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A Broader View of Housing-Market Macroprudential Measures

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A BROADER VIEW OF HOUSING-MARKET MACROPRUDENTIAL MEASURES

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Abstract: Housing-market macroprudential measures are among the most commonly used by policymakers, but there remain a number of unresolved issues arising from their use. For example, there is some ambiguity concerning the objective of housing-market macroprudential policy, which may in turn lead to issues inter alia in terms of accountability; some issues arise from standard practice in macroprudential policy modelling, including consistent measurement of policies in cross-country datasets; and we contend that a wider range of effects of LTV/DSTI policy should be considered beyond their immediate effect on mortgage lending and house prices. Based on our own research, we suggest that there is some indication that banks may respond to housing market controls with greater balance sheet risk. This may require consideration of what additional regulatory policies are needed to ensure overall financial stability when housing-market macroprudential policies are applied.

Keywords: Housing market, macroprudential policy, bank risk, bank profitability

JEL Classification: E44, E58, G17, G28

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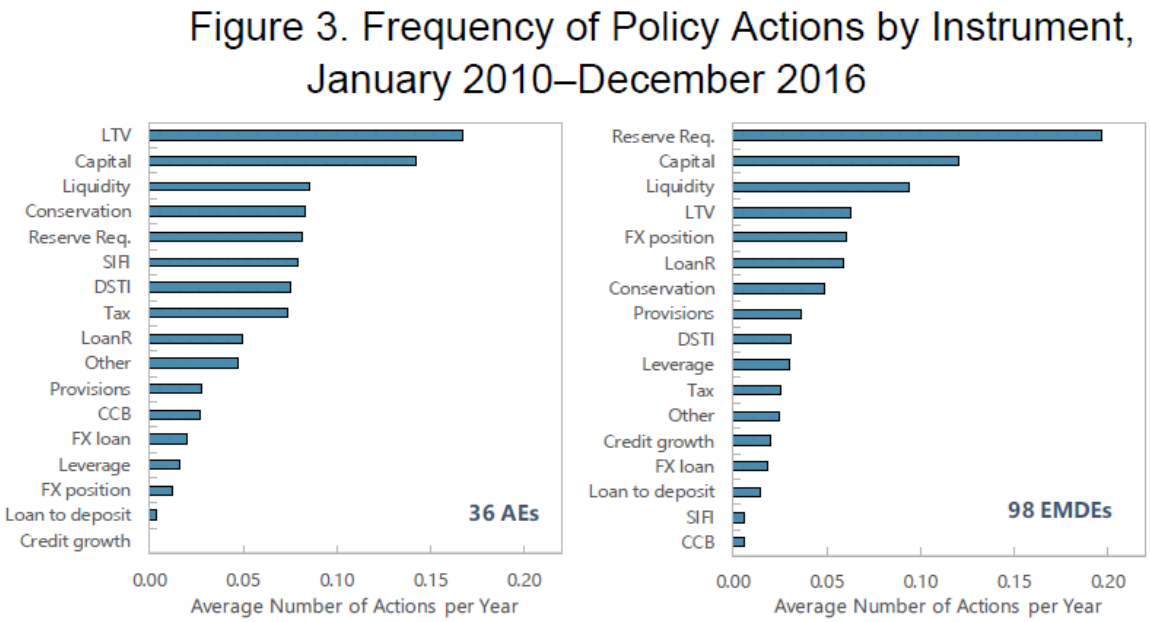
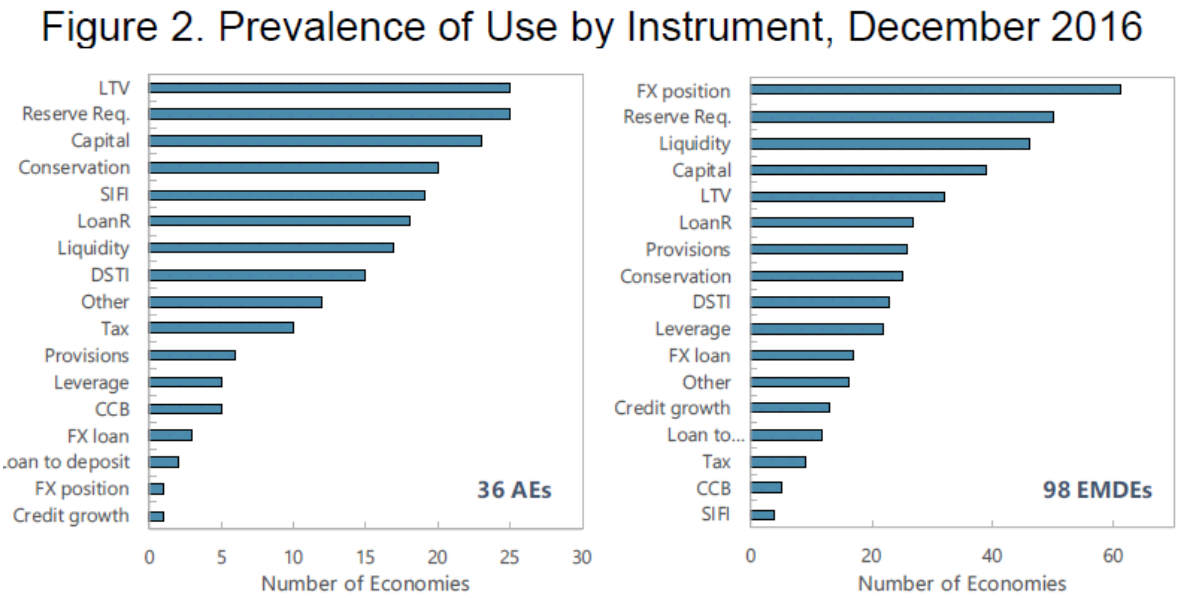
Introduction

Whereas a wide range of macroprudential policies can affect the housing market, the most commonly-used are Loan-to-Value limits (LTV) and Debt-Service-to-Income limits (DSTI) (as well as loan-to-income (LTI)). These are the key borrower-related policies in the macroprudential toolbox; other policies apply more directly to financial institutions. They are, respectively, the most commonly used policy by advanced (AE) economies for the case of the LTV and the seventh/eighth (for DSTI), as shown in the charts below from Alam et al (2019). They are also widely used by emerging market and developing economies (EMDEs).

Chart 1: Frequency of use of macro-prudential policies



Source: Alam et al (2019)



Source: Alam et al (2019). AE is advanced economies and EMDE is emerging market and developing economies

The focus of macroprudential policy on the housing market raises a number of conceptual and policy issues and we seek to identify some points of contention. Empirically, there is

extensive analysis of the effectiveness of these instruments in the housing market, and also among other macroprudential tools in respect of individual policy targets (notably house prices and credit expansion). We suggest however that some general issues remain to be addressed in empirical practice.

What is less common is an assessment of the broader effects of these borrower-related tools not only on housing but also financial institutions and the wider economy. This is a gap that we seek to fill in this paper, using mainly our own work but also citing some relevant recent studies. The suggestion is that further work in these areas is warranted, not least to give an assessment of comparative advantage of the different tools available as well as appropriate combinations.

The paper is structured as follows; in the first section we give some broad considerations on macroprudential policy and housing, the second highlights some modelling issues in extant empirical macroprudential studies. We then go on to show, mainly using our own research, some macro effects on house prices and credit, micro effects of the policy tools on bank profitability, micro effects on banks' net interest margins, bank risk and categories of lending. We highlight some other key results in the literature before reaching our concluding remarks.

1 Macroprudential policy and housing – some broad considerations

A key question at the outset is why do we want to control housing finance? The usual justification for macroprudential policies is "to protect and enhance the resilience of the whole financial system, to safeguard stability". But the question arises, how does this apply in the housing market? Is the aim to prevent excessive rises in house prices, and/or to ensure resilience for borrowers and hence lenders by limiting leverage?

In this context, note that mortgage loan defaults are rarer (depending on the legal framework) than for other types of loan. Even when borrowers are in negative equity, experience shows that recourse loans (which are the most common outside the US) may continue to be serviced. Historically, banking crises have more often been driven by commercial property lending and price volatility and not residential loans . Examples from the 1980s and 1990s include the Scandinavian crises, banking problems in Japan and the difficulties of the US Thrifts (Davis 1995). To a considerable extent UK bank losses in 2008 were also focused on commercial property lending rather than mortgage defaults.

Accordingly, one might question whether the concern is not so much financial stability risks per se but rather about spillovers to consumption from loss in net wealth if house prices collapse, even if households do not default (Eerola 2017). Another justification could be to avoid hysteresis effects on productivity from housing market collapse (Barwell 2017). In the context of these arguments, it might be suggested that authorities may use housing market macroprudential tools as a more selective policy than interest rates, since they have much less effect on companies, exchange rates, long rates etc. Such arguments are at most indirectly linked to financial stability. Often, it would appear that housing market macroprudential policy are used largely to reduce the macroeconomic impact of a downturn, thus easing the counter inflationary task for monetary policy.

As noted by Aikman (2022) the vagueness in operational objectives of macroprudential policy leads to difficulties in accountability, "framework hysteresis" and leaves open scope for self-

interested direction of policy. One might also question whether borrower-based policies are sufficient alone – is the complementary use of the countercyclical buffer essential to ensure resilience (Fell 2022)? And does policy focus too much on banks and not institutional investors that are becoming increasingly active in housing? (Munoz and Smets 2022)

Some further questions arise from consideration of the way macroprudential restraint relates to the highly tax-favoured status of housing compared with holding most financial assets, which encourages borrowing. Tax measures have a macroprudential impact but are usually under control of fiscal and not monetary/regulatory authorities – it is not clear that they are well-coordinated.

Note also that control via macroprudential tools is largely limited to housing demand – supply is more related to interest rates and government limits on land use (although demand-driven price changes may also affect supply). One might consider whether an LTV/DSTI rule creates new benchmarks, potentially undermining the risk management of the lenders. Furthermore, by restricting access to mortgages for the most leveraged clients who are typically first time buyers, LTV/DSTI policies have a distributional impact in terms of wealth across age cohorts (Georgescu and Martin 2021). Taxation might be used to help offset such an effect.

These overall issues are of particular importance in the current conjuncture where the issue arises as to how the housing markets will handle the current tightening of monetary policy and rise in long rates, and how macroprudential policies should respond.

2 Some modelling issues in empirical macroprudential studies

Turning to issues in empirical studies (abstracting from DSGE/agent-based studies), a key point is that there are measurement problems with macroprudential measures – most cross-country datasets are categorical, i.e. just showing whether a policy is applied rather than the stringency of the application. To date there is mainly progress in making available numerical measures for LTV (Alam et al 2019), which we employ in Table 5 below.

There is a need for more studies to look at micro household data as well as bank and macro data, not least to show distribution of leverage. Cross-country studies often overweight countries with large numbers of banks – a more even sample may be more appropriate (as in Davis et al 2022). Furthermore, results may differ markedly by bank size, capitalisation and loan quality (Morgan et al 2019 and our results below). Studies often omit the potential impact of banks' market power/competition as a control variable which may also interact with macroprudential policy in important ways (Chan et al 2021).

Many studies look at effects of policy change only when cumulative measures (showing stringency/stance) may be appropriate also - macroprudential measures can have effects not just initially but also subsequently, and because it cannot be shown at what point the policy becomes binding (Meuleman and Vander Vennet (2020). Cumulative measures allow long run as well as short run effects of policy to be distinguished. Also cumulative measures are less likely to be subject to issues of endogeneity, as they are mostly predetermined (Bergant et al 2020).

3 Macro effects of the policy tools

We now go on to highlight some of the results of our own research, which highlight some key points in both effects of macroprudential policy and research practice. Note that all the studies cited below have an appropriate set of control variables to limit omitted variables bias, as well as looking at effects of a range of policy measures. We focus solely on the significant housing-market policy effects (marked with asterisks) for brevity. For further information on specification, estimation and control variables as well as reference to other key studies, the reader is referred to the references.

Carreras et al (2018) assessed the effects of a range of policies on real house prices and real personal sector debt at a macro level using cointegration techniques for 19 OECD countries over 2000-2013. Their main result is that LTV and DSTI are much more effective for restraining house prices than for real credit growth. Most of the literature, even for macroeconomic effects, has tended to use simple "partial adjustment" approaches and omit cointegration. As shown in the bottom rows of the table these may give a false impression, namely suggesting that there is an impact on real credit from these measures.

Table 1: Results for macro effects with cointegration

Estimation method (dataset)	Real house price growth	Real household credit growth
Panel EGLS with cointegration (IMF1 database)		
LTV	-0.0023* (1.7)	-0.0023 (1.3)
DSTI	-0.004** (2.0)	0.0043* (1.8)
LTV Cap	-0.0046** (2.4)	0.0024 (1.1)
Panel EGLS with cointegration (BIS database)		
LTV	-0.0025* (1.9)	0.002 (1.3)
DSTI	-0.0047** (2.3)	-0.0004 (0.1)
Panel VECM (IMF1 database)		
LTV	-0.0034** (2.7)	-0.0005 (1.3)
DSTI	-0.0068** (2.2)	-0.0024 (0.9)
LTV Cap	-0.0039** (2.3)	0.0007 (0.5)
Panel FMOLS (IMF1 database)		
LTV	-0.0023* (1.9)	-0.004** (2.5)
DSTI	-0.0055*** (3.6)	-0.0034 (1.6)
LTV Cap	-0.0046*** (3.1)	-0.0033* (1.7)
"Simpler approach" using partial adjustment (IMF1 database)		
LTV	-0.0049*** (4.2)	-0.0058*** (3.9)
DSTI	-0.0037** (2.3)	-0.0037* (1.9)
LTV Cap	-0.0039*** (2.7)	-0.004** (2.2)

Source: Carreras et al (2018). The IMF1 database is from Cerutti et al (2017) and the BIS database from Kuttner and Shim (2016)

4 Micro effects of the tools on bank profitability

Davis et al (2022) assessed effects of macroprudential policy on bank profitability as measured by returns on average assets (ROAA) and returns on average equity (ROAE). This

took place via OLS regressions with a range of bank-specific, macroeconomic and industry control variables for up to 7,250 global banks over 1990-2018 in 92 countries. A maximum of 100 banks per country ensured individual countries were not overweighted. They used the latest IMF database (IMAPP) from 2020, which covers the period 1990-2018. Policy changes were cumulated to obtain a measure of stringency as suggested above. Besides global estimates, subsamples included advanced countries versus emerging market and developing countries. Leveraged results for bank size and capitalisation were also provided.

As shown in Table 2, the main result is that LTV/DSTI policies were found to have little significant effect on average bank profitability, including global, advanced and EMDE samples. But there is a clear negative impact on small bank profitability that is not present for large banks, implying that housing market policies may distort competition. A similar although more mixed pattern is evident for capitalisation (CAP) where the more highly capitalised banks lose out especially for LTV and ROAA. Larger and less well capitalised banks may have more scope to take on more profitable but riskier business when the housing macroprudential policies are tightened

Table 2: Results for effects on bank profitability

	ROAA	ROAE
Global sample		
LTV	0.021 (1.1)	0.14 (0.9)
DSTI	0.009 (0.2)	0.086 (0.2)
Advanced countries		
LTV	-0.0021 (0.1)	0.118 (0.6)
DSTI	-0.032 (0.8)	-0.521 (1.3)
Emerging and developing		
LTV	0.062** (2.2)	0.215 (1.0)
DSTI	0.018 (0.2)	0.842 (1.1)
Leveraged by bank size		
LTV (MPP)	-0.52*** (4.0)	-1.78 (1.5)
LTV (MPP*SIZE)	0.48*** (4.4)	1.73* (1.8)
DSTI (MPP)	-1.06*** (4.0)	-6.35* (1.8)
DSTI (MPP*SIZE)	0.99*** (4.5)	5.97* (1.9)
Leveraged by capitalisation		
LTV (MPP)	0.12*** (3.8)	-0.14 (0.5)
LTV (MPP*CAP)	-0.14*** (3.8)	0.39* (1.7)
DSTI (MPP)	0.07 (1.1)	-0.71 (0.9)
DSTI (MPP*CAP)	-0.08 (1.5)	1.05* (1.8)

Source: Davis et al (2022). Note: CAP and SIZE are demeaned so average size and capitalisation are set to one. The net effect on an average bank is shown by adding the two coefficients. A smaller bank has a smaller leveraged effect than that shown, a larger bank a larger one.

5 Micro effects of the tools on the net interest margin

Davis et al (2020) assessed the relation of macroprudential tools to the net interest margin for banks, using a sample for 3,723 banks in advanced countries over 1990-2018 and the IMAPP database. The independent variables included the level and difference of interest rates and the yield curve which affect the margin, in line with existing work (the short term effect of tightening on the margin is negative, the long term effect is positive). Such results are themselves relevant to considering effects on banks of the current monetary tightening

They found that macroprudential policy works similarly to monetary policy with a tightening (denoted DMPP) leading to a lower net interest margin but the long term effect for DSTI, denoted MPP, is for the margin to increase. This may be consistent with a riskier balance sheet in the long run. The narrowing short run effect of LTV is accentuated when monetary policy is tightened at the same time (denoted DCBR).

Table 3: Results for effects on net interest margin

Coefficient for	**MPP**	**DMPP**	**DMPP(-1)**
Individual macroprudential Instruments			
LTV	-0.00525 (0.3)	-0.051*** (3.2)	0.00783 (0.2)
DSTI	0.0515** (2.2)	-0.0726*** (4.5)	-0.0652 (1.6)
Interaction with interest rate	**MPP*CBR**	**DMPP*DCBR**	**DMPP(-1)*DCBR(-1)**
LTV	0.0024 (0.2)	-0.0249 (1.0)	-0.0879*** (3.5)
DSTI	-0.0043 (0.4)	0.0533 (0.6)	-0.0163 (0.3)

Source: developed from Davis et al (2020). MPP denotes the macroprudential tool and CBR the central bank policy rate. D denotes a first difference.

6 Micro effects of the tools on bank risk

Chan et al (2022) assessed the effect of macroprudential tools on a key measure of risk, namely the Z-score for individual banks (where Z-score = (ROA+(Capital/Assets))/SD(ROA), where ROA is the return on assets and SD is the standard deviation). Their main focus is on East Asia where macroprudential tools have been used for the longest period, but include a test for European banks, cited here. Their key innovation is to not only include competition (Lerner Index) as an independent variable – which raises risk - but also allow for interaction between competition and macroprudential tools. Note that Lerner is inversely related to market power – the higher the Lerner Index, the more market power a bank has.

The main result for housing market tools is that in the long run they directly reduce Z-score and hence raise the level of risk. Allowing for interaction with competition, the more competitive banks take more risk, a “competition-fragility” result. Accordingly, more supervisory attention in Europe should be given to the more competitive firms which are shown to take relatively more risk in response to macroprudential policies.

Table 4: Results for effects on the Z score for European Banks

	DMPP	MPP-1	DMPP*LERNER-1	MPP-1*LERNER-1
Direct effect only				
LTV	-0.032 (0.9)	-0.033 (1.5)		
DSTI	0.003 (0.1)	-0.084** (2.1)		
Direct effect and leveraged effect				
LTV	-0.038 (0.9)	-0.072** (2.8)	-0.001 (0.1)	0.032** (2.1)
DSTI	-0.042 (0.6)	-0.132*** (3.7)	0.034 (0.7)	0.05** (2.5)

Source: developed from Chan et al (2021), Lerner is demeaned

Complementing these results for risk, macroprudential policy and competition, we show below some original results using IMF data for the LTV measured as a percent (so 100% indicates no restriction). Results are shown not just for risk but for mortgage lending and total lending by the bank in question. We transform using 100-LTV, so the data are zero for where there are no LTV limits, rising to 100-X where limits apply (so for 80% LTV, MP is 20). Accordingly it rises with the stringency of the LTV policy.

We find that the lower the LTV, the higher the level of risk as measured by the log Z-score. There is a reduction in mortgage lending from a tighter LTV constraint but no reduction in overall lending, suggesting in combination with the Z-score result a substitution to higher risk lending. There are again variations in these effects depending on bank market power. The more competitive banks with a lower Lerner Index take more risk as shown by the Z-score. They also reduce mortgage lending more and adjust overall lending less when LTV limits are tighter.

Table 5: Results using 100-LTV as macroprudential variable, European Banks

	DMPP	MPP-1	DMPP*LERNER-1	MPP-1*LERNER-1
Direct effect only				
Log Z-score	-0.012** (2.8)	-0.057*** (3.4)		
D log mortgages loans	-0.0036 (1.1)	-0.0025*** (6.5)		
D log gross loans	-0.0007 (1.1)	-0.00005 (0.3)		
Direct effect and leveraged effect				
Log Z-score	0.0072 (1.7)	-0.0081*** (4.1)	-0.015*** (4.1)	0.0022** (2.3)
D log mortgages loans	-0.01 (1.4)	-0.0034*** (7.6)	0.0045 (1.2)	0.00092** (2.1)
D log gross loans	0.0012 (1.5)	0.00025 (1.1)	-0.0014*** (2.8)	-0.00027** (2.3)

Source: author's estimates, Lerner is demeaned

7 Further key results in the empirical literature

Meuleman and Vander Vennet (2020) found that overall systemic risks and risks for individual banks are reduced by lending standards policies such as LTV and DSTI, but they increase systemic linkage risk. The latter is seen as linked to risk-shifting from restricted classes of asset such as household mortgage lending to risky corporate borrowers

Nakatani (2020) found that a higher LTV reduces the possibility of a banking crisis, although they did not test with other macroprudential policies.

Alam et al (2019) found that LTV restrains house prices but not credit in advanced economies but DSTI did not affect either. They found no wider effect of these policies on consumption or GDP.

Fendoglu (2017) and Davis et al (2017) found that borrower-based measures such as LTV and DSTI are more effective than financial-institution based measures in controlling the BIS aggregate credit/GDP gap, a measure which is widely seen as a key indicator of risk to financial stability, and a recommended indicator for adjustment of the countercyclical capital buffer.

Bergant et al (2020) found macroprudential regulation – including credit demand policies such as LTV and DSTI - can considerably dampen the impact of global financial shocks on emerging markets via capital flows or market volatility.

8 Conclusion

We have highlighted that there is some ambiguity concerning the objective of housing-market macroprudential policy, which may in turn lead to issues inter alia in terms of accountability. A key issue at present is the appropriate macroprudential stance as monetary policy is tightened to counter inflation. Some issues arise from standard practice in macroprudential policy modelling, including consistent measurement of policies in cross-country datasets.

We contend that a wider range of effects of LTV/DSTI policy should be considered beyond their immediate effect on mortgage lending and house prices, and some illustrations of key effects have been included based on our existing work and some other recent studies. Tightening of the main housing market policies – LTV and DSTI – have the following effects in our research:

- they tend to affect house prices negatively rather than real household credit when cointegration is allowed for – simpler specifications may exaggerate effects on credit.
- they tend to reduce profitability for smaller and more highly capitalised banks, although there is not a significant effect across banks as a whole.
- they tend to narrow the bank interest margin in the short run although the long run effect is positive.
- they tend to raise bank risk in the long run, all the more so when the bank has a weaker market power.
- They appear to reduce aggregate mortgage lending and have no significant effect on total bank lending.

Furthermore, we note that Meuleman and Vander Vennet (2020) find rising systemic linkage risk from tighter housing market measures, that they relate to risk-shifting, although other forms of risk are reduced. However, other results in the literature show that wider risks such as banking crises and macroeconomic volatility may be reduced by such measures. We suggest from our own results above that there is some indication that banks may respond to housing market controls with greater balance sheet risk. This may require consideration of what additional regulatory policies are needed to ensure overall financial stability when housing market macroprudential policies are applied.

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