated new social rented housing starts in areas of high affordability pressure.

Our study also contributes to academic understanding of how subsidy operates in context. The findings suggest that the efficacy of capital grant is contingent upon its interaction with a conducive institutional setting. The stronger effect on HA supply compared to LAs highlights that the capacity of delivery partners to utilise available grant may be supported or hindered by policies adjacent to the capital grant, e.g., the legacies of stock transfer, austerity and RTB (Pawson and Mullins, 2010; Perry et al., 2020). It is noteworthy that LAs lobbied to retain 100% of RTB receipts for several years prior to the national government committing to this reform in 2024. Moreover, LAs have called for central government to invest in skills and capacity building programmes in LA housing delivery teams and for skills-sharing arrangements between LAs and HAs (HCLGC, 2020).

Our findings suggest that capital grant can provide a counter-cyclical stimulus to new supply, but we fail to find a catalytic effect whereby social rented grant resulted in more affordable housing overall. This draws attention to the limits of capital grant for affordable housing within an English development and planning system that is characterised by a shortage of available land for residential development (Ball et al., 2022; Drayton et al., 2024). As well as the potential inflationary impact of competition for sites resulting from overlapping bidding rounds (Milcheva, 2020; SQW, 2022).

Our guasi-experimental design has allowed us to evaluate whether capital grant delivered homes that were additional to a counterfactual scenario where grant for social rent was absent. Nonetheless, there are limitations to the study. Our analysis focuses on the 2019/20 financial year, but grant may have differential effects in subsequent years, especially in an era of post-pandemic inflation that has undermined the borrowing capacity of providers (Apps, 2024). Alternatively, efforts to build capacity within LAs could result in a lagged effect on supply, and LA supply could be greater in localities under different grant regimes (e.g., London). Similarly, the data does not allow us to disaggregate within local authorities the amount of grant accessed via SPs or on a scheme basis, meaning our results are limited in contrasting the effect of important aspects of policy design. Future research could seek to estimate how the effectiveness of capital grant is moderated by further changes to the institutional context, for example planning reforms intended to release land for affordable housing, however such changes are likely only to be produce impact over the long-term (Ball et al., 2022).

Notes

- The term 'local authority' can be used to refer either to local government administrations (also known as councils), or the geographical area they cover. The former may supply affordable housing, whereas the latter is the geography in which housing is provided. To avoid conflation, we use the acronym LAs to refer to administrations providing housing, and 'local authorities' as the geographical area.
- The rule was initially applied in the subsequent programme—Affordable Homes Programme 2021-26—but scrapped in February 2023. However, the restriction remained in place for homes funded via SOAHP 2016-21 throughout its entirety (Homes England, personal communication, 7 March 2023).

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- 3. To avoid confusion between the general concept of affordability (which changes over time), and the variable used to allocate capital grant for social rent (which was fixed to 2016/17 data throughout SOAHP 2016-21), we refer to the latter as the *forcing variable* in the methods and findings.
- 4. Fixing the eligible authorities to those in affordability pressure in 2016/17 only, and therefore prior to intervention, means the policy treatment is exogenous to the outcome. It removes the potential for simultaneity bias where selection is determined by the outcome itself, which would be the case if the list of eligible authorities was updated each year to reflect changes in affordability.
- 5. Recall, local authorities below the cutoff could access grant for social rented homes if the grant was equal to that which would be required to fund more expensive affordable rented homes, and so was in effect not a product of the policy change to increase funding above the cutoff. Similarly, social rented homes delivered above the cutoff may be funded without capital grant e.g., via S106.
- 6. The five authorities are: Bournemouth, Christchurch and Poole; Dorset; East Suffolk; West Suffolk; Somerset West and Taunton.

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