

EMBARGO: not for release before 12.45pm on
Thursday 14 November 2013



Housing, leverage and stability in the wider economy

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Monetary Policy Committee

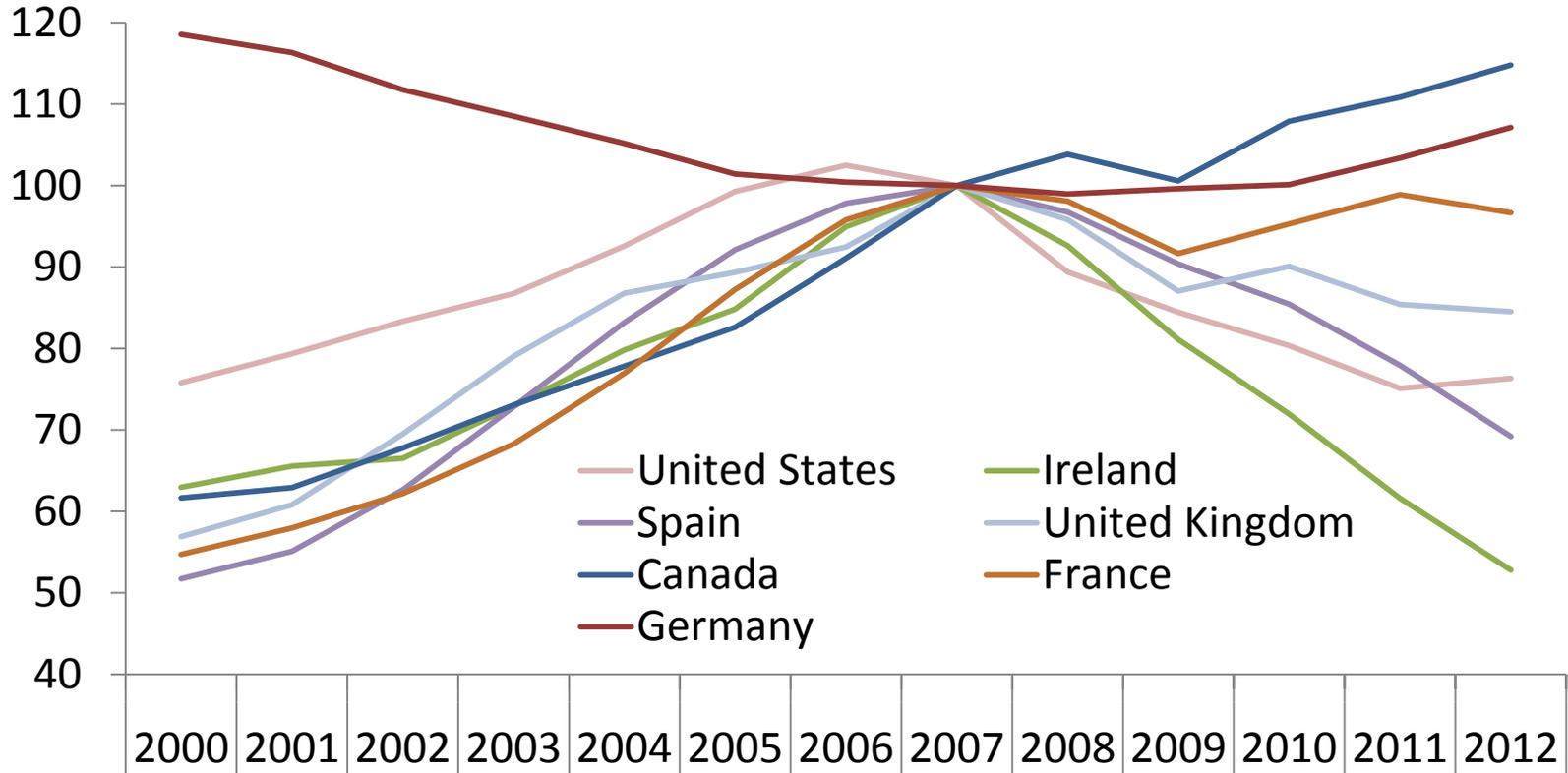
Bank of England

Dallas

14 November 2013



Real house prices, 2007=100

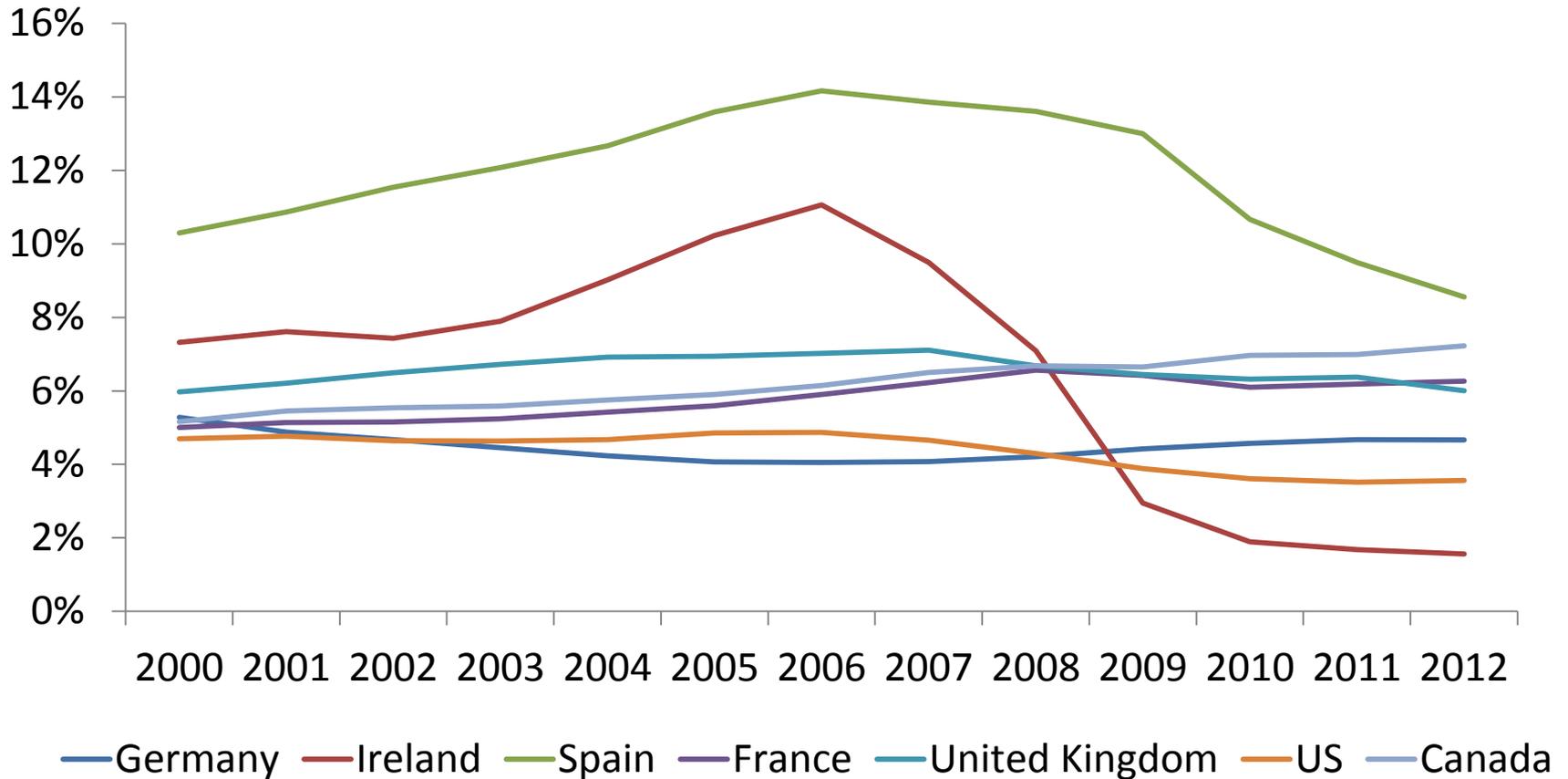


Sources: OECD, Bank of England calculations

Note: House prices deflated by the private consumption deflator.



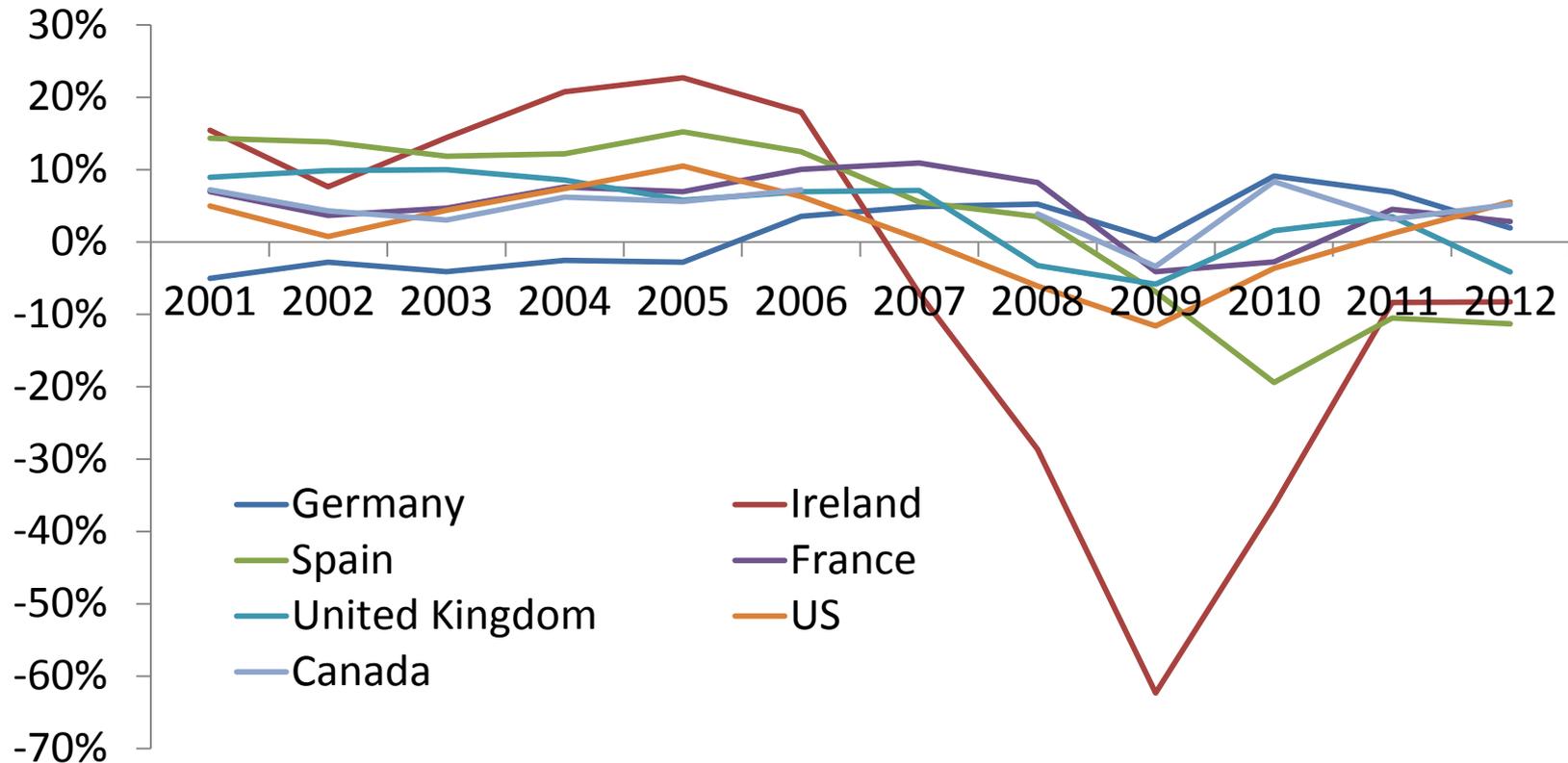
Construction, relative to total economic activity



Sources: Bureau of Economic Analysis, Eurostat, Statistics Canada, Bank of England calculations.



Annual growth rate of gross value added by construction

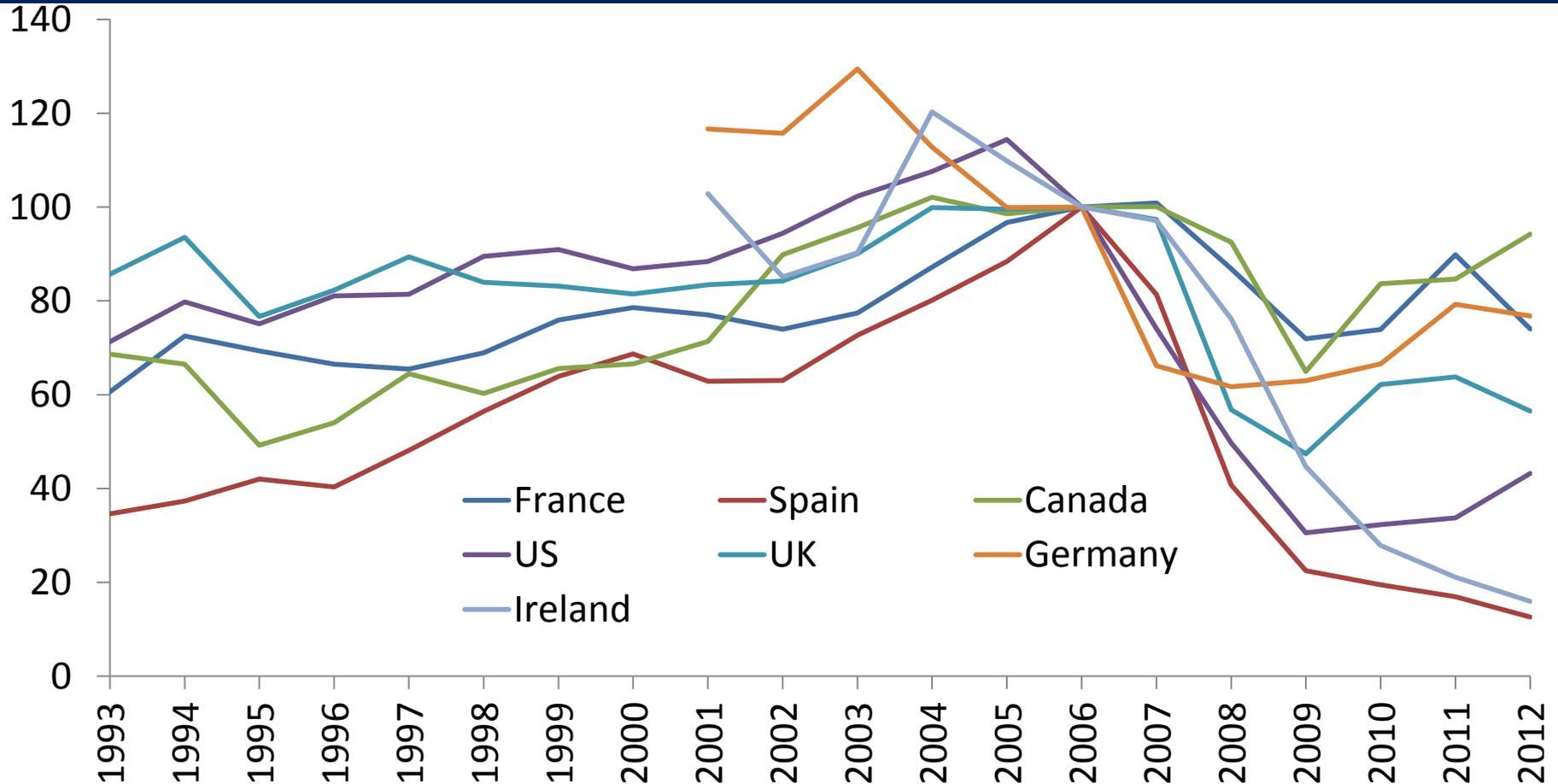


Sources: Bureau of Economic Analysis, Eurostat, Statistics Canada, Bank of England calculations.

Note: Due to a break in the value added series for Canada the 2007 data point is missing.



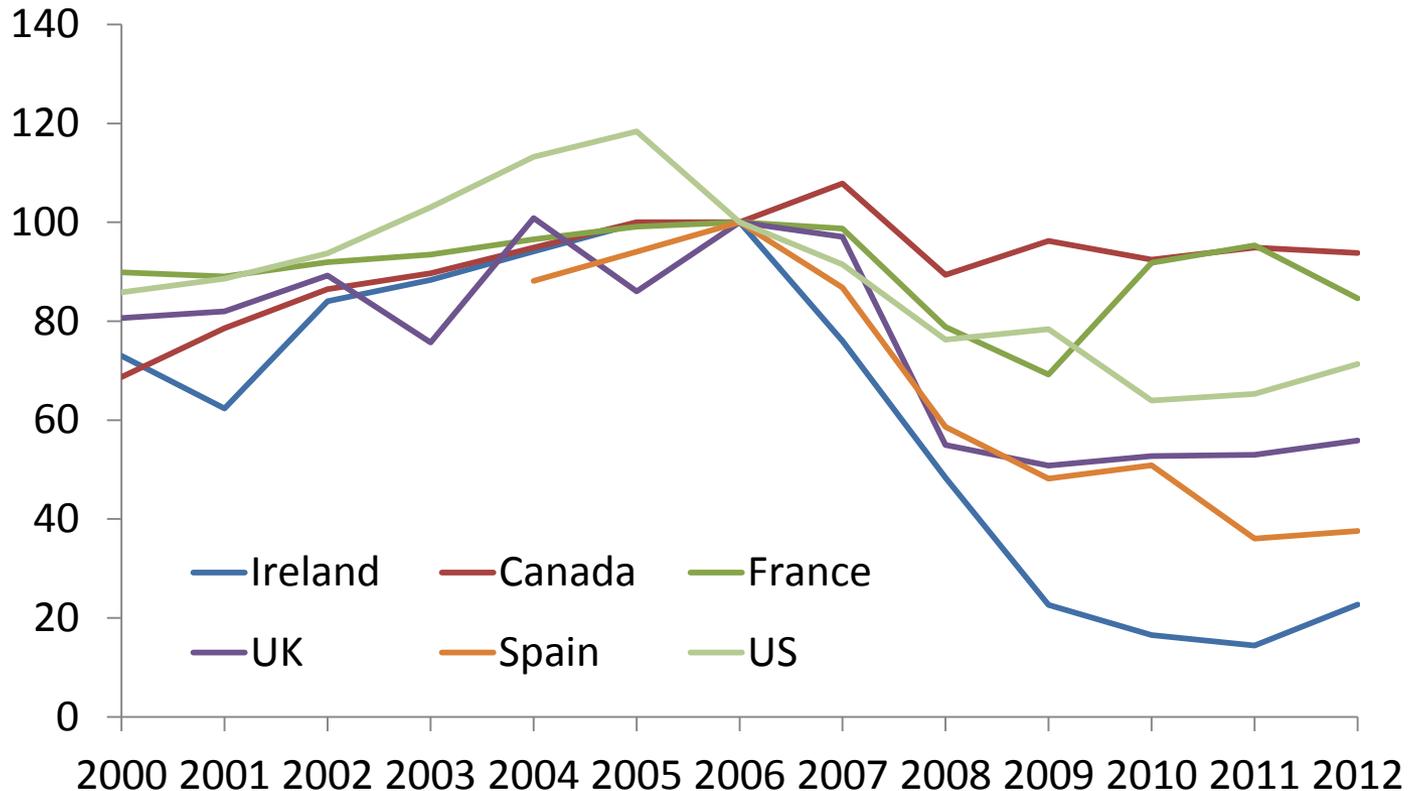
Housing starts, 2006 = 100



Sources: National Institute for Statistics and Economic Studies, Bloomberg, U.S. Census Bureau, German Federal Statistical Office, Irish central statistics office.

Note: France, Spain, Canada, US, UK information is for building (housing) starts during the period. Data for Germany and Ireland is for planning permissions granted. 5

Transactions, 2006 = 100

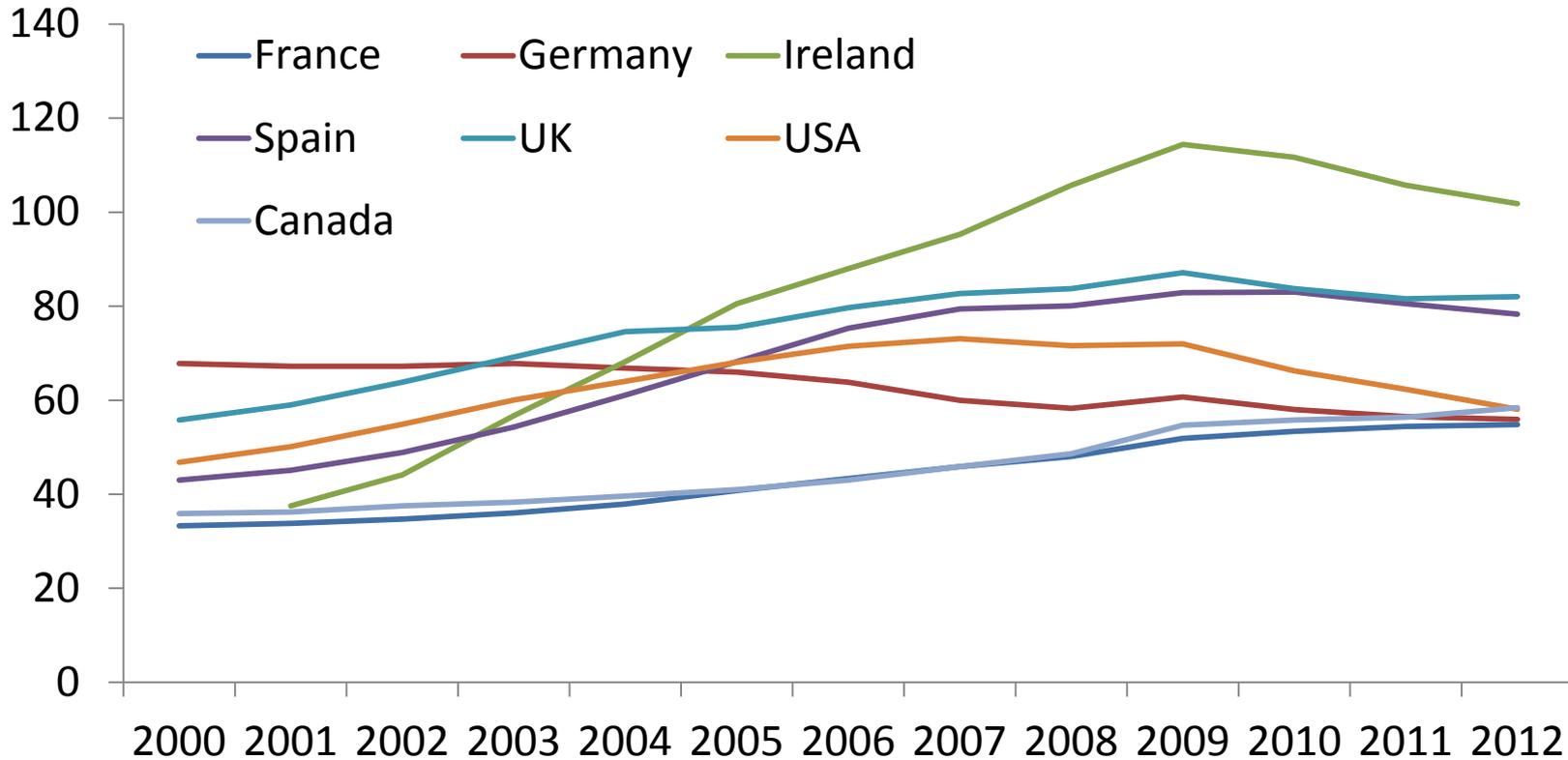


Sources: Bloomberg, European Mortgage Federation (Hypostat 2011), HMRC, Mortgage Bankers Association, ONS, Property Services Regulatory Authority, Ministère de l'Écologie, du Développement Durable et de l'Énergie, The Canadian Real Estate Association, US Census Bureau.

Note: Data obtained for Ireland from European Mortgage Federation has been spliced forward from 2011 using growth rates from Property Services Regulatory Authority. US data are based on a combination of data from the European Mortgage Federation for 2000 to 2004, and the Mortgage Bankers Association and US Census Bureau for the period 2005 to 2012. UK data ranging from 2000 to 2003 use a count on all Particulars Delivered forms (ONS). The UK series from 2004 to 2012 is based on a count on all transactions paying stamp duty (from the ONS between 2004 and 2006 and from HMRC between 2007 and 2012).



Mortgage debt to GDP ratios

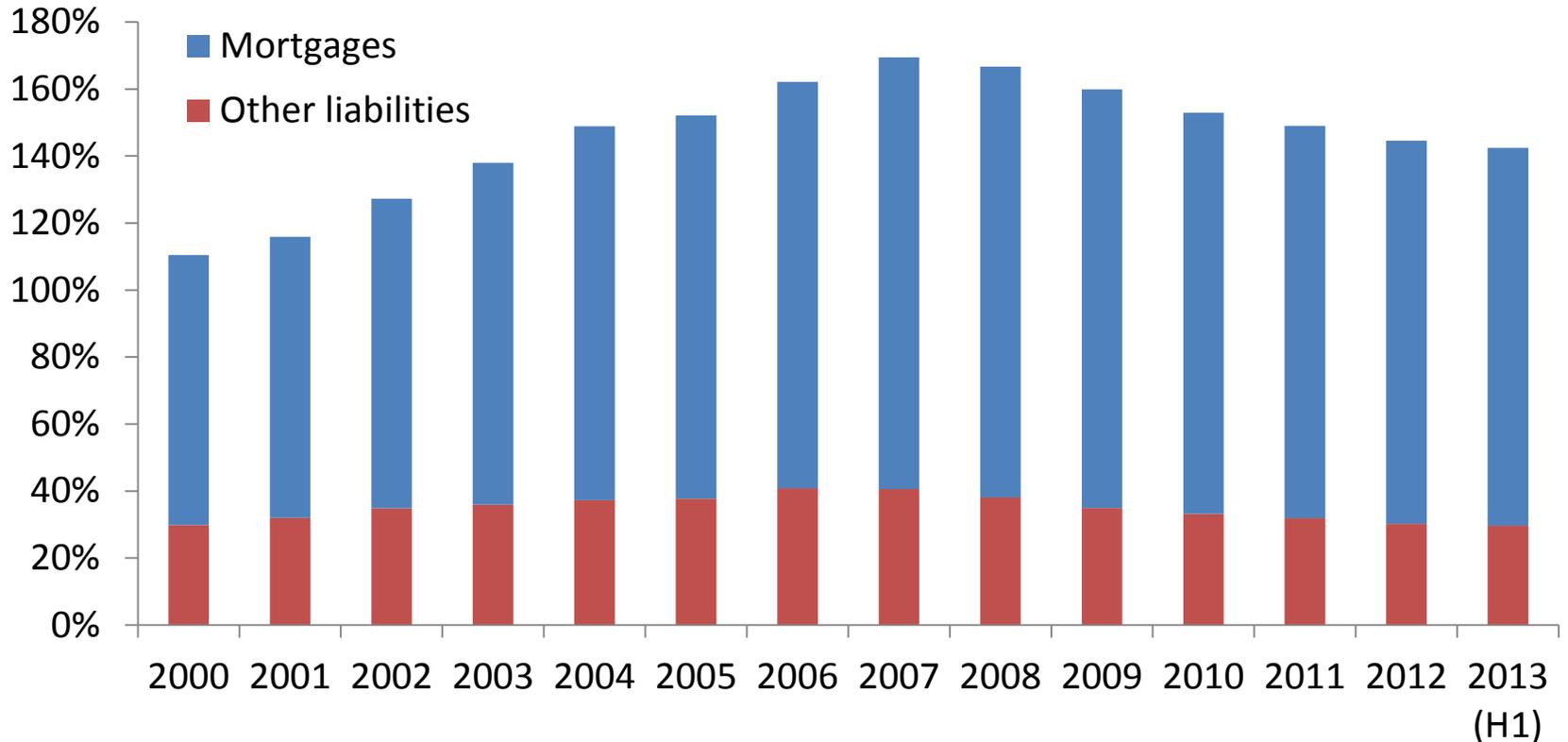


Sources: Bureau of Economic Analysis, Eurostat, Federal Reserve Economic Data, Statistics Canada, Bank of England calculations.

Note: The series for Canada is constructed as household mortgage debt, which includes all mortgage debt, not only residential. Data for France, Germany, Ireland, Spain and the UK are based on households' long term liabilities supplied by Eurostat. US data are households' home mortgage liabilities over GDP.



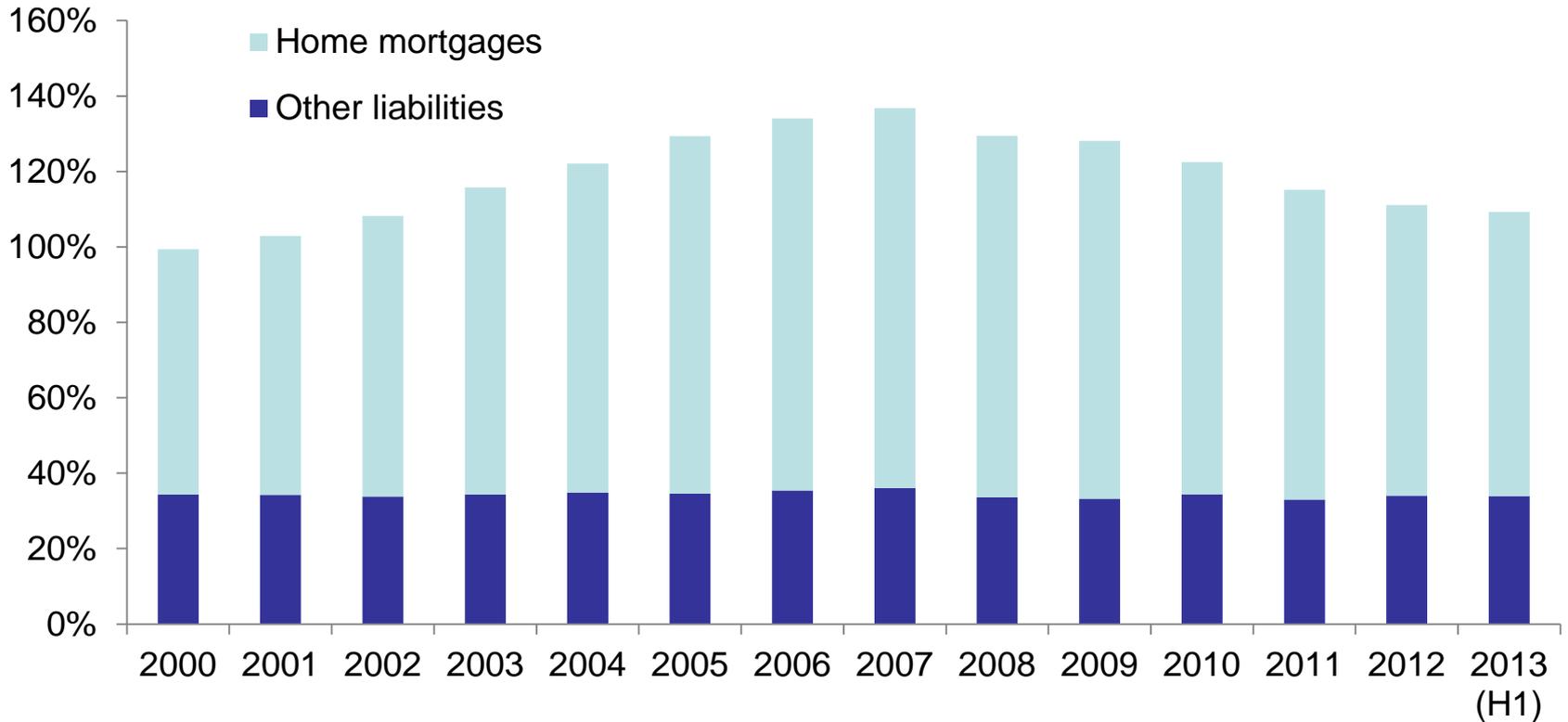
Mortgages and other household liabilities in the UK – percentage of disposable income



Sources: ONS, Bank of England calculations.

Note: Data cover households and non-profit institutions serving households. Gross disposable income sourced from ONS: QWND, which excludes taxes on income, social contributions and other transfers. Other liabilities are the difference between households' total financial liabilities and loans secured on dwellings. 2013 H1 data are second quarter liabilities over the annualised sum of seasonally adjusted first and second quarter gross disposable income.

Mortgages and other household liabilities in the US – percentage of disposable income

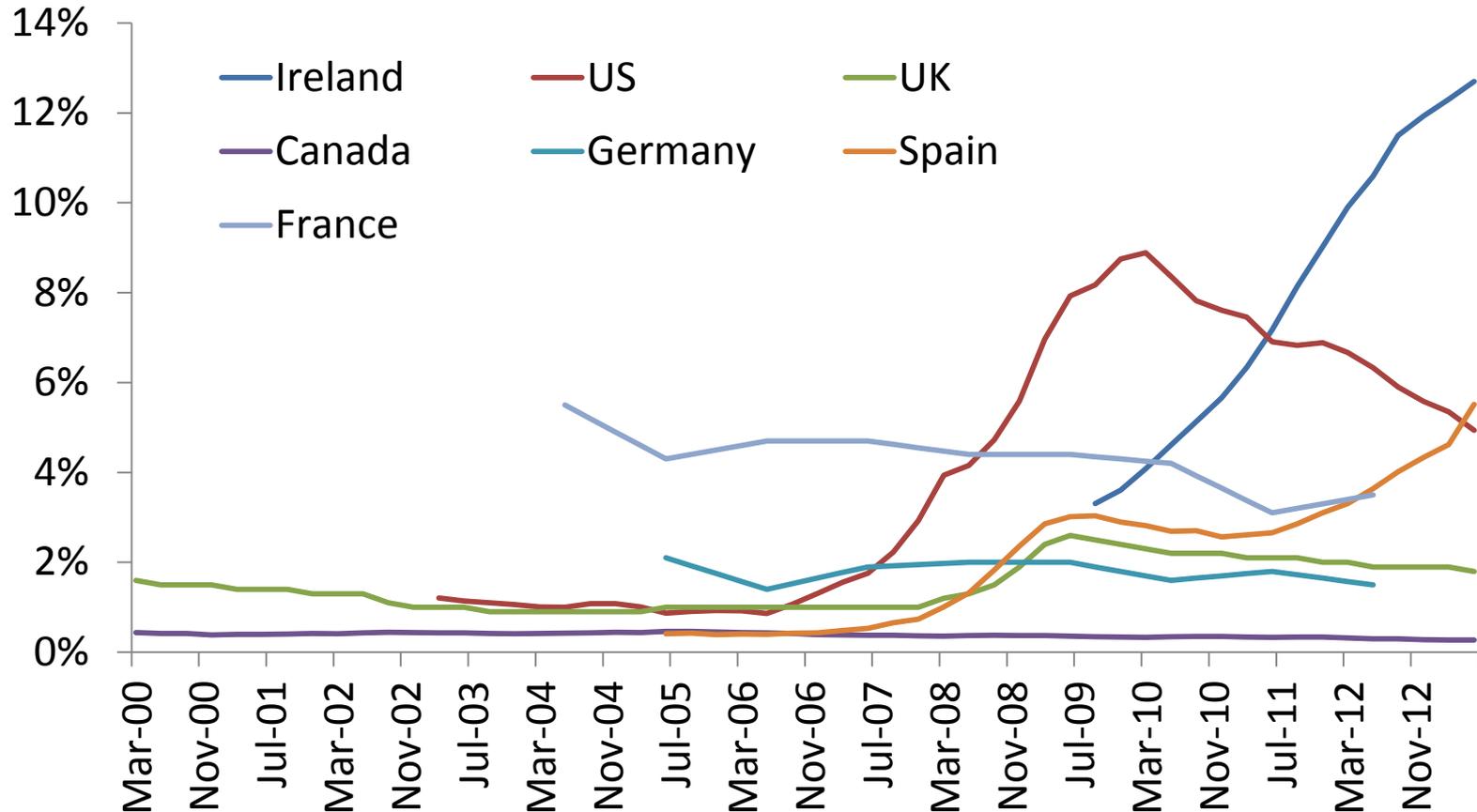


Sources: Bureau of Economic Analysis, Federal Reserve, Bank of England calculations.

Note: Disposable personal income (net of taxes and contributions for government social insurance) over liabilities of households and non-profit organisations. Other liabilities calculated as the difference between total liabilities and home mortgages. 2013 H1 data are second quarter liabilities over second quarter disposable income data seasonally adjusted at annual rates. 9



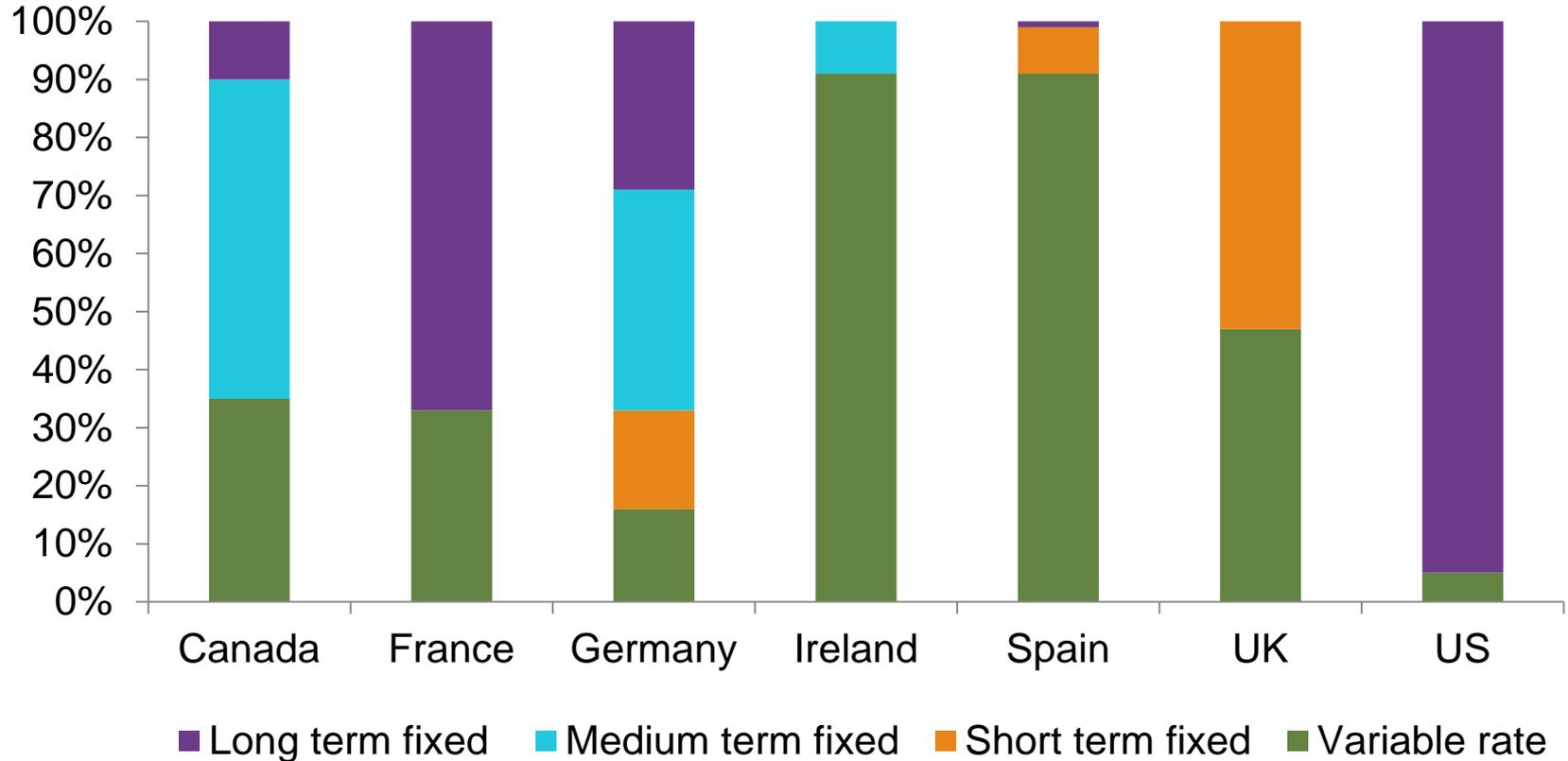
Mortgage arrears



Sources: Bank of Ireland, Bank of Spain, Canadian Bankers' Association, CML, Eurostat, Federal Reserve Bank of New York.
Note: Data for Canada, Ireland, Spain and the UK are the number of mortgages in arrears for more than 3 months as a proportion of total mortgage accounts. Data for the US are the proportion of mortgage balance 90+ days delinquent. Data for France and Germany are the proportion of population who are in arrears on both mortgages and rent. Underlying data for Canada are monthly, the chart plots end-quarter figures. Data for France and Germany are annual. The rest of the data are quarterly.



Mortgage product interest variability



Source: Lea, M. (2010), "International comparison of mortgage product offerings", Report, Research Institute for Housing America, Washington, September, available at www.housingamerica.org/RIHA/RIHA/Publications/74023_10122_Research_RIHA_Lea_Report.pdf (accessed 23 October 2013).



Risk sharing funding

- Assumption:

$$\ln(P)_t = a + b \ln(P)_{t-1} + e$$

- Rate of return (ex post) on an equity loan:

$$\begin{array}{ll} pu/g & \text{if } p > 0 \\ pd/g & \text{if } p < 0 \end{array}$$

- Equilibrium condition:

$$Re = E(pu/g | p > 0) \cdot \text{prob}(p > 0) + E(pd/g | p < 0) \cdot \text{prob}(p < 0)$$

where $E(pu/g | p > 0)$ is the expectation of pu/g conditional on $p > 0$
and $E(pd/g | p < 0)$ is the expectation of pd/g conditional on $p < 0$



Equity loan – equilibrium combinations of upside and downside shares of investor

**Share of
upside (%)**

29 30 32 33 35 36 38 39 41 42

**Share of
downside (%)**

0 10 20 31 43 57 68 78 92 100

Assumptions: Equity loan is 20% of house value. Percentage change in house price value over 5 years follows a normal distribution with mean of 15% and standard deviation of 20%. Required rate of return on equity loan is 25% over five years.



Varying house price volatility – equilibrium upside share of investor

Share of upside (%)	33	32	32	31	30	30	29	28
Standard deviation house price change (%)	5	15	20	25	30	35	40	45

Assumptions: Equity loan is 20% of house value. Percentage change in house price value over 5 years follows a normal distribution with 15% mean. Required rate of return on equity loan is 25% over five years.

Varying time horizons – equilibrium upside shares of investor



Share of upside (%)	30	31	32	32	33	33	33
Time horizon (years)	3	4	5	7	10	20	25

Assumptions: Equity loan is 20% of house value. Percentage change in house price value over 5 years follows a normal distribution with 20% standard deviation. The share taken of any house price fall is 20%. Required rate of return on equity loan is 25% over five years. Average house price change is 15% over 5 year horizon. The average house price change is assumed to be 3% a year.



Varying required rates of return on the loan – equilibrium upside share of investor

Share of upside (%)	20	26	32	37	43	49	55
Required return on the loan (%)	15	20	25	30	35	40	45

Assumptions: Equity loan is 20% of house value. Percentage change in house price value over 5 years follows a normal distribution with 20% standard deviation. The share taken of any house price fall is 20%. Average house price change is 15% over 5 year horizon.



Varying average house price changes– equilibrium upside share of investor

Share of upside (%)	67	51	42	32	25	20	17
Mean house price change (%)	3	7	10	15	20	25	30

Assumptions: Equity loan is 20% of house value. Percentage change in house price value over 5 years follows a normal distribution with 20% standard deviation. The share taken of any house price fall is 20%. Required rate of return on equity loan is 25% over five years.



Conclusions

- High leverage is at the heart of problems in housing market.
- Monetary policy and macro prudential policy can influence leverage.
- But more fundamentally outside equity might be a way of permanently bringing down reliance upon debt financing.
- Switching 20% of funding from debt to outside equity very substantially reduces leverage.
- The moral hazard at that scale of outside equity funding might be low enough to make such contracts feasible. But this is a major issue.