



The impacts of restricting housing supply on house prices and affordability

Executive summary



The impact of restricting housing supply on house prices and affordability

Executive summary

Dr. Christian Hilber
London School of Economics and SERC

Dr. Wouter Vermeulen
VU University, CPB and SERC

November 2010
Department for Communities and Local Government

This research report was commissioned by the NHPAU. The Department for Communities and Local Government is publishing the report in the interests of transparency. The views expressed are those of the authors and do not necessarily reflect the view or proposed policies of the Department for Communities and Local Government.

Department for Communities and Local Government
Eland House
Bressenden Place
London
SW1E 5DU
Telephone: 030 3444 0000
Website: www.communities.gov.uk

© Queen's Printer and Controller of Her Majesty's Stationery Office, 2010

Copyright in the typographical arrangement rests with the Crown.

This publication, excluding logos, may be reproduced free of charge in any format or medium for research, private study or for internal circulation within an organisation. This is subject to it being reproduced accurately and not used in a misleading context. The material must be acknowledged as Crown copyright and the title of the publication specified.

You may re-use this information (not including logos) free of charge in any format or medium, under the terms of the Open Government Licence. To view this licence, visit <http://www.nationalarchives.gov.uk/doc/open-government-licence/> or write to the Information Policy Team, The National Archives, Kew, London TW9 4DU, or e-mail: psi@nationalarchives.gsi.gov.uk.

If you require this publication in an alternative format please email alternativeformats@communities.gsi.gov.uk

DCLG Publications
Tel: 030 0123 1124
Fax: 030 0123 1125

Email: product@communities.gsi.gov.uk
Online via the website: www.communities.gov.uk

November 2010

ISBN: 978 1 4098 2640 8

Executive summary

The problem: The mounting housing affordability crisis

House values in England – particularly in London and the South East of England – are, especially relative to incomes, amongst the highest in the world. Price volatility is similarly extraordinary. During the last full real estate cycle, real house values in England as a whole were substantially more volatile than in the most volatile metro area – Los Angeles – in the United States. At the same time, houses are much smaller, on average, in England compared to Continental Europe. A new-build house is 38 per cent smaller in the UK than in densely populated Germany and 40 per cent smaller than in the even more densely populated Netherlands (Statistics Sweden, 2005). This is even though the average household size is larger in the UK than in the Netherlands or Germany (2.4 persons per household versus 2.3 and 2.2, respectively; UN Economic Commission for Europe, 2001). In other words: England is facing an extraordinary housing affordability crisis, especially in parts of the country and particularly during boom periods.

The housing affordability crisis has been slowly developing over decades. Real house prices have grown faster in England over the last 40 years than in any other European country. This implies that young households – in particular young families living in London or the South East of England – who want to get their feet on the owner-occupied housing ladder, are hardest hit by the crisis. Many older households who became home owners decades ago and have now accumulated – at least on paper – significant financial wealth in their property are the seeming beneficiaries of the long-standing British real house price growth. The gains for elderly home owners are in fact smaller than one might think; they cannot realise their gains unless they sell their house and move abroad, significantly downsize their housing consumption or give up owner-occupation and rent.

Report objectives and nature of empirical analysis

This report explores the *underlying causes* of the English housing affordability crisis. The main focus is on identifying the causal impact of spatial variation in *regulatory (planning) restrictiveness* on housing costs, housing affordability and house price dynamics. However, we also carefully control for physical supply constraints and disentangle and identify the separate causal impacts of the two types of constraints using standard econometric techniques, briefly explained below (under Key Finding 8) and explained in more detail in the body of the report.

The empirical analysis is based on a dataset that combines house price and income information – spanning 35 years and covering 353 local planning authorities in England – with rich and direct information on regulatory and physical supply constraints for these locations.

On the basis of this rich dataset, this report provides unambiguous *causal* evidence demonstrating that regulatory supply constraints and, to a lesser

extent, physical supply constraints have had a serious negative long-run impact on housing affordability and have increased house price volatility. We summarise our key findings in more detail below:

Key findings

- 1. House prices react more strongly to changes in demand in more supply constrained places. As a consequence, controlling for demand conditions, house prices are significantly higher in more supply constrained places.**
 - Both regulatory and physical supply constraints affect the response of house prices to changes in local earnings positively and in a statistically significant way.
 - Our central estimates imply that a one standard deviation increase in our measure of regulatory restrictiveness raises the house price-earnings elasticity of a local planning authority with average levels of constraints by 0.293. That is, a 10 per cent increase in local earnings raises house prices roughly 3 per cent more than it otherwise would.
 - A one standard deviation increase in our measure for local scarcity of (undeveloped) developable land has a very similar effect on the price-earnings elasticity. A 10 per cent increase in local earnings raises house prices by roughly 3 per cent more than it otherwise would.
 - Uneven topography also affects the responsiveness of prices to earnings shocks but the effect is relatively small quantitatively.

- 2. Regulatory constraints imposed by the British planning system can to a large extent explain the high house prices in much of southern England. In most places planning constraints have a larger impact on house prices than physical supply constraints.**
 - Our simulations imply that the increase in real house prices between 1974 and 2008 can – to a large extent – be explained by the existence of tight planning constraints.
 - Although one standard deviation changes in the measures for regulatory restrictiveness and scarcity of developable land have roughly the same impact on the ‘price-earnings elasticity’ (see above), for the majority of local planning authorities the impact of regulatory constraints is much more severe than that of physical constraints. This is because – in contrast to our measure for regulatory restrictiveness – the distribution of our measure of local scarcity of undeveloped developable land is highly skewed; very few localities are actually constrained by physical constraints although those that are suffer badly in terms of housing supply elasticity.

3. The extraordinarily high house prices in the Greater London Area (GLA) can to a large extent be explained by a combination of physical supply constraints due to local scarcity of undeveloped developable land and planning related constraints. Outside of the GLA, scarcity of undeveloped developable land has no meaningful impact on house prices.

- The findings of our base estimates imply that physical constraints due to scarcity of developable land are only binding in the most urbanized places. When we drop local planning authorities in the GLA – the most physically developed area in England – from our sample and re-estimate our base specification, the effect of physical constraints on the price-earnings elasticity disappears.
- All our findings consistently imply that the effect of physical constraints on house prices is highly non-linear.
- Even though our estimates suggest that physical constraints due to local scarcity of developable land are comparably more important than regulatory constraints in the GLA, this finding has to be interpreted with caution. Local scarcity of developable land itself reflects regulatory constraints – height restrictions that hinder ‘vertical development’. (In other large rich cities with less binding height restrictions – such as New York – it has been shown that regulatory restrictions have less impact on prices.)

4. Physical supply constraints due to uneven topography (steep slopes, ruggedness) matter too, but the effect is relatively small in economic terms.

- We include uneven topography as a supply constraint-measure in our analysis because previous research for the US has demonstrated that steep slopes constrain residential development.
- These results are robust to how exactly we define ‘uneven topography’ (i.e., whether we define it as elevation range or standard deviation of slope) and whether we measure linear or non-linear effects.
- We also investigated whether other types of physical constraints may matter. Specifically, we examined whether ‘semi-developable’ land has any effect on the price-income elasticity. ‘Semi-developable’ land includes land cover categories that are common in flood risk areas. It also includes land cover categories that are at the margin of being developable because of e.g. geological constraints, technical constraints or viability considerations. We find that ‘semi-developable’ land has no discernible impact.

5. Regulatory and scarcity related physical supply constraints have a larger effect on house prices during boom than during bust periods.

- When we split our sample into time periods with positive and negative house price growth, we find – consistent with theory – that regulatory and physical supply constraints affect the price-earnings elasticity more strongly during boom periods.
- The estimated effects are highly statistically significantly different.

6. Regulatory and scarcity related physical supply constraints do not only explain high house prices but are the key explanatory factors of housing affordability.

- Housing affordability is essentially driven by three factors: house prices (negative effect), household earnings (positive effect) and the availability and cost of debt financing (higher mortgage interest rates reduce affordability).
- Our analysis implies that falling housing affordability has been driven in large parts by house prices and nominal interest rates. Housing affordability is low today despite very low nominal mortgage interest rates. This lack of affordability in large areas of the country is largely driven by regulatory constraints imposed by the British planning system.

7. The British planning system and physical supply constraints substantially increase long-term and short-term house price volatility but cannot fully explain it, suggesting that macroeconomic factors also play a role.

- The findings of our base specifications imply that a one standard deviation increase in regulatory restrictiveness raises the mean deviation of house prices by 6.6 percent and a one standard deviation increase in the share of land developed raises it by 7.1 per cent.
- Similarly, a one standard deviation increase in regulatory restrictiveness raises the mean deviation of house price growth by 1.4 per cent and a one standard deviation increase in the share of land developed raises it by 2.0 per cent.
- The year fixed effects – that capture time-specific macro-economic shocks – in our estimates account for a significant fraction of the cyclical behaviour of house prices, implying that macro factors that vary over time but not noticeably across local planning authorities (e.g., interest rate movements, overall GDP growth) may be quite important in explaining the cyclical behaviour of housing markets.

8. Our estimate of the impact of the restrictiveness of the British planning system on house prices can and should be interpreted as a causal effect.

- Our measure of regulatory restrictiveness is the refusal rate (= refused applications / total number of applications) of major residential projects in an local planning authority. The refusal rate (or: acceptance rate) of planning applications is a standard measure to capture regulatory restrictiveness. It is for example used in the seminal studies by Cheshire and Sheppard (1989), Preston et al. (1996) or Bramley (1998).
- Like many other indicators of planning restrictiveness, the refusal rate is potentially endogenous – that is, it may be both a cause and an effect:
 - a) The refusal rate is influenced by demand conditions: it increases during boom periods and falls during bust periods.
 - b) Developers may not submit planning applications in restrictive local planning authorities as they anticipate that their application is highly likely to be rejected. However, equally, a more restrictive local planning authority may encourage submissions because the payoff to developers increases with restrictiveness, other things equal.
 - c) The refusal rate may also be influenced by other omitted factors that happen to be correlated with the price-earnings elasticity.
- The trouble with an endogenous explanatory variable is that its measured impact – when measured in an ordinary way – may be biased and cannot be interpreted as a causal effect. Fortunately, econometric techniques are available to take endogeneity issues into account and correct for them.
- The first endogeneity issue a) can easily be dealt with by using the average refusal rate over a long time period, in our case 1979 to 2008.
- Endogeneity issues b) and c) require a more advanced econometric technique. The standard econometric technique to correct for endogeneity and identify causal effects is the so called Instrumental Variable (IV) approach (the main IV-estimator – which we use in our analysis – is the Two-Stage-Least-Squares (TSLS)-estimator). The details of the approach – with respect to our analysis – are explained in Section 5.1.
- The IV-approach is a very widely used methodology in Statistics, Econometrics or Epidemiology to address the omitted variable problem (endogeneity issue c) and the classic errors-in variables problem (endogeneity issues a) and b)) (see e.g., Pearl (2000), Angrist and Krueger (2001) or Heckman (2008) for a more in depth discussion of the method and see e.g. Angrist and Krueger (1991) for a famous application of the IV-methodology.
- The basic idea of the IV-approach is to identify a variable or variables (the excluded instrumental variables or excluded

instruments; often just abbreviated as instruments) that affect the key explanatory variable (in our case: the refusal rate) but only impact the outcome (the house price-earnings elasticity) through the key explanatory variable.

- In our empirical analysis we use two excluded instruments. The first instrument – the change in delay rate before and after 2002 is derived from a policy reform. As outlined in the report this instrument is strongly correlated with the refusal rate and can be expected to influence the price-earnings elasticity only through the refusal rate. Exploiting situations where the forces of nature or government policy have thrown up instruments is common practice in econometrics. See e.g. Angrist and Krueger (2001). See Angrist and Krueger (1991) for a famous study that uses a government policy to derive an instrument.
- The second instrument – the share of party votes – is frequently used in Applied Econometric work as an excluded instrument as it is often strongly correlated with a key explanatory variable but is only expected to be related to the outcome measure through the key explanatory variable. For example, Sadun (2008) uses the voting share as an excluded instrument to identify the restrictiveness of local planning policies in the context of retail development.
- A range of statistical tests suggest that our instruments are both valid and allow us to strongly identify the causal effect of the refusal rate on the house price-earnings elasticity. Our results are robust to using the combination of the two instruments or only one of the two instruments.
- Consistent with theoretical considerations we find that the unbiased causal impact of the refusal rate on house prices is much larger than biased estimates based on ordinary methods that do not take into account the endogeneity of the variable.
- One important contribution of this report – compared to previous studies on the impact of planning constraints on house prices – is that we deal with the endogeneity of refusal rates in a robust manner and therefore identify causal effects of the British planning system on house prices, rather than merely measuring correlations.

9. Our estimate of the impact of physical constraints due to local scarcity of undeveloped developable land can and should be interpreted as a causal effect.

- Similar to the refusal rate, the share of undeveloped developable land is potentially endogenous (we explain the rationale in the body of the report). We deal with this endogeneity concern by using historic population density from about 100 years ago as an excluded instrument.
- Tests suggest that the excluded instrument is both valid and allows us to strongly identify the causal effect of our key measure of physical constraints.

10. Our estimated effects of the causal impact of the restrictiveness of the British planning system on house prices are both cautious (lower bound) and robust to a large number of sensitivity checks.

- The quantitative effects derived from our analysis are cautious as we assume that regulatory constraints were not binding in 1974 (despite research already claiming that they were having a significant impact, e.g., Hall et al., 1973, or Hall, 1974). To the extent that regulatory constraints were already binding in 1974, we underestimate their impact on house prices.
- Our estimates are also cautious because they are based on estimates of the local impact of local constraints. Partial substitutability of locations implies that some of the impact of local constraints operates at the aggregate level, for which our analysis does not account.
- The strong impact of land scarcity on house prices in the GLA is likely to be significant because local planning authorities in the GLA operate height restrictions. That is, part of the estimated impact of our key physical constraint measure may in fact be generated by regulatory constraints. This is another reason why the estimated impact of the restrictiveness of the planning system is a lower bound.
- Our estimated effects are robust to a large number of sensitivity checks including using different geographical scales. The range of sensitivity or robustness checks undertaken is outlined in Sections 5.4-5.6 and 5.8. Our empirical findings are not significantly affected by any of these checks.

11. The estimated effects of the impact of the British planning system on house prices are very important in quantitative terms

- Quantifying the ‘economic impact’ of regulatory constraints is tricky, not least because we identify our effects based on variation in regulatory restrictiveness across locations. Yet, the British planning system seems likely to impose constraints on residential development even in less restrictive places.
- In an attempt to quantify the causal effects we have carried out a number of ‘counterfactual’ analyses for a local planning authority with average levels of regulatory restrictiveness.
- The first such analysis assesses the overall impact of supply constraints by asking the question ‘what would be the impact on house prices if – unrealistically – all supply constraints were removed?’ This analysis suggests that house prices would be between 34 per cent (using the change in delay instrument) and 52 per cent (using the vote share instrument) lower, depending on the choice of instrumental variable strategy used to identify causal effects.
- In a second counterfactual analysis we explore the effect of the various supply constraints measures using the regulatory restrictiveness at the 90th percentile, the average and the 10th

percentile. The simulated effects are illustrated in Figure 5. These estimates imply an average house price for 2008 of £183,000 to £203,000 for the 10th percentile and £250,000 to £276,000 for the 90th percentile depending on which model estimates are used.

- In a third counterfactual analysis we ask: What would be the effect on house prices if an local planning authority with average levels of constraints had instead the restrictiveness of the most restrictive English region (South East) or the least restrictive English region (North East). The results are illustrated in Figure 6. The simulated average house prices in 2008 would be £206,000 instead of £241,000 or £188,000 instead of £257,000 again depending on the model choice.
- We have also computed counterfactual analyses for a number of local planning authorities that are known to be comparably restrictive and unrestrictive, respectively. The results are illustrated in the Appendix Figures A5 to A8.

12. Our findings imply that if current trends continue and in the absence of major policy reforms, future housing (affordability) crises will be increasingly severe

- If current urbanisation trends continue and planning policies and incentive structures are unaltered, both regulatory and physical supply constraints will become even more binding, exacerbating future housing affordability crises and future house price volatility, implying an even larger impact of the housing market(s) on the macro-economy.

Conclusions: What can be done to make housing more affordable again?

Our empirical analysis has identified restrictive planning constraints – and to a lesser extent – physical constraints to be the main causal drivers of the housing affordability crisis in large parts of England. Reducing physical supply constraints – although not entirely impossible as the example of Hong Kong illustrates – is extremely difficult and costly and the scope for making more land available by removing physical constraints appears to be quite limited.

The more obvious solution therefore is to provide greater incentives to local planning authorities to permit more residential developments. However, how can such incentives be introduced? Three approaches seem sensible and deserve further consideration:

1. Use fiscal system to provide serious fiscal incentives to permit residential developments
2. Allow local planning authorities to benefit from land price uplifts for example via land auctions
3. Reform planning system so price signals become a material consideration

PROVIDE SERIOUS FISCAL INCENTIVES TO LOCAL PLANNING AUTHORITIES
(precedence: *Switzerland, United States*)

- Our empirical findings imply that local planning authorities have strong fiscal disincentives to permit new residential developments. This is due to a misalignment of costs (too much burden on local planning authorities) and benefits (too low long-term payback) associated with residential developments.
- The costs associated with residential development to the local planning authorities are substantial as they have to provide infrastructure, additional public services etc.; and there are real costs to residents in the immediate surroundings of proposed developments. An existing match-funding scheme (the Housing Planning Delivery Grant) provides some very partial compensation to local planning authorities for these costs. However, our findings imply that these funds are not effective in inducing local authorities to permit residential development.
- Impact fees to be paid by the developers to the local planning authorities in compensation for infrastructure costs and other burden have been shown in the US to make local communities more willing to accept developments and could induce local planning authorities to become less restrictive.
- The lions-share of future revenue streams associated with local residential development (all national taxes and fees with the exception of the council tax) is collected by the central government and redistributed to all local planning authorities via the central government grant system. As a consequence of this allocation mechanism, local planning authorities do not directly participate in a substantive way from the long-run benefits associated with any residential development they permit within their boundaries (e.g., through local tax increases), generating strong adverse incentives to permit residential developments.
- Experience from other countries with fiscal federalism (e.g., Switzerland or the United States) where benefits and costs of local development are more aligned (local residents can reap the benefits from local development via increased local tax revenue and do not merely bear the cost) suggest that genuine incentives at the local level to permit residential development can have a substantial soothing impact on housing affordability. For example, whereas according to the Bank for International Settlement real house prices more than quadrupled in the UK between 1970 and 2006, they increased by merely 12.7 percent in Switzerland during the same time period.

ALLOW LOCAL PLANNING AUTHORITIES TO BENEFIT FROM PLANNING GAIN
(precedence: *The Netherlands*)

- When land is first zoned for development it observes a massive uplift in values. One way to provide incentives to local planning authorities to permit development would be to let them capture all or at least parts of these planning gains. Various proposals have been suggested to achieve this objective (e.g., planning gain supplements, betterment taxes etc.) but one proposal appears to be particularly appealing: making use of a land auction mechanism (see, for example, Leunig, 2007, for a detailed proposal).

REFORM THE PLANNING SYSTEM SO PRICE SIGNALS BECOME A MATERIAL CONSIDERATION

Cheshire and Sheppard (2005) propose the use of price signals in land use planning decision making. The idea is to exploit information embodied in price premiums of neighbouring parcels of land zoned for different purposes. The proposed mechanism envisages that if the price premium were above some threshold level, “this should provide a presumption of development unless maintaining the land in its current use could be shown to be in the public interest.” The burden of proof would be allocated to the local planning authority so as to increase the likelihood of development. Such a mechanism arguably would make housing supply more elastic and the planning system more transparent. For a more in-depth discussion of the proposal see Cheshire and Sheppard (2005).

Department for Communities and Local Government
© Crown Copyright, November 2010

ISBN: 978 1 4098 2640 8