

Title: The Financial Policy Committee's tools over the buy-to-let mortgage market - Impact Assessment IA No: Lead department or agency: HM Treasury Other departments or agencies: Bank of England	Impact Assessment (IA)					
	Date: 7/10/2015					
	Stage: Consultation					
	Source of intervention: Domestic					
	Type of measure: Secondary Legislation					
Contact for enquiries: Benjamin Whitworth/Chris Goodspeed						
Summary: Intervention and Options						RPC Opinion: Awaiting Scrutiny

Cost of Preferred (or more likely) Option

Total Net Present Value	Business Net Present Value	Net cost to business per year (EANCB on 2014 prices)	In scope of One-In, One-Out?	Measure qualifies as One-Out?
-4.0	-3.8	0.43	No	NA

What is the problem under consideration? Why is government intervention necessary?

The Financial Policy Committee (FPC) have stated that the buy-to-let mortgage market could pose broad risks to financial stability. Buy-to-let mortgage lending has grown in recent years and now represents a significant proportion of total mortgage lending in the UK. Mortgages are the largest asset class on UK banks' balance sheets, which exposes banks to significant credit risk. Buy-to-let mortgages may also amplify house price swings both in an upturn and in a downturn in the housing market. This amplification can pose significant negative externalities to financial stability, the owner-occupier housing market and wider economy.

The FPC consider powers of Direction in the buy-to-let market to be necessary to reduce the probability and cost of a materialisation of these risks, which could exacerbate the scale of a future financial crisis. The FPC also believes being able to apply a consistent approach to owner-occupied and buy-to-let mortgage lending is appropriate for macroprudential purposes, given the effects that buy-to-let activity can have on the stability of the owner-occupier housing market. The FPC was granted powers of Direction over owner-occupied mortgage lending in April 2015.

What are the policy objectives and the intended effects?

The FPC have requested powers of Direction over loan-to-value (LTV) limits and interest coverage ratio (ICR) limits over buy-to-let mortgage lending. Powers of Direction provide for more certainty, greater accountability and enhanced policy predictability.

An LTV tool can have a direct impact on financial stability by reducing defaults in a lender's mortgage book, and reducing the loss to the lender in the event of default. This can reduce the cost of a shock or crisis by preserving banks' capital. In addition, LTV limits can indirectly enhance financial stability by reducing the extent to which buy-to-let investors amplify the scale of house price rises during a cyclical upswing by re-investing capital gains from existing investments. This can be detrimental to financial stability if increases in indebtedness in the owner-occupied sector leave households more vulnerable to shocks and potentially increases the costs of the FPC's LTI policy for this sector.

An ICR tool constrains the value of the loan that a lender can extend for a given rental income and interest rate. This can have a direct impact on financial stability by reducing the probability of default on the loan, particularly in an environment of rising interest rates. It can also have an indirect impact on financial stability by reducing the risk that a significant number of buy-to-let investors sell their properties if market conditions mean their investments are no longer profitable, which could amplify the scale of a house price fall and have negative feedback effects on the macroeconomy.

What policy options have been considered, including any alternatives to regulation? Please justify preferred option (further details in Evidence Base)

Two policy options have been considered: a baseline scenario where the Government does not grant the FPC powers of Direction over the buy-to-let sector, and the FPC does not act through its powers of Recommendation, and the 'preferred option' where the Government provides the FPC with the powers of Direction requested and these are used proportionately. The preferred option will enable the FPC to direct the regulators to place LTV/ICR tools in response to a potential build-up of systemic risks. Given that the FPC is legally required to have regard to the principle of proportionality, the potentially large benefits of the policy appear likely to exceed the relatively small costs.

Will the policy be reviewed? It will be reviewed. If applicable, set review date: Month/Year

Does implementation go beyond minimum EU requirements?	N/A				
Are any of these organisations in scope? If Micros not exempted set out reason in Evidence Base.	Micro Yes	< 20 Yes	Small Yes	Medium Yes	Large Yes

What is the CO ₂ equivalent change in greenhouse gas emissions? (Million tonnes CO ₂ equivalent)	Traded: N/A	Non-traded: N/A
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I have read the Impact Assessment and I am satisfied that (a) it represents a fair and reasonable view of the expected costs, benefits and impact of the policy, and (b) that the benefits justify the costs.

Signed by the responsible Minister

H. H. Bala Date:

Summary: Analysis & Evidence

Policy Option 1

Description: "Do nothing" option

FULL ECONOMIC ASSESSMENT

Price Base Year 2015	PV Base Year 2015	Time Period Years 10	Net Benefit (Present Value (PV)) (£m)		
			Low: 0	High: 0	Best Estimate: 0

COSTS (£m)	Total Transition (Constant Price) Years	Average Annual (excl. Transition) (Constant Price)	Total Cost (Present Value)
Low	0	0	0
High	0	0	0
Best Estimate	0	0	0

Description and scale of key monetised costs by 'main affected groups'

Zero. The Government would not grant the FPC powers of Direction and for the purposes of this assessment, it is assumed that the FPC would not act. Therefore, there would be no costs. This scenario is the baseline for determining the incremental cost of option 2.

Other key non-monetised costs by 'main affected groups'

None.

BENEFITS (£m)	Total Transition (Constant Price) Years	Average Annual (excl. Transition) (Constant Price)	Total Benefit (Present Value)
Low	0	0	0
High	0	0	0
Best Estimate	0	0	0

Description and scale of key monetised benefits by 'main affected groups'

Zero. The Government would not grant the FPC powers of Direction and for the purposes of this assessment, it is assumed that the FPC would not act. Therefore, there would be no costs. This scenario is the baseline for determining the incremental cost of option 2.

Other key non-monetised benefits by 'main affected groups'

None.

Key assumptions/sensitivities/risks	Discount rate	N/A
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BUSINESS ASSESSMENT (Option 1)

Direct impact on business (Equivalent Annual) £m:	In scope of OIOO?	Measure qualifies as
Costs: 0	No	NA
Benefits: 0		
Net: 0		

Summary: Analysis & Evidence

Policy Option 2

Description: Grant the FPC powers of direction over ICR and LTV

FULL ECONOMIC ASSESSMENT

Price Base Year 2015	PV Base Year 2015	Time Period Years 10	Net Benefit (Present Value (PV)) (£m)		
			Low: -5.1	High: -2.6	Best Estimate: -4.0
COSTS (£m)	Total Transition (Constant Price) Years		Average Annual (excl. Transition) (Constant	Total Cost (Present Value)	
Low	2.6	1	0	2.6	
High	5.1		0	5.1	
Best Estimate	3.8		0	4.0	
Description and scale of key monetised costs by 'main affected groups'					
It is neither possible nor accurate to produce a final set of monetised costs for granting the FPC powers of Direction over LTV and ICR limits, given the range of ways the FPC could use these powers and limited data on the buy-to-let market. Of the costs considered, the administrative costs to the Bank of England would be a maximum of £50,000 of one-off costs and £30,000 per annum thereafter. Firms would face a one-off transitional cost of approximately £3.8m to facilitate broader data collection. These costs have been used to calculate the figures in the cost table above. The broader macroeconomic costs, under a scenario in which the FPC implemented a policy that reduced buy-to-let mortgage lending very significantly, have been estimated at a maximum of 0.08% of GDP per annum. This could, however, be offset by monetary policy.					
Other key non-monetised costs by 'main affected groups'					
Other non-monetised costs discussed in the evidence base include the impact to market structure, 'effective' competition, and small and micro-businesses. These all appear small.					
BENEFITS (£m)	Total Transition (Constant Price) Years		Average Annual (excl. Transition) (Constant	Total Benefit (Present Value)	
Low	N/A	N/A	N/A	N/A	
High	N/A		N/A	N/A	
Best Estimate	N/A		N/A	N/A	
Description and scale of key monetised benefits by 'main affected groups'					
It is neither possible nor accurate to produce a final set of monetised benefits for granting the FPC powers of Direction over LTV and ICR limits given the range of ways the FPC could use these powers. Therefore, the benefits have been labelled as not applicable. Analysis below suggests, however, that the benefits in reducing the scale of a potential financial crisis could be large. The impact of a one percentage point reduction in the likelihood of a crisis has been estimated to have an annualised GDP benefit of £4.5bn. The estimates show that under severe but plausible scenarios, an FPC power of Direction could reduce credit losses in the event of a shock by up to £7.3bn. In the same severe but plausible scenario, such a policy could also reduce the risk of a fire-sale by buy-to-let borrowers that could cause an additional fall in house prices of between 25% and 59%, leading to a fall in consumption by home-owners of up to 3%, reducing GDP by up to 2%. And in an upswing such a policy could reduce the extent to which buy-to-let borrowers amplify house price rises. If a significant buy-to-let boom were to push up house prices, then it would mean that the FPC's current Recommendation of a loan to income flow limit on the owner-occupied sector (implemented to insure against the effects of a rise in house prices on household indebtedness) would be likely to bite harder, increasing the number of borrowers who cannot get a loan, or are forced to reduce the size of their loan, more than three-fold. These costs could suggest that the current policy mix, focused on only one sector of the mortgage market, might not be optimal.					
Other key non-monetised benefits by 'main affected groups'					
The main benefits are covered in the section above.					
Key assumptions/sensitivities/risks					N/A

The evidence base provides quantitative estimates of the economic and financial costs and benefits for arbitrary calibrations of ICR and LTV limits. Estimating these impacts requires the use of numerous economic models which rely on a variety of assumptions. These are based on data where possible. The key assumptions are discussed in the text, and a technical annex contains further details.

BUSINESS ASSESSMENT (Option 2)

Direct impact on business (Equivalent Annual) £m:			In scope of	Measure qualifies
Costs: 0.4	Benefits: N/A	Net: -0.4	No	NA

The FPC's housing tools in respect of the buy-to-let market: Impact Assessment

A. Introduction

1. This is an impact assessment of establishing, in legislation, a framework for general use by the Bank of England's Financial Policy Committee (FPC)¹ of powers to Direct, if necessary to protect and enhance financial stability, the Prudential Regulation Authority (PRA) and the Financial Conduct Authority (FCA), to require regulated lenders to place limits on residential mortgage lending in the buy-to-let market by reference to:
 - (a) loan-to-value (LTV) ratios;
 - (b) interest coverage ratios (ICRs).
2. The FPC is empowered to make Recommendations to the Government that it be given powers of Direction over specified tools.² Following the Chancellor's June 2014 Annual Mansion House speech³, the FPC recommended that it be granted powers of Direction over housing market tools in relation to owner-occupied mortgages and buy-to-let residential mortgages, by reference to:
 - Loan-to-Value (LTV) Ratios; and
 - Debt-to-Income (DTI) Ratios, including Interest Coverage Ratios (ICR) in respect of buy-to-let lending.⁴
3. In response to this recommendation, the Government consulted on and legislated for powers of Direction over LTV limits and DTI limits in respect of owner-occupied mortgages. In respect of buy-to-let mortgages, the Government stated its intention to consult separately on the recommendations by the end of 2015. This impact assessment forms part of that consultation. It draws on the framework used for the impact assessment of powers of Direction for the owner-occupier market but provides much more quantitative assessment of the potential costs and benefits.
4. The FPC has had macroprudential policy actions in place with respect to the owner-occupier market since June 2014.⁵ The primary motivation for this is to insure against the risk of a marked loosening in underwriting standards and a further significant rise in the number of

¹ The FPC's role includes identifying, monitoring and taking action to address emerging risks and vulnerabilities across the financial system as a whole.

² As set out in section 9P of the Bank of England Act 1998 (as amended by the Financial Services Act 2012)

³ See 'Mansion House 2014: Speech by the Chancellor of the Exchequer' <https://www.gov.uk/government/speeches/mansion-house-2014-speech-by-the-chancellor-of-the-exchequer>

⁴ See Financial Policy Committee statement, 26 September 2014, <http://www.bankofengland.co.uk/publications/Pages/news/2014/080.aspx> . For further discussion of why these tools are appropriate see <http://www.bankofengland.co.uk/financialstability/Documents/fpc/statement021014.pdf>.

⁵ These are that:

- When assessing affordability, mortgage lenders should apply an interest rate stress test that assesses whether borrowers could still afford their mortgages if, at any point over the first five years of the loan, Bank Rate were to be 3 percentage points higher than the prevailing rate at origination.
- The PRA and the FCA should ensure that mortgage lenders do not extend more than 15% of their total number of new residential mortgages at loan to income (LTI) ratios at or greater than 4.5. This recommendation applies to all lenders which extend residential mortgage lending in excess of £100 million per annum.

For more information see 'Record of the FPC Meetings held on 17 and 25 June 2014'

<http://www.bankofengland.co.uk/publications/Pages/Records/fpc/2014/1407.aspx> and Bank of England Financial Stability report june 2014 <http://www.bankofengland.co.uk/publications/Documents/fsr/2014/fsrfull1406.pdf>.

highly indebted households. At higher levels of indebtedness, households are more likely to encounter payment difficulties in the face of shocks to income and interest rates. This could pose direct risks to the resilience of the UK banking system and indirect risks via its impact on economic stability.

5. The Government continues to hold the view that buy-to-let is primarily a business activity and deserves a regulatory treatment distinct to that of mortgage lending to owner occupiers⁶, but the Government also acknowledges that buy-to-let lending could pose a risk to the financial stability of the UK economy.
6. The introduction of a general framework for use of instruments over buy-to-let lending does not imply that any powers would be exercised imminently. Any calibration of instruments would be decided by the FPC at the point at which a particular power of Direction was being used.
7. In light of that, this impact assessment considers the costs and benefits in principle, using both qualitative and quantitative estimates, of granting the FPC powers of Direction.⁷
8. It does so against a background in which the buy-to-let mortgage market has continued to grow. The outstanding stock of buy-to-let lending has increased by over 40% since 2008, compared with only 2% growth for owner-occupied lending. Buy-to-let lending now accounts for 16% of the stock of outstanding mortgages, and 17% of the total flow of new mortgage lending. This strength is consistent with a structural trend towards a larger private rental sector,⁸ driven by demographic changes and higher house prices relative to income. Recent growth in buy-to-let lending has also been supported by strong competition between banks.
9. For this assessment the baseline scenario is that the Government does not grant the FPC powers of Direction on the tools requested, and that the FPC does not act through powers of Recommendation. This assumption simplifies the impact assessment to one of the costs and benefits of the FPC implementing a policy when it assesses the market conditions to warrant one.
10. If it judged conditions warranted, the FPC could act through powers of Recommendation, as it did in June 2014 for the owner-occupied mortgage sector. If the regulators complied, there is no reason to expect any material difference in the economic impact from the application of the rules as a recommendation instead of a direction. However, there are other benefits of using a power of Direction over a recommendation, such as certainty and accountability, which are discussed in detail in section B.
11. The objectives of the FPC are to contribute to the achievement by the Bank of the Financial Stability Objective to protect and enhance the stability of the financial system of the UK (which includes reducing the impact and probability of a financial crisis) and subject to that, support the economic policy of the Government, including its objectives for growth and employment.
12. In assessing how powers of Direction over the buy-to-let sector enhance this objective, the impact of potential FPC Directions on the risks to financial stability from buy-to-let lending

⁶ This approach is driven by two key considerations. The first is that an owner-occupier's own home is at risk, so there are potentially significant social policy implications if these borrowers are not adequately protected. The second is that buy-to-let borrowers tend to be acting as a business. The government is committed to introducing FCA regulation only where there is a clear case for doing so, in order to avoid putting additional costs on firms that would ultimately lead to higher costs for borrowers. Businesses are expected to be better placed than consumers to judge whether contracts they make with other businesses are in their interest.

⁷ The FPC would be required to conduct a cost-benefit analysis, where practicable, each time it specifies a calibration and ensure it takes accounts of any proportionality implications.

⁸ The private rental sector accounted for 19% of households in 2013, compared with 11% in 2003.

are identified in the associated buy-to-let consultation document⁹. These risks – the reduction of which constitute the (indirect) benefits from the policy – include:¹⁰

- credit risk from buy-to-let lending and the impact on banks' balance sheets
- the potential of the buy-to-let sector to amplify the scale of house price cycles both in upswings and downturns. This can affect financial stability if:
 - i. in an upswing, higher house prices boost the indebtedness of the owner-occupier mortgage sector, leaving these households more vulnerable to shocks and potentially increasing the costs of the FPC's LTI Recommendation for this sector.¹¹
 - ii. in a downswing, lower house prices exacerbate credit risk and may cause owner-occupiers to cut back their spending due to the fall in their housing wealth and the collateral this provides them to borrow for consumption spending.¹²

13. These risks were discussed by the FPC in their September 2015 meetings. The FPC concluded that whilst there was no immediate case for action in the buy-to-let mortgage market, they would remain alert to the growth of the market and potential developments in underwriting standards. They noted that 'the rapid growth of the market also underscores the importance of FPC powers of Direction for use in future'.¹³

14. The potential costs of using powers of Direction are both direct and indirect, and include: administrative costs to the Bank and lenders; adverse impacts on lender business models; the effects on small and micro-businesses, the structure and nature of competition in the buy-to-let mortgage market, and the wider economy.

15. Overall, the scenarios discussed later in this impact assessment show that the benefits of the FPC exercising the powers of Direction could be large, particularly if the buy-to-let sector were to continue its expansion, or underwriting standards were to deteriorate significantly. Different scenarios are used to highlight different channels of risk:

- **Scenario 1** shows that if the FPC had implemented a hypothetical LTV policy in 2004 Q1 then this could have reduced credit losses in the financial crisis.

⁹ https://www.gov.uk/government/publications?publication_filter_option=consultations

¹⁰ This assessment does not consider in detail the 'indebtedness' channel through which increased buy-to-let mortgage debt makes household's balance sheets, their spending and hence GDP, more vulnerable to a shock. Although this channel was the main motivation for the FPC's Recommendations on the owner-occupier mortgage sector in June 2014, the risks from buy-to-let lending associated with this channel appear low. This is because households with buy-to-let mortgages tend to have higher income than those with owner-occupied mortgages, which suggests that a shock to their income will have a smaller impact on consumption, and buy-to-let lending makes up a smaller share of household balance sheets than owner-occupied lending. For details of the FPC's June 2014 recommendation see Bank of England Financial Stability Report June 2014 - <http://www.bankofengland.co.uk/publications/Pages/fsr/2014/fsr35.aspx>

¹¹ See footnote 5 for details of the FPC's Recommendations.

¹² When house prices fall, this does not represent a fall in wealth for households as a whole. Assuming that households need to live somewhere households who expect to trade down are better off, but households who will need to trade up, or purchase a property, are worse off. However a fall in the value of housing means households are less able to borrow against housing wealth to smooth consumption – this is termed a 'collateral effect'.

¹³ See FPC Statement from its September 2015 policy meeting <http://www.bankofengland.co.uk/publications/Pages/news/2015/022.aspx>

- **Scenario 2** shows that if the FPC had implemented a hypothetical ICR/LTV policy in 2011, the impact of a severe, and also hypothetical, housing market downturn coupled with higher interest rates three years later, would feature:¹⁴
 - lower credit losses, and
 - a reduced risk of a buy-to-let ‘fire-sale’ – during which a large number of buy-to-let borrowers exit the market at the same time – limiting the negative impact of this scenario on house prices and hence household consumption (and GDP).

The scenario shows that these effects would be larger if the buy-to-let market had expanded and underwriting standards deteriorated significantly prior to that shock.

- **Scenario 3** demonstrates the effectiveness of an ICR policy in mitigating the impact of buy-to-let lending on house prices in an upswing, and hence the positive externalities of such a policy for the owner-occupier mortgage market and wider economy given the extent to which existing FPC policies aimed at limiting household indebtedness via this market might otherwise bind.

16. The rest of this impact assessment is structured as follows. Section B discusses the benefits of powers of Direction over powers of Recommendation. Section C discusses the potential costs and benefits of the FPC directing regulators over LTV and ICR limits. The assessment explains qualitatively the costs, benefits, and other economic externalities of the tools, and quantifies these as far as possible using scenario analysis. Section D provides some rationale to justify the level of analysis used, and Section E explains why the FPC might choose one tool over the other. Section F discusses the wider impacts, and section G provides the summary and preferred option. A technical annex at the end of this document provides more detail on modelling approaches and assumptions.

B. Benefits of powers of Direction

17. The FPC already has the power to make recommendations to tackle housing risks, including in the buy-to-let market. But there are several benefits to also being able to use a power of Direction.
18. First, powers of Direction provide greater certainty for the FPC as, unlike a Recommendation, the regulator is compelled, within the scope of its powers, to comply with the Direction. In principle, there could be differences between the preferred policy actions of microprudential and macroprudential regulators. For example, in a downturn the macroprudential authority might judge that loosening regulatory requirements could help to protect and enhance the resilience of the financial system as a whole, whereas the microprudential regulator may place more weight on maintaining standards to ensure the safety and soundness of individual firms.
19. Furthermore, powers of Direction can allow for greater accountability and policy predictability than Recommendations. In addition to the duty to explain how a policy action will help the FPC meet both its objectives – including estimates of the costs and benefits of the action, where reasonably practicable – which applies to Recommendations and Directions, the FPC is required to produce and maintain a statement of policy for each of its Direction powers. These statements set out how the tools are defined, the impact the tools

¹⁴ The scenario examines the case where an ICR policy reduces the flow of lending. But given credit risk models for the buy-to-let sector rely on the LTV distribution as an input, the impact of this policy on the LTV distribution is a key variable. Hence the same outcome could be achieved by a particular calibration of an LTV tool.

are expected to have on lenders' resilience and the wider economy, and in what situations the FPC would expect to use the power. The FPC is also expected to provide as part of the statement a list of key indicators that it will consider when judging if policy action using the tool in question is appropriate.¹⁵ Ex-ante explanations of this depth are not possible or practical for the FPC's Recommendation powers because of their breadth. The information contained within the policy statement will help market participants discern the FPC's policy reaction function and serve as useful context when the FPC is held to account for its actions after the fact.

20. The government recognises the important contribution the buy-to-let market can make to both the housing market and hard-working individuals. As such, the government intends to require that the FPC have regard to the principle of proportionality, the costs to business and prosperity when considering issuing a direction relating to the buy-to-let powers set out in this assessment.
21. There are also potential benefits from prescribing a set of tools which is proportionate to the threat posed. This means a set of tools whose role and effects can be more clearly defined which avoids undue complexity, and helps to ensure public accountability and communication. By maintaining simplicity and clarity of the macroprudential framework, the FPC would be more likely to convey a clear reaction function (i.e. improve predictability of its actions) which would help shape expectations of future FPC actions.

C. Cost-benefit analysis

22. This section discusses the costs and benefits associated with the FPC using a power of Direction over buy-to-let LTV ratios or ICRs, evaluated against the baseline of the FPC taking no action. The design of the tools is set out in the associated buy-to-let consultation document¹⁶.
23. An LTV ratio for a new mortgage is calculated as the ratio of the mortgage value to the property value at origination. The FPC could choose to implement this tool as either a 'hard cap' or a portfolio 'flow limit'. A portfolio flow limit specifies that, over a given period of time, no more than a specified proportion of the flow of new mortgage originations by a given lender can have an LTV at origination above a certain level. The proportion of new mortgages is calculated on either a values or volumes basis.
24. A buy-to-let mortgage's ICR is defined as the ratio of the expected (monthly) rental income from the buy-to-let property to the expected (monthly) mortgage interest payments. For this tool the FPC would have to specify both the interest rate used to calculate expected interest payments (the 'stressed interest rate') and the minimum level of the ICR at this stressed interest rate. For example, a number of lenders currently require that rental income must be at least 125% of mortgage interest payments when using an interest rate of 5% – although this practice is not universal. The minimum ICR in this example is 1.25, or 125%, and the stressed interest rate is 5%. As with the LTV limit, this could be policy could be implemented as a 'hard cap' or a flow limit, and the flow limit could be calculated on either a values or volumes basis.

¹⁵ Some indicators for the buy-to-let market are already included in the FPC's 'Core indicator set for LTV and DTI limits'. These are mean LTV on buy-to-let mortgages, advances to buy-to-let borrowers (including the percentage that are interest only) and the spreads on new buy-to-let mortgages. See Table A.3 in the FPC's Financial Stability Report <http://www.bankofengland.co.uk/publications/Documents/fsr/2015/fsrfull1507.pdf>

¹⁶ https://www.gov.uk/government/publications?publication_filter_option=consultations

25. Section C.1 discusses, mostly qualitatively, the costs and benefits but presents quantitative estimates where possible. The costs considered here are: the direct costs to the Bank and lenders from collecting data and monitoring compliance with the tools; the impact on the profitability of lenders; the impact on small and micro-businesses; and the impact on market structure and 'effective' competition. The benefits considered are the reductions in risks to financial stability stemming from implementation of the tools. HMT's forthcoming consultation on whether the FPC should be granted the powers of Direction in question should provide further evidence of the materiality of these, and other, costs and benefits to specific actors that might be affected.
26. Section C.2 is mostly quantitative, and estimates the economic and financial costs and benefits under a number of hypothetical scenarios.

C.1 Qualitative evaluation

Costs

Costs to the regulators

27. Direct costs may be incurred by the PRA through the need for data collection. There are limited data on the buy-to-let mortgage market currently available to monitor the compliance of lenders with any LTV or ICR power of Direction. These costs are estimated to be marginal given that a new data set is already being developed by the Bank of England, and the information obtained may be shared with the regulators. An additional marginal cost arises through the cost of staff needed to monitor compliance.
28. As most buy-to-let mortgages¹⁷ fall outside of conduct regulation, existing regulatory and statistical data on the volume and characteristics of lending are more limited than for the owner-occupier mortgage market. The Mortgage Lenders' and Administrators' Return (MLAR), collected jointly by the FCA and PRA, contains a break-down of the flow of unregulated lending by LTV buckets, but does not allow buy-to-let loans to be split out from other unregulated lending,¹⁸ and reporting buckets are wide.¹⁹ It does not include any information on ICRs.
29. Improved data on buy-to-let lending will help the FPC to assess potential risks to financial stability, and can also inform the Bank's work in relation to its monetary stability objectives. The Bank therefore has a data collection already in development, and this is likely to continue even if the FPC is not given a power of Direction in relation to buy-to-let lending. The data collection will be designed to include all the variables necessary to monitor compliance with the proposed tools for use by the FPC. However, the reporting population for monitoring compliance may need to be larger than the currently planned reporting population (which will be consolidated across existing Bank of England statistical and regulatory reporting samples).
30. The Bank estimates that the direct staff and IT costs of setting up and conducting the collection would sum to around £95,000 in the first year, and £60,000 annually thereafter. Under the conservative assumption that increasing the reporting population would increase

¹⁷ Unlike owner-occupier mortgages, most buy-to-let mortgages are not regulated as a product for conduct purposes by the FCA. Only the 'consumer buy to let' segment of the market is subject to a regulatory regime applied under the Mortgage Credit Directive Order which comes into force on 21 March 2016 and introduces an EU-wide framework of conduct rules for mortgage firms. The PRA and FCA can, however, write rules relating to the buy-to-let lending of the firms they authorise.

¹⁸ Estimates suggest that the around 87% of the MLAR unregulated sample is buy-to-let lending. The other 13% includes second charge mortgage lending.

¹⁹ For example, the LTV buckets only split lending by the following thresholds – 75%, 90% and 95%.

the cost by 50%, the additional cost attributable to the powers of Direction over buy-to-let lending could be £48,000 in the first year, and £30,000 per annum thereafter.

31. The indirect incremental costs associated with regulators monitoring compliance also appear small. Supervisors already monitor prudential risks emanating from firms' buy-to-let lending, and monitoring compliance with a power of Direction can be incorporated into this at minimal extra cost.

Direct costs to regulated businesses

Administrative

32. The main administrative costs to regulated lenders from the powers of Direction are through the need for appropriate data. As discussed above, a data collection is already in development for other purposes, so the majority of the costs associated with this are not attributable to the powers of Direction. The data collection includes large lenders covering at least 85% of new buy-to-let lending. But an increase in the reporting population, and the costs associated, may be attributable to the powers of Direction.
33. The Bank provisionally estimates the upfront fixed costs of the planned collection to reporters (on aggregate) are £20mn-£50mn, depending on the extent to which they have the required data readily available. The data items required to monitor an LTV or ICR tool (loan amount, property valuation, rental income, interest rate, and stressed interest rate) are standard data items that lenders already collect as part of their underwriting process. Therefore, we estimate that the one-off fixed costs of the collection of these particular items would be towards the lower end of the range, at around £25m. As this cost relates to a planned collection, this analysis places this cost within the base case "do nothing" scenario.
34. To ensure that this data collection could be used to implement an FPC policy under powers of Direction, the reporting population may have to be expanded to some smaller lenders. The incremental cost of that is expected to be smaller than the cost to the lenders already in the sample. These smaller lenders would report fewer loans or even nil returns, requiring less automated reporting and less fixed costs. Therefore a more likely estimate of the additional one-off set-up cost to firms from an increase in reporting population would be £2.5mn-£5mn, which would be borne by smaller lenders. This incremental cost has been used to calculate the figures provided in the summary pages above.
35. Each time the FPC specifies a new calibration of the tools firms may incur additional costs as they update IT, train staff, and adjust their product offering and pricing to ensure compliance. But these additional direct costs are unlikely to be significant as many firms already implement internal LTV and ICR limits for their buy-to-let lending, and control this via pricing, or hard caps.

Impact on profitability

36. Finally, the tool could affect lender profitability. In the long-run, the enhanced financial stability resulting from any policy action should have a positive impact on aggregate profitability. In the short-run the impact would vary across lenders, and the scale would depend on market conditions at time of the policy action, the calibration of the policy, and how lenders react. For example, MLAR data suggest that a policy that limited a lender's share of new lending above 75% LTV to 20% would currently directly impact the lending of only two of the six largest lenders by asset size, but would have a greater impact on firms outside this group. Lenders with high LTV lending could see profits fall in the short-run if this forces them to cut back on lending, but this could be offset to some extent if they were

to control their lending via price increases for these products. The impact on profits for lenders below the limit is unclear. They could see their profits fall if lenders above the limit refocused their products towards low LTV lending increasing competition in this area. But they could see profits boosted by taking advantage of the redistribution of demand for high LTV lending and increasing their share in this market, providing they had the risk appetite to do so.

37. Data from the CML Buy-to-let Mortgage Survey²⁰ suggest that the flow of lending affected could be quite sensitive to the calibration of an ICR limit. In the five quarters to 2015 Q1, for example, 10% of new buy-to-let loans would have been directly affected by a policy which prevented lending with an ICR below 125% at a stress interest rate of 5%. However, the same policy with a stress interest rate of 5.5% would have directly affected 27% of loans. Firms with ICR lending below such a limit, could see profits fall if an ICR limit forced them to cut back on lending. And, as with an LTV tool, evidence suggests these are more likely to be small or medium sized firms.²¹ Given firms currently tend not to control their low ICR lending through higher spreads, as they do for high LTV lending, any such impact on profits from an ICR tool could be more difficult to offset. The FPC would take account of any proportionality implications in the cost-benefit analysis it is required to conduct, where practicable, each time it specifies a calibration. The Government proposes that the secondary legislation providing these powers will require that the FPC have regard to the principle of proportionality, the costs to business and prosperity when considering issuing a direction.

Small and micro-business assessment

38. Of around 90 lenders currently active in the buy-to-let market and in scope of the FPC's powers of Direction, 60% have assets below £100mn. For these 'small and micro' firms, high LTV lending currently makes up a greater share of their book than for other firms, so their business models may be disproportionately directly affected if the FPC implemented an LTV policy.²² Data to assess whether these lenders will be affected more by an ICR limit than other firms are not currently available. Evidence from Moneyfacts suggests that these firms tend to use lower stressed interest rates in their affordability assessments and so, as with an LTV tool, could be disproportionately affected. The Government's consultation will seek to clarify any costs to firms that might be disproportionately affected. The PRA would also be able to monitor the impact on 'small and micro' firms through their regular supervisory work, and the Bank's planned data collection will allow for a more systematic assessment once it is in place.
39. Prior to acting, the FPC would assess whether or not the application of a tool to a class of firms was proportional to their systemic relevance. In line with their requirements to have regard to proportionality, they have the option to apply a *de minimis* threshold to carve out those firms that are not systemically relevant if they thought this was appropriate. The choice of this threshold is not included in the legislation, but is left to the FPC and regulators' discretion given it is likely to depend on the specific calibration of the tool the FPC decides to use. For the FPC's June 2014 recommendation on LTI limits for owner-occupier residential mortgage lending, the PRA defined a *de minimis threshold* such that lenders extending less

²⁰ Comprehensive data on the ICR distribution of mortgage lending is not currently available. The CML Buy-to-let Mortgage Survey quoted covers 11 lenders accounting for roughly 80% of the market.

²¹ Data from Moneyfacts suggest that although most firms have a minimum ICR requirement of 125%, smaller lenders tend to use lower interest rates in their stressed ICR calculations than the larger market players.

²² In 2015 Q2, the share of lending above 75% LTV for these small and micro lenders was 24%, compared to 11% for the rest of the market.

than £100m lending by value or fewer than 300 regulated mortgage contracts would fall outside the scope of the policy.²³

40. Some small-scale buy-to-let borrowers who account for a large share of the market,²⁴ will also be directly affected by the tools. Some of these borrowers could see an impact on their access to funding and/or the profitability of their letting activities (due to either higher deposit requirements or higher spreads on their mortgage interest rate). As a result, some may choose not to enter the market, and invest their savings elsewhere. Others may choose to invest with more equity.²⁵
41. The profitability of mortgage brokers/intermediaries could also be affected if the policy were to slow the volume of buy-to-let lending. Market intelligence suggests around 95% of buy-to-let lending is through the intermediary channel. As noted above, the Government's consultation will seek further views on any potential impact on profitability.

Impact on market structure

42. Like the owner-occupier mortgage market, the UK buy-to-let mortgage market is concentrated. The largest five buy-to-let lenders currently account for 63% of new lending by value, compared to 66% for the owner-occupier market. This concentration has fallen significantly since the immediate post-crisis period as lenders that exited the market at that time have since returned, and some new challenger banks have entered the market. However, as mentioned above, the smaller lenders tend to be more active in the high LTV markets (Table 1) and typically tend to use lower interest rates in their ICR calculations. To the extent that these lenders are most affected by an FPC policy the market may become more concentrated. But this will depend on how different lenders respond to a potential policy.

Table 1 – buy-to-let lending market shares (by value)

	Market share of 'top 5' lenders	Market share of 'rest of the market'	Market share of 'top 5' lenders for LTV>75	Market share of 'rest of the market' for LTV>75
Q3-Q4 2007	40%	60%	46%	54%
2008	55%	45%	58%	42%
2009	87%	13%	76%	24%
2010	87%	13%	78%	22%
2011	81%	19%	84%	16%
2012	76%	24%	76%	24%
2013	74%	26%	67%	33%
2014	70%	30%	53%	47%
Q1-Q2 2015	63%	37%	38%	62%

Source: Bank of England Mortgage Lenders and Administrators Return (MLAR).
Notes: This table uses MLAR sample for unregulated lending, of which around 87% is buy-to-let lending.
'Top 5' refers to the five largest buy-to-let lenders by value of gross new lending. 'Rest of the market' excludes these 'Top 5'.
The threshold of 75% for high LTV lending is used for illustration purposes only, and does not represent the Government or the FPC's view on the potential threshold for high LTV lending.

²³ See PRA Policy Statement PS9/14 'Implementing the FPC's recommendation on loan to income ratios in mortgage lending' <http://www.bankofengland.co.uk/prs/Documents/publications/ps/2014/ps914.pdf>

²⁴ Data collected for the Bank's Supervisory function suggests that 88% of outstanding buy-to-let loans are to landlords with less than 5 properties. The underlying regulatory data from which this fact is calculated is confidential.

²⁵ As explained in section E, given the ICR and LTV tools are quite closely related, an increase in equity/deposit can both reduce the LTV on a given loan and increase the ICR.

43. If reductions in high LTV or low ICR lending by smaller lenders were offset by larger lenders not directly affected by the limits, the market share of large lenders could increase. However, these firms may not wish to increase their risk appetite, in which case both the share of lending at high LTV/low ICR, and the total volume of lending, could fall. Another option for firms with high LTV (or low ICR) lending exceeding an FPC limit could be to increase the absolute value of their lending which meets the criteria.
44. An FPC Direction will only apply to entities regulated either by the PRA or the FCA.²⁶ A power of Direction could be accompanied by a Recommendation to the regulators to use the full extent of their powers, so that as many firms as possible become subject to policy measures. However, there will be some firms who will not be captured. This means there is a risk of regulatory arbitrage, with lending that is prevented due to a Direction or Recommendation migrating to unregulated institutions. If it saw fit to do so, the FPC has the power to issue a Recommendation to HM Treasury to extend the regulatory perimeter.

Impact on 'effective' competition²⁷

45. A market may be considered to demonstrate effective competition if rivalries between suppliers of a product/service enable the benefits of competition to materialise. For consumers, the benefits of competition include lower prices, better quality, and greater choice. To suppliers, the benefits allow them to earn a return commensurate with the level of risk taken, and to enter, expand or exit the market without encountering significant barriers.
46. It is difficult to fully assess the impact of a tool on effective competition without knowing the calibration and the market conditions prevailing at the time of implementation. But the tools could help facilitate effective competition if lenders that are more affected were under-pricing risks or driving down underwriting standards to pursue short-term profits. Such lenders generate negative externalities; through either barriers to entry and expansion for new and existing competitors unwilling to under-price risks, or an increase in excessive risk-taking as rivals follow suit in driving down underwriting standards in order to remain competitive.
47. However, the tools could also pose a tension for effective competition if lenders who are more affected have adequately prudent business models. For example, a lender specialising in higher LTV lending could see its business severely affected, even if its business model was economically viable with appropriate pricing of risk and sufficient capital to deal with losses.

Benefits

Reduction of risks

48. If the FPC were to give a Direction to regulators to impose an LTV or ICR limit on buy-to-let mortgages the (indirect) benefits would, as discussed in the introductory section of this assessment, mainly be through a reduction of risks to financial stability through the credit risk channel and the reduction in the potential for the buy-to-let sector to amplify the house price cycle. This would have positive impacts on a wide range of sectors across the economy, including financial and non-financial businesses and households. Section C1 sets out the evidence for the materiality of these risks, and how the proposed tools could

²⁶ Over the year to June 2015 unregulated entities accounted for around 3% of buy-to-let mortgage lending

²⁷ The cost-benefit analysis that the FPC is required to publish, where practicable, when using its powers of Direction, will include a more detailed assessment of the impact on the chosen tool and calibration on 'effective' competition.

reduce the risks. Section C.2 uses models to quantify the extent to which the proposed tools can reduce these risks.

49. Evidence suggests that individual buy-to-let mortgages tend to pose a higher credit risk than owner-occupier mortgages. For example, loan-level analysis from the Central Bank of Ireland (CBI)²⁸ on UK mortgages found that in the 2009-13 period the probability of default (PD) for buy-to-let mortgages was 36% higher than for owner-occupier mortgages when other factors such as LTV and the economic environment are controlled for. Given only a small share of buy-to-let lending is extended at high LTV ratios currently, the losses in the event of default (loss given default or LGD) may be contained when house prices fall moderately. However, given, buy-to-let mortgages are typically extended on interest-only terms and therefore do not amortise LTV ratios on buy-to-let loans fall more slowly over time. This means loss given default on the stock of buy-to-let lending is disproportionately vulnerable to very large falls in house prices.
50. According to MLAR data, write-off rates for lending outside the scope of conduct regulation (of which around 87% is buy-to-let) have been double that of owner-occupier lending over the period since 2008. The impact of this credit risk on financial stability will increase as the buy-to-let market expands. By way of illustration, assuming write-off rates on the aggregate buy-to-let portfolio of UK lenders remain double that of the owner-occupier portfolio, credit losses on the two portfolios could be equalised if the buy-to-let share of the mortgage book expanded from its current 16% to 33%.
51. LTV or ICR limits could reduce the credit losses on buy-to-let mortgages by reducing both the probability of default (PD) and the loss given default (LGD). The CBI study found that for all UK mortgages a one percentage point increase in LTV leads to a one percent increase in the probability that a mortgage defaults, and that this relationship is considerably stronger for buy-to-let loans than for loans to owner-occupiers. Similarly, data collected for the Bank of England's Supervisory function²⁹ shows that, at end-2014, 4% of buy-to-let mortgages of the six largest mortgage lenders with a current LTV above 80% were in arrears of more than three months' payments, compared to 0.6% of mortgages with LTV less than 80%. The same data shows that at end-2014 2.4% of mortgages with an ICR below 125% were in arrears of more than 3 months, compared to 0.8% of mortgages with an ICR above 125%. Therefore, limiting the flow of high-LTV mortgages and/or low ICR mortgages could reduce the portfolio share that defaults in the event of a shock. The use of an LTV tool could also reduce total losses for a given number of defaults.
52. LTV or ICR limits could also reduce the scale of the amplification channel. In an environment of rising house prices, buy-to-let borrowers can take advantage of capital gains and extract equity to expand their portfolio, boosting house prices further. Research from the US and Ireland provides evidence for this dynamic. Haughwout et al³⁰ found that, in the 2000's boom, US states that saw bigger booms and busts in house prices tended to have bigger, and faster growing, shares of borrowers in the housing market. And research by the CBI³¹ finds that the share of buy-to-let borrowers in the market is positively correlated with a measure of overvaluation. Overvaluation may lead to an unsustainable increase in household indebtedness by all mortgagors. This can compromise their ability to pay their

²⁸ McCann, F, (2014) 'Modelling default transitions in the UK mortgage market' Central Bank of Ireland Research Technical Paper 18/RT/14.

²⁹ The underlying regulatory data from which this fact is calculated is confidential.

³⁰ Haughwout, A, Donghoon, L, Tracy, J, van der Klaauw, W, (2011) 'Real Estate Investors, the Leverage Cycle, and the Housing Market Crisis', Federal Reserve Bank of New York Staff Reports no. 514.

³¹ Coates, D, Lyndon, R, McCarthy, Y, 'House price volatility: the role of different buyer types', Central Bank of Ireland Economic Letter Series, Vol 2015, No.2.

mortgage and maintain their spending in the face of a shock, which is a clear risk to financial stability. An LTV limit would reduce the scale of this channel by reducing both the amount of equity borrowers can withdraw when remortgaging, and the scale of investment they can make with this equity. An ICR limit could also help by linking loan sizes to rental income, which in general tends to be less cyclical than house prices.

53. The proposed tools could also reduce the scale of the downward amplification channel. In an environment where the returns on buy-to-let investments no longer appear attractive, perhaps due to rising interest rates, lower rents, or expected falls in house prices, there could be a 'fire-sale' of buy-to-let properties – where a large number of mortgaged buy to landlords choose to sell their property at the same time. That could have negative impacts on the wider economy if it exacerbates the scale of a house-price fall during a downturn. It would increase credit losses in the event of a mortgage default, and reduce value of housing collateral against which to borrow reducing the consumption spending of home-owners.
54. The scale of this channel will be determined by a number of factors, including: the impact of a fall in ICRs on the incentives for buy-to-let borrowers to exit the market; the effect of these sales on house prices; and the impact of house prices on consumption. On the first of these, responses to the Bank's NMG survey³² suggest that around 40% of buy-to-let borrowers say they would sell their property if rental income was insufficient to cover mortgage costs (that is, if their ICR at their prevailing interest rate fell below 100%). An ICR limit can help to protect borrowers from this eventuality arising, either from a rise in interest rates or fall in rents. In this way, it reduces the potential for this risk to arise.
55. Hence, through a reduction in these risks to financial stability, both tools could reduce the costs of a financial crisis. The reduced credit losses through lower probability of default, loss-given default, and lower likelihood of fire-sales by vulnerable borrowers pushing down house prices further, would reduce the costs to banks (and Government) in repairing banks' balance sheets. Lower likelihood of fire-sales also benefits financial stability, as fire-sales can reduce GDP through home-owners cutting back their spending in a response to the fall in their mortgage collateral, which can also have knock-on effects on credit losses on other types of lending. And by reducing the scale of a potential house price boom, the tools can temper increases in household indebtedness for all mortgagors, which, as discussed in the introduction, reduces the vulnerability of these households and potentially reduces the costs of the FPC's LTI policy for this sector. Section C2 provides a more quantitative analysis of the scale of these effects.
56. The benefits of LTV tools are further supported by their use internationally. LTV limits are the most common form of macro-prudential tool used for housing, and where they are used loans for buy-to-let tend to be treated in the same way as loans to owner-occupiers. An exception is for two of the countries with buy-to-let sectors arguably the most similar to the UK (i.e. dominated by a large number of small amateur landlords) – where LTV policies are *tighter* for the buy-to-let sector. In 2015 the Central bank of Ireland announced that only 10% of buy-to-let mortgages should exceed an LTV ratio of 70%.³³ This compares to equivalent LTV limits of 90% for first-time buyer loans, and 80% for home-mover loans. Similarly, in 2015 the Reserve Bank of New Zealand (RBNZ) announced new regional LTV restrictions due to the accumulation of housing market risk in Auckland.³⁴ This stated that a maximum of 5% of new buy-to-let mortgages in this region should exceed an LTV ratio of

³² The analysis relating to this finding are not published in the public domain, but the underlying data can be accessed from the Bank of England website: <http://www.bankofengland.co.uk/research/Pages/onebank/datasets.aspx>

³³ Central Bank of Ireland (2015) 'Information Note: Restrictions on residential mortgage lending' <http://www.centralbank.ie/press-area/press-releases/Documents/CP87%20Information%20Note.pdf>

³⁴ See relevant Reserve bank of New Zealand webpage http://www.rbnz.govt.nz/financial_stability/loan-to-value_ratio/

70%, compared to a maximum of 10% of loans to owner-occupiers above an LTV ratio of 80%.

57. There do not appear to be any examples of ICR tools being used internationally for macro-prudential purposes.

Other economic externalities

58. The implementation of an LTV or ICR policy would have some additional economic effects stemming from a redistribution of resources between different agents, but these would be marginal, particularly in comparison to the benefits gained from the reduced impact of a financial shock. For example, if the banking sector faces some limitations in its lending capacity – for instance, due to the cost of raising new capital – then lower buy-to-let lending may free up some ‘capacity’ for lending to support productive activity elsewhere in the economy.
59. A reduction in the volume of new buy-to-let lending would also mean a slower expansion of the private rental sector (PRS), though the magnitude of this is unclear³⁵. This could lead to increased rents and reduce discretionary income and consumption of renters.

C. 2 Quantification of net impact

60. In practice, the costs and benefits associated with the FPC using a power of Direction over buy-to-let lending will depend on the situation in which the tools are used. For illustrative purposes, the analysis presented in this section aims to shed some light on the scale of those costs and benefits by modelling a range of hypothetical scenarios. Each scenario evaluates the use of one tool, but the close relationship between ICR and LTV (discussed in section E) means that, under certain calibrations, the results could be similar in magnitude if using the other tool or a combination of the two. The reasons why the FPC might choose one tool over another are also discussed in section E.
61. It is not possible to quantify all of the costs and benefits discussed in Section C.1. The following scenarios use macroeconomic and financial system models to estimate these costs and benefits as far as is possible. The main cost considered is the reduction in GDP that stems, via tighter credit supply, from the reduction in buy-to-let mortgage lending driven by a particular policy tool. The benefits of policy action that can be measured are:
- the reduction in credit risk for banks (Scenarios 1 and 2)
 - the reduction in the potential scale of a buy-to-let fire-sale (the downward amplification channel), and the impact of this on house prices, and in turn on household consumption and GDP (Scenario 2)
 - the reduction in the extent to which buy-to-let borrowers amplify the scale of house price rises, the impact of this on indebtedness of owner-occupiers and the extent to which the FPC’s LTI policy on owner-occupiers affects potential home-buyers (Scenario 3).

The technical annex provides more detail on the modelling.

³⁵ Analysis from the Bank of England suggests that if a policy reduced the flow of buy-to-let mortgages by 10%, annual growth in the stock of PRS properties would be a maximum of 0.5% lower (assuming no substitution by cash buyers and institutional investors). Research from the Intermediary Mortgage Lenders Association suggests buy-to-let has been responsible for over 50% of the additional properties in the PRS from 1996 to 2012.

62. The main costs not explicitly measured through models include the direct costs to lenders in terms of administration and profitability, the impact on the private rental sector and rents, the impacts on small and micro businesses and on 'effective' competition. Wider discussion of these costs, and numbers to quantify where possible, are provided in section C.1. The main benefits we cannot measure quantitatively are the wider impacts on the economy and financial system of the direct risks we identify.
63. The quantitative estimates discussed in these scenarios should always be treated with caution as there is considerable uncertainty surrounding them. For example, it is possible that the business models of lenders could have interacted with these policies in unanticipated ways, either muting the benefits or creating additional costs. In general, the numbers should be taken as indicative of the rough size of effects, rather than precise estimates.

Scenario 1

64. This scenario considers the hypothetical case in which a policy was implemented in 2004 Q1 that prevented each lender from conducting more than 15% of its buy-to-let lending at an LTV of greater than 75%. This would have prevented a large part of the flow of new lending with an LTV ratio above 75% that actually occurred pre-crisis, and instead brought underwriting standards during this period (in terms of LTV) closer to current levels.
65. The baseline for the scenario is no policy. Data on underwriting standards prior to 2007 are not available, but market intelligence suggests that the share of new buy-to-let mortgages with LTV ratios greater than 75% in 2004 was around 50%. Data for 2007 indicate that standards had deteriorated, such that 65% of lending was done with an LTV greater than 75%. The mechanical impact of the policy is therefore to reduce buy-to-let lending for house purchase by 35% in 2004 and 50% in 2007. But, as the crisis takes hold, the policy ceases to have an impact as actual underwriting standards tightened significantly; the share of lending above 75% LTV fell to 11% in 2009.

Costs

66. The policy constitutes a tightening in credit supply. According to a number of studies, such tightening can have a negative impact on GDP growth, although the scale of this impact appears fairly small. Based on the share of mortgages affected, and using an empirical model that relates lending spreads, lending quantities and spending in the economy, the policy is broadly equivalent to an increase in mortgage spreads of around 20-30bp, which could have a small negative impact on the level of GDP.³⁶ The maximum cost in terms of GDP would have been in 2006 at 0.2% of GDP, however the economic costs would have fallen to zero in post-crisis years. Furthermore, monetary policy could have reacted to offset any effect on the real economy. Estimates suggest that Bank Rate is likely to have been very slightly (around 10bp) lower under this policy scenario. Given this, the cumulative costs in terms of GDP between 2004 Q1 and 2012Q4 are between zero and £7.5bn (around 0.05% of average GDP per annum), depending on the extent to which the impact is offset by monetary policy.
67. The policy could also have affected the size of the private rental sector. The estimated reduction in buy-to-let lending over the three year pre-crisis period could have resulted in a PRS stock that was up to 10% smaller by 2007 (assuming there was no offsetting increase by cash-buyers and institutional investors). As a worst case this could push up rents and reduce discretionary income and consumption of renters.

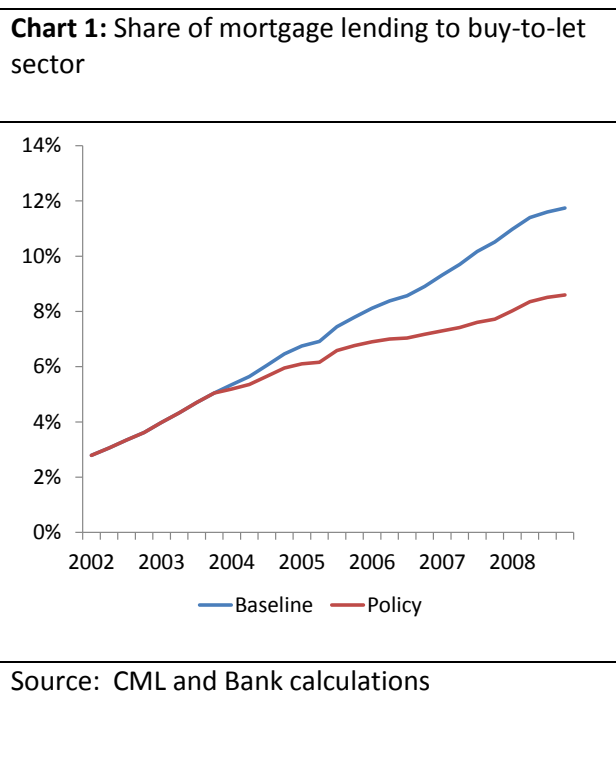
³⁶ See 'A sectoral framework for analysing money, credit and unconventional policy' Cloyne et al (2015), which uses a vector-error correction approach to model the relationships between credit, money and spending at a sectoral level. More details are given in the Technical Annex.

Benefits

68. It is estimated that such a policy would have reduced the growth of buy-to-let debt during the pre-crisis period significantly such that, in 2007 Q4, the stock of buy-to-let debt would have been around £30bn lower, albeit still a growing share of the overall mortgage stock (Chart 1).

69. A key benefit from this policy would have been lower credit losses in the crisis. Estimates from the Bank of England's in-house credit loss models suggest that, under the scenario, losses faced by UK banks in the crisis would have been around £1.0bn lower (around 0.7% of Core Tier 1 capital at the time).

70. There may also have been indirect, as well as direct, benefits to the financial system from lower buy-to-let credit losses. That is, if banks had suffered fewer losses, they may have faced less stringent funding conditions and the resulting contraction in credit to the wider economy may have been milder. Cloyne et al (2015)³⁷ estimate that the overall impact of the tightening in credit conditions in the crisis may have had a peak impact on the level of GDP of between 5-6%. A policy of this type may have been especially helpful in avoiding problems faced by particular lenders who had built up large buy-to-let portfolios with risky characteristics and subsequently required public assistance. For example, following the house prices falls in the post-crisis period one lender had a portfolio in which 75% of their loans had a current-LTV of over 75%.



71. A reduction in buy-to-let lending would also have had spillover effects on other parts of the economy, including through the dampening of pre-crisis house price rises. That would have meant that owner-occupiers took on less debt, although models suggest these effects would have been small. There was, however, no evidence during the crisis of a 'fire-sale' of buy-to-let properties which policy could have prevented. This is likely to reflect the path of Bank Rate following the crisis. Consequently, this scenario does not include a fire sale. (Scenario 2 presents an alternative in which a housing downturn occurs simultaneously with higher interest rates, leading to a fire sale.)

Net impact

72. Overall, it is difficult to quantify the extent to which the benefits from an LTV policy outweigh the costs in this hypothetical pre-crisis scenario. But the macroeconomic costs appear small,

³⁷ See 'A sectoral framework for analysing money, credit and unconventional policy', Bank of England Staff Working Paper no. 556, <http://www.bankofengland.co.uk/research/Pages/workingpapers/default.aspx>

particularly if monetary policy is assumed to be able to offset the impact of slightly tighter credit conditions.

Scenario 2

73. This scenario considers a hypothetical situation in which financial policymakers decided to implement a policy in 2011 Q1 that prevented banks from conducting lending at an ICR lower than 125% based on a 7% stressed interest rate.³⁸ The effect of this policy on both the credit risk and downward amplification channels discussed earlier are considered, in the context of a scenario broadly similar to that considered by the Bank of England in its 2014 Stress Test scenario³⁹. The scenario featured a significant house price fall (35% peak-to-trough) and simultaneous interest rate rise (Bank Rate rises from 0.50% to 4.20% over the three-year horizon)⁴⁰, and was applied to the buy-to-let portfolios of the UK's six largest mortgage lenders (referred to henceforth as the B6).
74. Given that mortgages with low ICR ratios that are eliminated by this policy tend to have higher LTV ratios, the stressed ICR policy limit also reduces the number of high LTV mortgages. This creates a new LTV distribution that is a key input for the Bank of England's credit risk models which are used here to estimate banks' impairments on their buy-to-let portfolios.
75. The benefits of the policy in reducing credit risk are estimated by comparing the model-based estimates of stressed credit losses incurred by the B6 banks over the five-year period from end-2013 (the point at which the 2014 Stress Test scenario begins) with and without the policy implemented in 2011. The benefits in reducing the downward amplification channel are analysed by considering the scale of house price fall resulting from this scenario, the scale of the fire-sale that this could generate, and the resulting impact on house prices, consumption and GDP.

Costs

76. The policy constitutes a tightening in credit supply. As noted in Scenario 1, a number of studies suggest that such tightening can have a negative impact on growth, though the scale of this impact appears fairly small in this case. Based on the share of mortgages affected, the policy is likely equivalent to an increase in mortgage spreads of around 15-20bp. Standard multipliers suggest that such an increase in spreads would have a small impact on the level of GDP, peaking at less than 0.2% in 2013, and equal to an average of around 0.08% of GDP per annum over the period. House prices by the end of 2013 would also be approximately 0.5% lower and the stock of owner-occupied debt around 0.5% higher. As in Scenario 1, these impacts could be mitigated by a loosening of monetary policy.

Benefits - credit risk

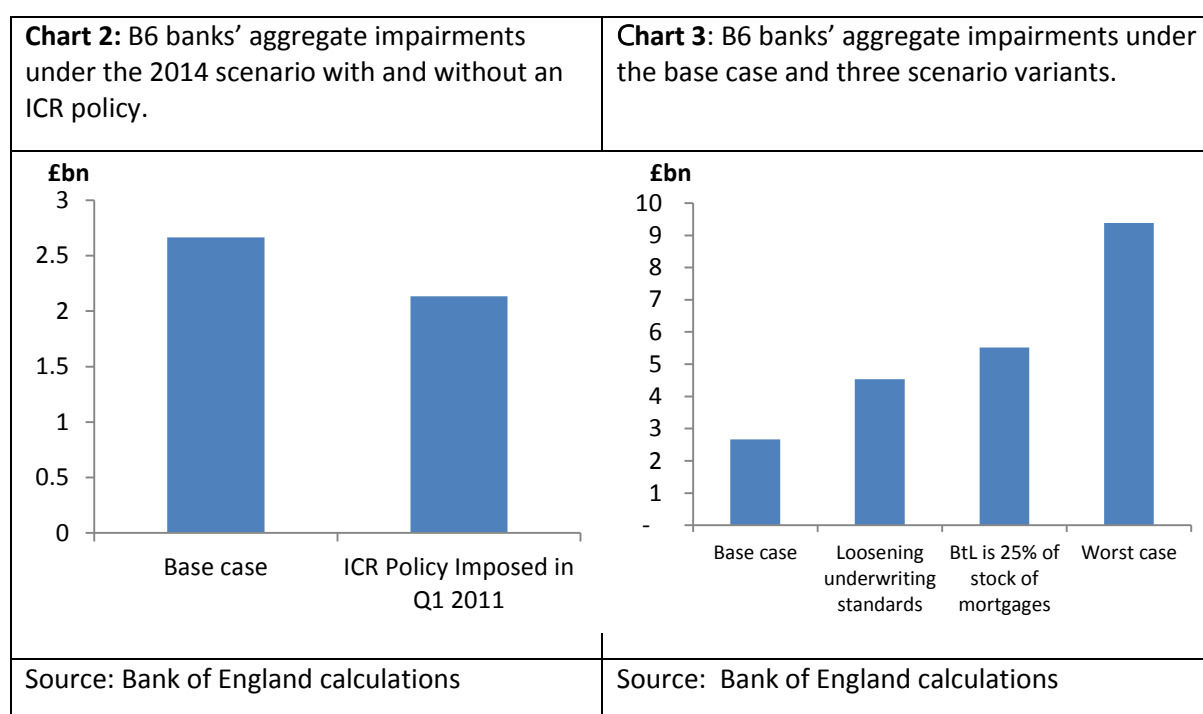
77. The policy is estimated to reduce the flow of new buy-to-let mortgages over the period 2011-13 by around 65% as many borrowers would no longer meet the ICR eligibility criteria. Given that higher ICR mortgages – which are unaffected by the policy – tend to have lower LTV ratios, the LTV distribution of this new flow of lending is also less risky (and this is what is modelled explicitly in the Bank's credit risk models).

³⁸ 7% is used as an illustrative example only. It is not indicative of a potential policy calibration.

³⁹ For more detail on the 2014 Stress Test scenario see <http://www.bankofengland.co.uk/financialstability/Documents/fpc/keyelements.pdf>

⁴⁰ Although the Stress Test scenario was based on a sharp increase in Bank Rate, there are shocks beyond monetary policy which could affect buy to let mortgage rates – ie, an increase in mortgage rates related to a sharp increase in banks' funding costs.

78. The cumulative impact of this policy on banks' balance sheets is, however, fairly small. This largely reflects the fact that the flow of new buy-to-let mortgages, relative to the stock, was much lower (by around 75%) during 2011-2013 than in the run-up to the crisis. Consequently, the reduction in the flow of buy-to-let lending implies a stock of buy-to-let debt only around £14bn, or 8%, lower in 2013 Q4 than if no policy had been implemented. The impact of the policy on the ICR and LTV distribution of the stock of buy-to-let mortgages at end-2014 is further limited by the fact that underwriting standards over the implementation period were in any case more robust than in the pre-crisis period.
79. The Bank's credit risk models suggest that under the base case, where no policy was implemented in 2011, the aggregate impairment charge for the B6 banks over the subsequent five year horizon would have been £2.7bn. Applying the ICR tool in 2011 would have reduced this figure by £0.6bn, to £2.1bn (Chart 2).



80. This scenario does not take into account the possibility that buy-to-let lending could become riskier in the period prior to a shock similar to the 2014 Stress Test scenario, leading to a more severe outcome that the FPC may wish to insure against. That could occur if underwriting standards deteriorated, the buy-to-let sector grew rapidly, or through a combination of these factors. So the variants of the scenario presented below show the aggregate stressed impairment charges the FPC could in future be seeking to insure against, implying a much larger potential impact of an ICR limit on credit risk (Chart 3).

- To investigate the impact of a plausible loosening in underwriting standards, the actual LTV distribution on the aggregate stock of buy-to-let lending is replaced by the LTV distribution of the riskiest of the B6 lenders as at 2013 Q4. This could have been the case, for example, if the market had been more competitive over the period from 2011-2013.⁴¹ Under this scenario, the aggregate stressed

⁴¹ As explained above given lower ICR mortgages tend to have higher LTVs, the FPC could have insured against this deterioration in LTV ratios using an ICR or LTV policy. The link between the two tools is explained in detail in section E.

impairment charge the FPC would have been seeking to reduce would have been £4.5bn rather than £2.7bn.

- To investigate the impact of more rapid growth in the buy-to-let sector, a case where buy-to-let as a share of total mortgages is 25%, 11pp higher than in our original scenario, is considered. Under this scenario, the aggregate stressed impairment charge would have been £4.8bn. This would have required growth in buy-to-let lending to have increased to its pre-crisis (2005-2007) rate in the years following the crisis (2010-2013). Based on current growth rates, the buy-to-let share could reach this level by 2023.
- Finally, given that rapid lending growth and deteriorating underwriting standards often coincide, these scenarios are combined to generate a 'worst case' variant. In this case aggregate impairments reach £9.4bn (more than three times greater than in the base-case scenario) following a severe housing market stress.

81. In terms of the impact of an ICR policy under these alternative variants, one assumption is that such a policy could bring about the same impact as when it was applied to the base case. Credit losses in this case were just £2.1bn, £7.3bn lower than under the no-policy 'worst case' variant of £9.4bn.

Benefits - downward amplification

82. Scenario 2 can also be used to consider the scale of the risks associated with the downward amplification channel, under both base case and worst case variants. In particular, the modelling presented here considers the impact of higher interest rates on the ICR distribution of the stock of buy-to-let lending and hence the risk that some landlords would find that their investments become uneconomic on a cash flow basis and consider selling their properties, with knock-on effects for the macroeconomy.

83. That modelling suggests that, in the absence of policy, the substantial (3.7pp) rise in interest rates in this scenario would result in the ICR ratio of 54% of mortgaged buy-to-let properties falling below 100% (ie, not breaking even on a gross income basis) in the base case described earlier, and 65% falling below 100% in the worst case variant, where the buy-to-let sector has expanded to 25% of the mortgage stock and underwriting standards have deteriorated.⁴² The impact of that on the macroeconomy will further depend on a number of assumptions including: the extent to which an ICR less than 100% causes buy-to-let borrowers to exit the market; the mapping from property fire sales to house prices; and the impact of house price falls on the consumption of both owner-occupiers and buy-to-let borrowers.

84. Table 2 uses 'central' and 'conservative' estimates for these three key assumptions to show the potential impact of an interest rate shock on house prices, consumption and GDP under both the base case and worst case scenario variants.

85. To estimate the 'central' case it is assumed that:

⁴² In the worst-case variant the ICR distribution of the stock of aggregate buy-to-let lending is assumed to be the same as the riskiest ICR distribution of the B6 lenders as indicated by unpublished supervisory data for end-2014. This is broadly the same assumption as made for the credit risk modelling in this scenario, which relied on the riskiest LTV distribution given LTV is the key input for the credit risk models used.

- 40% of buy-to-let borrowers that have ICRs below 100% after the interest rate shock sell their properties (consistent with survey evidence described in footnote 30), and one quarter of these sales occur through foreclosure.
- the effect of these sales on house prices can be modelled using a house price equation popularised by housing academic Geoff Meen (see, for example, Auterson (2014)⁴³), together with an additional effect from foreclosures which is based on empirical evidence from the US.
- the effect of falling house prices on consumption is consistent with empirical estimates from the UK academic literature, which tend to find evidence of collateral but not pure wealth effects – and therefore this multiplier is relatively small.

86. The ‘conservative’ assumptions assume that 25% of borrowers with an ICR between 100% and 125% after the interest rate shock also sell their properties, and that the latter two effects are twice the size. This reflects uncertainty around the extent to which survey evidence and previous trends may be reliable for predicting relationships during a crisis in which non-linearities may occur. For example, the impact of falling house prices on consumer spending may be greater during a crisis if it is accompanied by weakness in households’ expectations of disposable income growth or if weakness in the buy-to-let market spills over into tighter credit conditions for owner occupiers or other real economy borrowers. The estimates based on these conservative assumptions are large, and should be considered a maximum impact.

87. Table 2 shows that under the base case variant of the scenario the actions of buy-to-let borrowers in response to the interest rate hike could lead to house price falls of between 12% and 30% (in addition to the standard impact of interest rates on house prices), depending on whether the central or conservative assumptions are used. This could result in a fall in consumption of around 0.3% to 1.5%, and a fall in GDP of 0.2% to 1%. But under the worst-case variant, where the buy-to-let market is bigger and the quality of lending weaker, the actions of buy-to-let borrowers could reduce house prices by between 25% and 59% depending on the assumptions used. This could result in a fall in consumption of between 0.6% and 3%, and a fall in GDP of 0.4% to 1.9%. In these circumstances, the benefits of a policy to reduce the build-up of buy-to-let borrowers with low ICRs following an interest rate shock could be large.

Table 2 – Impact of a ‘fire-sale’ by buy-to-let borrowers following a 3.7pp shock to Bank Rate

	Assumptions	Impact on house prices	Impact on consumption	Impact on GDP
Base case	Central	-12%	-0.3%	-0.2%
	Conservative	-30%	-1.5%	-1.0%
Worst-case	Central	-25%	-0.6%	-0.4%
	Conservative	-59%	-3.0%	-1.9%

Source: Bank of England calculations

Net impact

88. It is difficult to weigh up precisely the effects of an ICR policy in this scenario, but the potentially large benefits appear to outweigh the fairly small costs particularly when this tool

⁴³ Auterson, T (2014), ‘Forecasting house prices’, OBR Working Paper no.6.

is viewed as an insurance policy against the materialisation of the worst-case variant. The policy has the potential to reduce aggregate impairments in the mortgage book considerably at a time when banks' capital may be under stress due to losses incurred in other areas of the balance sheet. This could reduce the severity and impact of a crisis. It could also reduce significantly the scale of the resulting fall in house prices, which may lower the negative impact of a crisis on GDP and in turn back onto the broader financial system.

Scenario 3

89. An ICR tool could also mitigate the impact that buy-to-let lending can have in amplifying a house price cycle in its upward stage, with knock-on implications for household indebtedness. This scenario illustrates the potential scale of that impact.
90. Under this scenario, the total stock of mortgages is assumed to be growing at a rate of around 15% per annum, as it did in the 2003-4 period.⁴⁴ House prices are assumed to grow at 16% per year, also broadly in line with the 2003-04 episodes. However, in contrast to that period, the majority of net mortgage lending is assumed to be extended to the buy-to-let sector, in line with the average seen over the past two years.
91. This scenario is not a central case. Given the current size of the buy-to-let market, this scenario would require very rapid growth rates in the stock. However, as the buy-to-let sector becomes larger, its potential to amplify house price rises is likely to grow.
92. An ICR limit could be a useful tool for limiting the negative effects of such a surge in buy-to-let lending. If, for instance, the ICR distribution of buy-to-let lending in this scenario were the same as in the five quarters to 2015 Q1 and buy-to-let lending had put additional pressure on house prices, a policy to limit ICRs at 125% with 7% stressed interest rates would reduce the flow of buy-to-let lending by 60%, and so reduce the impact of buy-to-let lending on house prices, leaving prices 10% lower after five years.⁴⁵ This would have significant benefits in reducing the indebtedness of the owner-occupier sector that would otherwise arise from higher house prices.
93. The FPC already has two Recommendations in place to insure against the risks from an increase in the share of highly indebted owner-occupier households (see Introduction Section). The FPC currently judges that, in a central case, its LTI Recommendation will not significantly affect the owner occupier mortgage market over the next few years. However, that central case is one where house prices rise gradually relative to incomes. If buy-to-let were to contribute to house price growth, a buy-to-let ICR limit could prove more effective, and less costly, in moderating household indebtedness than relying on the LTI flow limit alone.
94. This interaction between buy-to-let and owner-occupier policies can be explored using a model developed at the Bank of England that projects the loan-to-income (LTI) distribution of owner-occupier mortgages under various assumptions – including house prices – and calculates the impacts of the FPC's LTI recommendation.⁴⁶ To illustrate the possible adverse impacts of a buy-to-let boom, the effect of an additional increase in house prices of 10% over a three year period (holding other assumptions in the model fixed) is estimated.⁴⁷ The

⁴⁴ The buy-to-let sector emerged during this period, and grew as a share of the stock. However, the vast majority of net lending during this period was to owner-occupiers, and owner-occupiers probably played the dominant role in driving higher prices.

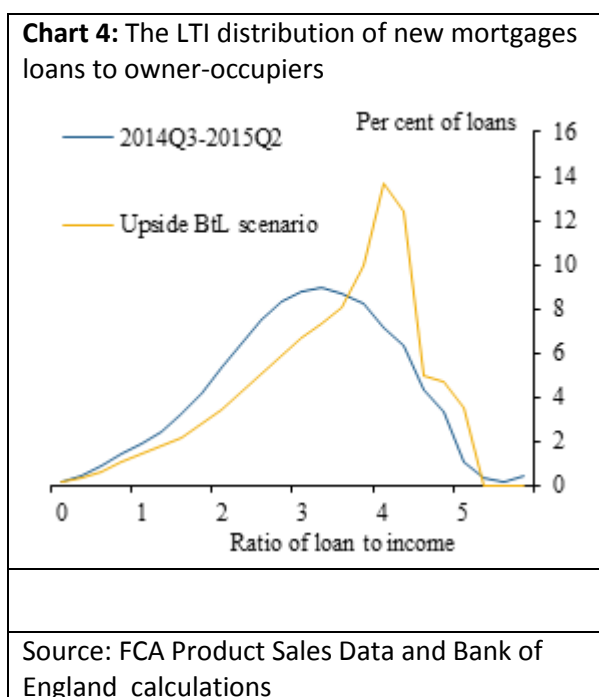
⁴⁵ This is assuming that mortgage rates at origination are similar to those over the five quarters to 2015Q1. Mortgage rates could either be higher – if such a scenario took place at a point where monetary policy had normalised – or lower – if buy-to-let spreads had fallen in the scenario.

⁴⁶ For more detail about this model, see <http://www.bankofengland.co.uk/prd/Documents/publications/cp/2014/cp1114.pdf>

⁴⁷ The distribution of the mortgage flow depends on many variables and factors which would probably be different in a future scenario. For simplicity only the effect of prices is considered here, as this is the main channel through which the buy-to-let sector could impact the distribution of indebtedness of owner-occupiers.

additional house price inflation increases the share of borrowers who do not get a loan at all as a result of the LTI limit from 0.2% of the flow to 0.9%. And almost three times as many borrowers (11% compared with 4%) are forced to reduce the size of their loan.

95. In addition, as prices are pushed up faster, more of the mortgages of new owner-occupiers become 'bunched' just below the 4.5 LTI limit (Chart 4). As well as increasing the compliance costs for firms, this bunching behaviour would undermine the effectiveness of the FPC's policy in limiting risks from owner-occupier indebtedness. To contain those risks, the FPC might need to tighten the LTI policy. If it were available to them as a power of Direction, the FPC could judge that an ICR limit on buy-to-let – in combination with existing owner-occupier policy on LTI ratios – was a more effective policy package than relying only on owner-occupier measures.



96. In summary, were buy-to-let lending to contribute to house price growth in the future, this would increase the cost and reduce the effectiveness of existing policies designed to insure against growth in the share of highly indebted owner-occupier households. In such a situation, introducing a policy to limit slippage in buy-to-let underwriting standards could have significant indirect benefits.

D. Rationale to justify the level of analysis used in the IA

97. This impact assessment has been completed on the basis of comparing the options of not granting the FPC powers of Direction and the FPC taking no action in the face of risks, and the FPC being granted powers of Direction and utilising them accordingly.

98. As mentioned earlier, there are several different calibrations that the FPC could apply when using LTV or ICR limits and it is infeasible to model these exhaustively. Providing quantitative estimates based on a range of scenario analysis is proportionate and useful in illustrating the costs and benefits. However, given that it only provides the costs and benefits for that particular calibration, it is prudent to conclude that the cost and benefits of this legislation are not monetisable.

99. The buy-to-let mortgage market has a short history, and as a result data and models available to analyse this sector are limited. For the quantitative analysis of the impact of LTV limits, data on firms' non-regulated residential loans to individuals by LTV was used. For the quantitative analysis of the impact of ICR limits, data from the CML buy- to-let Mortgage Survey was used. Given the limited data on the distribution of ICRs on the stock of lending, credit risk models do not include this variable. Therefore, to model the impact of an ICR policy on credit losses it was necessary to 'map' an ICR distribution into an LTV distribution using a number of assumptions.

100. Although a precise cost-benefit analysis is not included in this document, the FPC will be required to, where practicable, publish, a cost-benefit analysis specific to the calibration of

the tool they are considering. The cost-benefit analysis will vary each time the FPC changes the calibration of a tool.

E. Interactions between the ICR and LTV tools

101. The two tools for which the FPC has requested powers of Direction over are related. The equation below demonstrates that for a given house price, rental yield and stressed interest rate, a limit applied to either of the tools could have the same impact on lending.

$$ICR = \frac{\text{rental income}}{\text{interest payment}} = \frac{\text{rental yield} \times \text{property value}}{\text{interest rate} \times \text{loan}} = \frac{\text{rental yield}}{\text{interest rate}} \times \frac{1}{LTV}$$

102. However, there are benefits to the FPC having powers of Direction over both tools, which relate to the relevant benefits discussed in Section C. In short, if the FPC were concerned about the upward amplification channel, an LTV tool may be more appropriate and straightforward. An LTV limit reduces the scale of this channel by reducing the scale of investment a borrower can make with a given amount of equity, and reducing the amount of equity existing borrowers can withdraw by remortgaging. Converting an LTV limit to a corresponding ICR limit would require making some assumptions on rental yield which can differ among regions, and among different type of properties.

103. Having a LTV tool alone, however, is not sufficient. An LTV limit does not directly address the risks associated with interest rate rises. Therefore if the FPC were concerned about the impact of interest rate rises on credit risk in buy-to-let portfolios and the likelihood of a fire sale of loss-making buy-to-let properties, an ICR tool is likely to be more appropriate.

F. Wider impacts

104. The wider impacts, as with any impact, will depend specifically on the calibration the FPC decides to apply. In making this decision the FPC is required to look at whether the direction will have a disproportionate impact on certain types of firm or consumer in the market.

Statutory equality duties

105. The Government has considered the proposed reforms in relation to its public sector equality duties under the Sex Discrimination Act 1975, the Race Relations Act 1976, the Disability Discrimination Act 1995, section 75 of the Northern Ireland Act 1998 and the Equality Act 2010. The Government believes that no relevant issues arise.

Environmental, social and sustainable development impacts

106. The Government does not anticipate any impact on greenhouse gases, wider environmental issues, health and well-being, human rights, rural proofing and sustainable development. This assumes that the proposed FPC direction powers would not change the relationship between certain environmental phenomena and GDP.

One in Two Out rule

107. The FPC, in accordance with its statutory objective, would only use these tools if they considered it to be necessary to address financial core stability risks (i.e. financial systemic risk under the OECD (2004) definition). Moreover, the FPC is required to use its powers in a proportionate way to achieve its goals. Therefore, these powers appear to be out of scope of the Government's One in Two Out rule for new regulation.

G. Summary and preferred option

108. Providing the FPC with powers of direction over LTV and ICR limits in respect of the buy-to-let mortgage market will complement the powers of Direction of LTV and DTI limits the FPC was granted in respect of the owner-occupied market. Alongside the FPC's existing powers, the FPC should be sufficiently empowered to tackle risks to financial stability emanating from the UK mortgage market without a disproportionate cost.
109. The Government intends to use Section 9L of the Bank of England Act 1998 (as amended by the Financial Services Act 2012) to make secondary legislation prescribing macroprudential measures for the purposes of section 9H.
110. The Government does not intend to review this legislation, but notes that the FPC is required to produce explanations of its actions and keep them under review.
111. The Act also requires that the FPC must publish an explanation of why it has chosen to exercise its power of direction, the way it has chosen to exercise the power and how this action is consistent with the Committee's statutory objectives and the FPC's requirement to consider the proportionality of its actions. These explanations must include a cost-benefit analysis where the Committee believes it is reasonably practicable to produce such analysis. The Government is strongly in favour of these explanations including cost-benefit analyses and expects the FPC to require a high bar for not producing these estimates. Explanations and cost-benefit analysis by the FPC are a key accountability mechanism for the FPC.
112. Furthermore, the Act requires that the FPC reviews any outstanding directions given to the PRA or FCA within a year of the direction being given and then at least annually following the initial review. The purpose of these reviews is to consider whether the direction ought to be revoked.
113. Explanations and reviews by the FPC will be published in the Financial Stability Report, which is produced by the Committee twice a year.

Technical Annex – Modelling Assumptions

1. The scenarios presented in the impact assessment describe the costs and benefits of a loan-to-value (LTV) ratio or interest-cover ratio (ICR) policy on buy-to-let lending by examining the effects on a number of macroeconomic and financial variables. This annex provides further technical details on the models and judgements used to estimate the effects of the policies on:
 - a. the number and the distribution of buy-to-let loans
 - b. credit losses
 - c. house prices
 - d. owner-occupied mortgage debt
 - e. Loan-to-income (LTI) distribution of new owner-occupiers
 - f. GDP and interest rates
 - g. the scale and impact of a fire sale by buy-to-let borrowers

A. Impact on the number and distribution of buy-to-let loans

LTV flow limit policy (Scenario 1)

2. The policy modelled is a flow limit which ensures that only 15% of loans in the market have LTVs above 75%. This policy is modelled by 'knocking-out' enough high LTV loans from the actual distribution of lending at the time to achieve this. The behavioural response of borrowers and banks to the policy could pose both upside and downside risks to the magnitude of this effect, so they are assumed to net out. For example, borrowers could have adjusted their behaviour in order to still obtain a loan, perhaps by choosing a cheaper property. In this case our approach would overestimate the impact of the policy on the flow of lending. Alternatively, lenders may have targeted a buffer below the 15% threshold to reduce the risk of breaching it, in which case our approach would underestimate the effect of the policy.
3. This reduction in the flow of new lending is mapped into a lower stock of lending by end-2007. But over the period the stock of buy-to-let lending was also boosted by existing buy-to-let owners increasing the level of debt secured against existing properties (ie withdrawing mortgage equity). We assume the ratio of this new lending to the existing stock is unaffected by the policy, but refinancing must be consistent with the LTV policy. Together, these assumptions mean that as a result of policy the stock of buy-to-let lending is around 25% lower in 2007 Q4 compared to the baseline.
4. The LTV distribution of the stock of buy-to-let loans is assumed to fully reflect the policy by 2007 Q4. This is consistent with the stock of lending having grown during the 2004-07 period.

ICR Policy (Scenario 2)

5. The policy modelled prevents banks from conducting lending at an ICR lower than 125% based on a 7% stressed interest rate. The key input for the credit risk model used in this scenario is the LTV distribution, so the impact on this also estimated.

6. The effect on new buy-to-let mortgage lending is estimated using data on the joint ICR and LTV distribution of new buy-to-let mortgages in the five quarters to Q1 2015.⁴⁸ The policy reduces the flow of new buy-to-let mortgages by eliminating the tail of mortgages below the ICR policy threshold. The data show that the higher ICR mortgages that continue to be made have lower LTV ratios, so in addition to reducing the volume of lending, an effect of the policy is that the distribution of new lending becomes skewed towards lower LTV mortgages.
7. The key inputs for the credit risk model used in this scenario are the value and LTV distribution of the stock of buy-to-let lending, so the impact of the lower volume of new lending, and its less risky LTV distribution, on this is estimated. The degree to which new flows affect the stock of outstanding mortgages is determined by the size of the flow of mortgages relative to the stock (the 'flow - stock ratio'). The historical flow-stock ratio is used to estimate the cumulative impact of the policy over the three years for which it is hypothetically imposed. The post-policy LTV distributions on the flow and stock of mortgages, along with the new flow and stock volumes, provide the key inputs for the credit risk model.

B. Credit losses (*Scenario 1 and 2*)

8. Scenarios 1 and 2 examine the impact of a policy in reducing credit losses during a later stress episode. The credit losses are estimated using a Bank of England credit loss model.⁴⁹

C. House prices (*Scenarios 1 and 3*)

9. Because buy-to-let mortgage lending is a relatively recent phenomenon, it is difficult to establish the effect that buy-to-let lending, and thus a policy that reduces this, has on house prices. The upward trend in buy-to-let transactions since the market was established in the late 1990s has coincided with house price growth. It is therefore difficult to judge the extent to which house price growth has been caused by the emergence of buy-to-let, or whether both rising house prices and buy-to-let lending are driven by third factors, such as economic conditions. However, there are a few methods which can be used to indirectly estimate the effect that buy-to-let lending has on house prices. The first two discussed below are from the Office of Budgetary Responsibility (OBR), who have recently estimated a house price equation in the Geoff Meen tradition of modelling.⁵⁰
 - a) One methodology is the 'tenure share' approach. The OBR model includes the number of owner-occupied properties as a share of the housing stock as an explanatory variable which has a permanent effect on real house prices. A fall in this variable increases prices; this can be interpreted as a reduction

⁴⁸ This data is from the CML Buy-to-let Mortgage Survey, and unpublished in this form.

⁴⁹ The details of this model are confidential to the Bank of England.

⁵⁰ See Auterson, T. (2014), 'Forecasting house prices', OBR Working Paper no.6. <http://budgetresponsibility.org.uk/wordpress/docs/WP06-final-v2.pdf>

in the supply of housing available to owner-occupiers, which pushes up prices until equilibrium is restored. This essentially assumes a particular elasticity of demand from non-buy-to-let buyers. However as buy-to-let constitutes a relatively small share of the housing stock, even significant changes in the flow of buy-to-let lending have only a limited impact on prices using this modelling approach.

- b) The OBR also use a mortgage rationing ('MRAT') term in their house price model, which attempts to capture shocks to the supply of mortgage credit. Treating the change in buy-to-let lending resulting from policy as an MRAT shock tends to produce a slightly larger impact on prices than the tenure share approach, but it is still modest.
 - c) The National Housing and Planning Advice Unit (NHPAU)⁵¹ have estimated a simple house price regression which includes the number of mortgage approvals (owner-occupied and buy-to-let) as an explanatory variable. The effect of higher growth in buy-to-let lending on house prices can be estimated by increasing the number of total mortgage approvals. This methodology suggests a slightly larger impact on prices than the MRAT methodology.
10. Because it is a tried and tested methodology, and gives an estimate in the centre of the range of models, the MRAT methodology is used to estimate the impact of changes in the volume of buy-to-let lending on house prices. According to this model, a shock which reduces total net mortgage lending by an equivalent of 1% of the stock each quarter will reduce house prices by around 7% after three years.

D. Owner-occupied mortgage debt (*Scenarios 1 and 3*)

11. Scenarios 1 and 3 show the impact of policies that reduce buy-to-let lending on the level of mortgage debt held by owner-occupiers. The direction of this impact will depend on two offsetting factors:
- a. A smaller buy-to-let sector leaves owner-occupiers owning a larger share of the housing stock, which increases the level of mortgage debt they hold.
 - b. A smaller buy-to-let sector is less likely to exacerbate the scale of house price rises in an upswing, so owner-occupiers who have made house purchases may have done so at a slightly lower price, and taken on less debt.
12. A simple econometric equation that relates owner-occupied mortgage debt to both the share of the market that they hold and house prices suggests that the tenure effect slightly dominates; so a policy that reduces the share of the housing stock that is owned by buy-to-let landlords will slightly increase the mortgage debt of owner-occupiers.

⁵¹ See 'Buy-to-let mortgage lending and the impact on UK house prices: a technical report', R. Taylor, NHPAU, <http://www.archive.selsondonhousing.org/Documents/NHPAU%20Buy%20to%20let%20technical%20report.pdf>

E. LTI distribution of new owner-occupied mortgage debt (*Scenario 3*)

13. Scenario 3 estimates the impact of a buy-to-let boom that leaves house prices higher on the loan-to-income (LTI) distribution of new owner-occupied mortgage lending. Greater house price growth affects new mortgage lending to owner-occupiers in two ways:
 - a. Larger swathes of borrowers will breach internal LTI and LTV limits imposed by lenders, forcing them to reduce their loan or not get one at all.
 - b. More borrowers will be pushed above the FPC's LTI flow limit which specifies that no more than 15% of new mortgage lending to owner-occupiers can exceed an LTI ratio of 4.5.

14. An internal Bank of England model estimates the impact of these two effects on the LTI distribution of new owner-occupier mortgage lending. This model was designed to inform the calibration of the FPC's LTI policy introduced in 2014. The model works by taking the characteristics of recent borrowers, such as LTI and LTV, from a loan-level database, and projecting them forwards using a number of assumptions and the Bank of England's macro-economic forecasts for key macro-economic variables. For example:
 - a. The deposits that house buyers raise are assumed to grow in line with projected incomes for first-time buyers and in line with projected house prices for home-movers. From estimated deposits and projected house prices projected loan values can be derived. From this, and the projections for house prices and incomes, LTV and LTI ratios on new lending can be derived.
 - b. It is also assumed that lenders appetite for high LTI and high LTV lending remain broadly stable. Borrowers breaching lenders LTI or LTV standards are forced to reduce their loan by 10% (i.e. get a smaller or lower quality home). If they still breach these standards after this adjustment it is assumed that they do not to get a loan.
 - c. The FPC's LTI flow limit is modelled in a similar way, preventing the flow of lending with LTI above 4.5 breaching the FPC's 15% limit. This means a further portion of borrowers will be forced to reduce their debt or not enter the market as lenders take action to stay within the limit. This results in a 'bunching' in the LTI distribution (illustrated by Chart 4 in the main document) as more loans are made just below 4.5 level.⁵²

F. GDP and interest rates (*Scenarios 1 and 2*)

15. Scenarios 1 and 2 estimate the impact of an ICR/LTV policy on credit conditions, the effect of this on GDP, and the potential response of monetary policy. However these effects are small.
16. Section A in this appendix explains how the impact of an ICR or LTV policy on the volume of buy-to-let lending is estimated. Bank England internal models are then used to estimate the increase in buy-to-let mortgage spreads that would bring about a similar

⁵² A full description of the model can be found at <http://www.bankofengland.co.uk/prd/Documents/publications/cp/2014/cp1114.pdf> paragraphs 3.21-3.28

contraction. The model in Cloyne et al (2015)⁵³ is used to estimate the effect of this change to mortgage spreads on GDP. A downward adjustment to the impact is then made to reflect the fact that buy-to-let lending is to higher income individuals whose consumption tends to be less sensitive to changes in interest rates.⁵⁴ This approach suggests that the policies considered in these scenarios would be equivalent to small changes in mortgage spreads, having modest effects on GDP.

17. The potential monetary policy response to this change in GDP is estimated using a standard 'Taylor Rule' equation (with smoothing)⁵⁵. The policy response, which is small, feeds back to offset some of the effect on GDP and house prices. For consistency with the approach used in other parts of this modelling, the Cloyne et al (2015) model is used for the effect on GDP, and the model in Auterson (2014)⁵⁶ used for the effect on house prices.

G. The scale and impact of a fire sale by but-to-let borrowers (*Scenario 3*)

18. Scenario 3 considers the effects of a fire-sale by vulnerable buy-to-let borrowers on house prices. Vulnerable borrowers are identified using the ICR distribution. The only data available for the ICR distribution of the stock of lending was collected for the Bank of England's Supervisory function at end-2014.⁵⁷ Under the base case the ICR distribution is assumed to be as indicated by this data. Under the worst-case scenario it is assumed to be the same as for the lender in this data with the weakest distribution.
19. To be consistent with the estimation of the effects of buy-to-let borrowers on house prices in an upswing, the effects of this fire-sale are estimated using the 'MRAT' approach described in section C of this appendix. An additional effect from sales that happen through possession (assumed to account for one-quarter of the sales of buy-to-let properties in the fire-sale scenario) is added to this. This is based on research by Mian and Sufi (2014)⁵⁸ using regional US data, which finds that every 1% of homes foreclosed causes a 1.9% fall in prices. These results are based on the US and given structural differences between the US and UK housing markets the impact for the UK may be quite different. However, the overall results are not particularly sensitive to this assumption.
20. Past empirical research is used to estimate the effects this fall in house prices might have on GDP. Studies using UK data have found little support for classic 'wealth' effects from house prices to consumption.⁵⁹ However, empirical research has estimated modest

⁵³ See Cloyne, J, Thomas, R, Wills, S and Tuckett, A. (2015), 'A sectoral framework for analysing money, credit and unconventional policy', Bank of England Staff Working Paper no. 550, <http://www.bankofengland.co.uk/research/Pages/workingpapers/default.aspx>, Section 4.

⁵⁴ Evidence from the Bank of England's NMG survey suggests that higher-income individuals have lower marginal propensities to consume; see <http://www.bankofengland.co.uk/publications/Documents/quarterlybulletin/qb120403.pdf>

⁵⁵ See, for example, Burgess, S, Fernandez-Corugedo, E, Groth, C, Harrison, R, Monti, F, Theodoridis, K and Waldron, M (2013), 'The Bank of England's forecasting platform: COMPASS, MAPS, EASE and the suite of models', Bank of England Working Paper 471, Burgess et al (2013), Section 4.

⁵⁶ See Auterson, T. (2014), 'Forecasting house prices', OBR Working Paper no.6. <http://budgetresponsibility.org.uk/wordpress/docs/WP06-final-v2.pdf>

⁵⁷ This regulatory data is confidential to the Bank of England.

⁵⁸ See Mian and Sufi (2014), 'House of debt' <http://press.uchicago.edu/ucp/books/book/chicago/H/bo20832545.html>

⁵⁹ See, for example, Attanasio et al, which looks at the response of older versus younger households to try and identify wealth effects. Another paper (Campbell and Coco) find larger effects, but is it argued in Cristini and Sevilla Sanz (2011) that this is not robust. For papers see:

causal effects on consumption from changes in house prices, consistent with collateral effects (by which a fall in the value of housing means households are less able to borrow against housing to smooth consumption) rather than classic wealth effects. For example, Benito (2007)⁶⁰ estimates that a 10% fall in house prices reduces consumption by around 0.2%. Other studies have found larger estimates. For example, Mian et al (2013)⁶¹ find much larger impacts using cross-sectional data for the US.⁶² Recognising that risks are skewed to larger magnitude effects, and the possibility of non-linearities involved in such a stressed scenario, we have assumed that a 10% fall in house prices reduces consumption by 0.25%.

-Attanasio, O, Blow, L, Hamilton, R, and Leicester, A (2005), 'Consumption, house prices and expectations', 'Booms and busts: consumption, house prices and expectations', *Economica*, 71, p20-50.

- Campbell, J and Cocco, J (2007), 'How do house prices affect consumption? Evidence from micro data', *Journal of Monetary Economics*, 54, p591-621.

- Cristini, A and Sevilla Sanz, A (2011), 'Do house prices affect? A comparison exercise', University of Oxford Department of Oxford Discussion Paper Series.

⁶⁰ See Benito, A (2007), 'Housing equity as a buffer: evidence from UK households', Bank of England Working Paper 324

⁶¹ See Mian, A, Rao, K, and Sufi, A, (2013), 'Household Balance Sheets, Consumption, and the Economic Slump', *Quarterly Journal of Economics*, 128, p1687-1726.

⁶² It is difficult to directly compare the elasticity, as it is based on the response of consumption to changes in housing equity rather than prices directly and so is state contingent. Based on UK levels of household wealth, their estimates are broadly consistent with a 10% fall in prices reducing consumption by around 1%.