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MS 163: "Mortgage Markets and Macro-Instability"

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glossary

Balloon loan: a loan which either does not amortize (no principal payments) or amortizes slowly, requiring a large lump sum repayment when it matures.

Collateralized debt obligations (CDOs): synthetic (derivative) bonds with different legal and sequential rights to part of the stream of income from a pool of mortgages

Covered bond: a pool of mortgages sold by a bank to the capital market but which stay on a bank's books and are usually guaranteed by that bank

Credit risk: the risk that a borrower might default on a loan

Interest risk: the risk that interest rates might change, thus causing the capitalized asset value of a given stream of income to change in the opposite direction

Mortgage backed security: a pool of mortgages sold by a bank to the capital market that do not remain on the bank's books

Mortgagee: The person or entity lending money to a buyer against the security of the real property being bought

Mortgager: The person or entity who borrows money to buy a house, putting up that property as collateral for the loan

Securitization: bundling assets, like mortgages, together to sell them to capital markets

Synopsis

The role that mortgage backed securities played in the financial crisis of 2007-09 creates a misleading impression that mortgages necessarily cause macro-economic instability. But the problem lies in the specific structure of mortgage instruments, how market actors use them, and the matching of maturities. Mortgages can supply long maturity assets that match the demand for those assets by pension plans and insurance firms. By matching maturities, this can be a stabilizing force. This article considers the different kinds of mortgages, shows their connections to financial markets, and stresses that governments everywhere have structured mortgage markets for political and prudential reasons.

[Article Text:]

General Considerations

The central role that mortgage backed securities played in the financial crisis of 2007-09 creates a misleading impression that mortgages necessarily cause macro-economic instability. But the problem lies in the specific structure of mortgage instruments, how market actors use them, and the matching of maturities. Mortgages and mortgage backed securities (XREF) theoretically can supply long maturity assets that match pension plans' and insurance firms' demand for those assets. By matching maturities, mortgages and derivatives of mortgage products can be a stabilizing force. At the same time, mismatched maturities can create considerable instability, either by reinforcing existing cyclic trends or by contributing to a systemic financial crisis. Finally, the macro-economic significance and effects of mortgages obviously rises as their share of private debt (and thus by definition financial system assets) rises. This article considers the different kinds of mortgages, shows their connections to financial markets, and stresses that governments everywhere have structured mortgage markets for political and prudential reasons.

Mortgages have two different kinds of macro-economic and macro-systemic consequences, captured by interest rate risk (XREF) and credit risk (XREF). Interest rate risk is the risk that rates will rise (or fall), possibly increasing costs to the borrower, and possibly increasing the lender's funding costs. Credit risk is the risk that a borrower might default, obliging the lender to cover the loss to themselves or their creditors from their own funds. Mismatched maturities aggravate the consequences of credit risk. Both can have pro-cyclic effects, exaggerating booms and busts and thus increasing instability.

Mortgages by definition are an asset and a liability. From the borrower's point of view, the mortgage creates a liability, as borrowers are obliged to make interest payments (XREF) on the loan, and usually, amortize (XREF) the loan via principal repayment (XREF). The amortization of a mortgage creates a stream of payments, usually but not always blending principal and interest. If a bank retains the mortgage, then the bank has an asset on its books, because it receives this stream of interest income. Alternately, the bank can find some way to sell off the mortgage in a secondary market through some form of securitization, creating an asset for a third party.

Making mortgages historically exposed banks to considerable interest rate risk and a large maturity mismatch. This is why banks in the era before state regulation made few housing mortgages to individuals, and then usually only to people who were already in the propertied classes. Mortgages on individually owned urban housing were usually too small to have macro-economic consequences compared to agricultural mortgages or lending for corporately owned housing. Typically large scale mortgage markets only emerged after a state regulatory regime ameliorated interest and maturity risks; the more regulation ameliorated the risks, the larger the resulting market. The larger the market the greater the macro-economic risks, and thus the more intensive and intrusive government regulation became. Equally important, governments had to stabilize the incomes of individual mortgagers so that homebuyers could countenance taking on long term debt.

Unregulated banks face risks because they fund long term, illiquid mortgages with short term, liquid deposits. Interest rate risks arise because the interest rate on deposits fluctuates from day to day (or whatever the time period for the deposit is). Mortgages typically are offered at a longer term and a fixed interest rate. Banks plan to profit from the spread between the lower, short term interest rate offered to depositors and the higher, long term rate offered to mortgagers. But if short term interest rates rise, the bank may find itself paying more interest to depositors than it received from mortgagers. The longer the interest rate squeeze, the greater the danger to the bank's profits and eventually its capital. This problem was a major precipitating factor in the 1989-1992 US savings and loan crisis. US savings and loan banks (i.e. the US version of *sparkassen* (XREF) or building societies (XREF)) with large portfolios of

low interest, long term mortgages on their books suddenly found themselves having to pay much higher interest rates to attract depositor money when interest rates were deregulated.

As noted above, the maturity mismatch is baked in right from the start – it is an initial source of bank profits. The maturity mismatch arises from the fact that short term depositors can come to the bank and withdraw their money at any time. But it is much more difficult for the bank to extract that much money from a borrower. Liquidating a house (or farm) can take a considerable amount of time. Meanwhile depositors, facing delay, will clamour for more of their money out of fear that the bank cannot honour its liabilities to them. The maturity mismatch can thus create a spiral of fear culminating in a bank run. Naturally, depositors in an unregulated system are more likely to be afraid at a time of cyclic downturn. Banks trying to borrow so as to avoid liquidating properties in a bad market could find themselves unable to obtain funds, leading to a bank crash. This makes mortgage lending very pro-cyclic. In bad times, banks stop extending mortgage loans, leading to a general fall in the price of real property. In turn the falling price of property makes banks unwilling to lend against depreciating collateral. And as property prices fall and borrowers default on their mortgages, banks find themselves the unwilling owners of devaluing property they cannot sell in order to repay their own liabilities to depositors.

State regulation of banking in general and mortgages in particular is supposed to ameliorate these risks. The degree and kind of regulation varies considerably, as does its effectiveness. The central point, however, is that extensive mortgage markets would not come into being on their own. Modern mortgage markets, mainly in agricultural land, emerged in Europe, North America, Argentina and Australia in the mid to late 1800s. States in these economies typically established specialized banks to extend long term credit to farmers. Thus the French state created the *Crédit Foncier* bank in 1852 and gave it a monopoly on mortgage lending. Similarly, the Danish state reformed mortgage laws in 1850, allowed banks to form freely after 1857, and made borrowers jointly liable for each other's debts. In both cases mortgages were funded through what we would now call a covered bond system (XREF?). This is an early form of securitization in which banks originate mortgages, and fund those mortgages by selling them as bonds to outside investors. However, those bonds remain on the bank's books and are guaranteed by the bank. Covered bonds (as *Pfandbrief* [XREF] in Germany, or *pantbrev* [XREF] in Denmark) still account for the vast majority of European mortgage securities.

The covered bond and *crédit foncier* systems removed both interest rate risk and the maturity mismatch from private banks. Interest rate risk was largely moved onto the buyers of the bond. More important, the bond buyers presumably wanted a long dated asset. Long term mortgages could thus be funded by long term investors' money rather than short term depositors' money. Those long term investors would be matching a long term liability, an outflow of money – for example annuitized pension payments – to their long term flow of income from the mortgage asset. These 19th century mortgage systems gradually extended their ambit from agricultural land to urban housing.

Banks also protected themselves (or buyers of covered bonds) from interest rate risks by requiring higher down payments (purchase money) (XREF) and quicker amortization than loans on farm land. Down payments usually amounted to 50 percent of the purchase price, and 5 year balloon loans (XREF) were common. Balloon loans are either interest only loans, with the entire debt repayable at the end of the term, or they are amortized as if they are longer term loans (for example, on a 20 or 30 year schedule) but the remaining balance on the loan is repayable after only 5 or 10 years. Balloon loans forced borrowers to renegotiate the interest rate every time the balloon payment was due, protecting banks and bond buyers against adverse interest rate movements. If interest rates had risen, borrowers would have to re-borrow at the higher rate.

The State and the Mortgage Market

After the Great Depression and World War II, most countries created some kind of dedicated, state-owned housing bank, like the Norwegian Husbanken (XREF) or the Japanese Government Housing Loan Corporation (XREF), to provide long term credit to housing markets. While these eventually yielded part of the market to private banks, they enabled a vast expansion of private, individual home-ownership and a vast expansion of the share of mortgage debt in total private debt. The US and Danish mortgage systems present the apotheosis of government systems for removing maturity mismatches from a largely private banking system by respectively using full securitization and covered bonds. We will consider the US system in depth as it is the world's largest mortgage market, with roughly \$11 trillion in home mortgage debt (of which \$6.6 trillion had been securitized) in 2008. The modern US mortgage market emerged from the chaos of the Great Depression, when the pro-cyclic dynamics sketched above caused a total collapse of the banking system as well as housing prices. At that time the United States had a typical, if weak, version of the 19th century system. Banks offered 5 year balloon loans to home buyers who could make a 50 percent down payment. During the 1930s, unemployment was so high that many buyers could not afford to refinance their balloon loans when they came due. A cascade of foreclosures led to falling home prices and failing banks, aggravating the general downturn.

To help solve this problem, the US federal government created the Home Owners Loan Corporation (HOLC) (XREF) in 1933. HOLC refinanced maturing balloon loans into 25 and 30 year amortizing loans. When HOLC ran out of money, the federal government created the Federal National Mortgage Agency (FNMA or Fannie Mae (XREF)) in 1938 to create a national market for long term mortgage funding. Eventually Fannie Mae was privatized in 1968-70 (and then effectively renationalized in the 2008). Privatization spun out the unsubsidized portions of FMNA as FMNA, leaving behind "Ginnie Mae," the Government National Mortgage Agency (XREF), to provide subsidized lending for public housing projects. Savings and loan banks got Freddie Mac (FHLMC – Federal Home Loan Mortgage Corporation) (XREF), their own version of Fannie Mae, in 1970; it was fully privatized in 1989 and renationalized in 2008.

As the problems of the Great Depression disappeared, Fannie Mae helped to resolve the maturity mismatch problem around mortgages. As a government agency, Fannie Mae could issue long dated bonds with virtually no credit risk to securities markets, turn those funds around to buy mortgages from banks, and then hold those mortgages to maturity on its own books. Meanwhile, banks now had new funds to issue more mortgages. Fannie Mae thus indirectly matched long term investors with long term borrowers. Before then, firms that had long term liabilities had to create long term assets directly by building and operating large real estate complexes. For example, in the 1940s Metropolitan Life Insurance company built over 20,000 apartments in the Peter Cooper Town-Stuyvesant Village and Riverton complexes in New York City, not only matching maturities but also creating a walled garden in which beneficiaries funded their own insurance and pension receipts with their mortgage payments. Fannie Mae effectively did the same thing at a national level, internalizing and socializing the risks of making mortgages, and helping insurance and pension funds get out of the business of managing property. Fannie Mae thus invented, enabled, and popularized the modern US small down payment, 30 year amortization, fixed interest rate mortgage.

Countries without a similar system for removing maturity and interest rate risks, still typically have shorter term, variable rate mortgages. Thus in Italy, the typical mortgage in the 20th century required a 50 % down payment, had an annual interest rate reset, and had a 10 year amortization period. Until the early 2000s, securitization was impossible in Italy. These factors limited the size of the Italian mortgage

market, rendering it less salient in terms of macro-economic stability. By contrast, systems with large amounts of mortgage debt and no stabilizing state institutions had very pro-cyclic mortgage systems. Australian mortgages, for example, are either variable rate or fixed for five years. Any change in interest rates thus flows through to homeowners almost immediately. If the central bank hikes rates, mortgage interest rates follow, sucking cash out of consumers' hands, and amplifying the central bank's effort to slow the economy. The reverse is also true.

Securitization and Macro-stability

Fannie Mae essentially invented the modern mortgage backed securities (MBS) market and the pass through MBS in 1981. (However, the Danish system of covered bonds had been operating a form of pass through securitization for almost a century at that point in time.) The MBS market gave long term investors direct access to long term interest income, but without the headaches of property management, and with a bigger, and thus safer, risk pool. Freddie Mac invented the CMO, collateralized mortgage obligation, a derivative that slices up principal and interest payments so that investors can buy bonds with maturities and returns that vary from the underlying individual mortgages.

To make an MBS, Fannie Mae and Freddie Mac would package mortgages with somewhat similar interest rates, maturities and credit risk into a huge pool with an average interest rate payout, maturity and credit risk. Long term investors bought a percentage of that MBS pool to get a *pro rata* share of principal and interest payments from the pool. Fannie and Freddie, acting as loan servicers, would 'pass through' these payments to investors. If the pool experienced a 1 % default rate, then all buyers of that pool experienced a *pro rata* 1 % loss on their share of the pool. To get a different interest rate, maturity or level of risk investors would need to buy a different MBS. Unlike more complicated derivatives, the mortgages in a pass through MBS stayed intact, allowing the MBS bond holders or the servicer to identify and foreclose on the defaulter. A defaulting mortgage only affected its own MBS pool, and conversely investors in that pool could foreclose defaulting homeowners without affecting other MBS pools.

Even though the MBS system removed maturity mismatches, the US mortgage system concentrated enormous risks onto what theoretically had become private enterprises by the 1970s. Yet Fannie Mae's and Freddie Mac's own underwriting criteria and the general system of financial regulation in place before the 1990s mitigated these risks. The mortgages going into these pass through MBS had to conform to Fannie Mae's and Freddie Mac's underwriting standards – thus the adjective 'conforming' in conforming mortgage. These standards required a potential home-buyer to possess a good credit rating, to document that their total post-mortgage debt payments would consume no more than 34 % of their gross household income, to make a substantial down payment (usually over 10% and typically 20 %), and to borrow no more than 125 % of the median US home value. In short, homebuyers usually came from the cohort of people with well-paying and stable jobs. Consequently conforming mortgages had a default rate lower than 0.5 %. This reduced the risk that the GSEs would have to liquidate mortgages in a panic. Financial firms with large liabilities to the general public would stuff their portfolios with GSE pass through bonds to insulate themselves from downturns.

These pass through MBS were thus in many ways a classic product of the Bretton Woods or 'fordist' (XREF) era welfare state. They socialized the risks in providing housing finance, implicitly homogenized investor returns, and favored debtors (because principal pre-payment was costless). They primarily gave mortgages to people who had stable employment and a good track record of meeting their debt obligations, which limited defaults. The system also theoretically prevented a cascade of foreclosures from causing a banking crash. As the economy turned down, the GSEs would bear most of the pain. But

because banks could still make mortgages, housing prices would not fall continuously. Consequently the GSE system and its process of securitization were counter-cyclic and stabilizing. The same was true for the Danish covered bond system.

The fact that US homebuyers had basically an unlimited right to pre-pay their mortgage (equivalent to a costless call on their bond in a covered bond system) reinforced this process. Two-thirds of the US population is homeowners, and mortgage debt constitutes roughly one-third of all private debt. Mortgage debt is thus macro-economically significant. In an economic downturn, interest rates would fall. Homeowners could retire their old, higher interest rate mortgages, take out new, lower interest rate mortgages, and then consume the difference in payments. This additional consumption would then put a floor under unemployment, helping to stabilize demand and restore economic growth. Conversely, if the central bank raised open market interest rates, homeowners with long maturity mortgages would not experience an increase in their mortgage payments, mitigating the contractionary effects of monetary policy. The system of securitization and widespread mortgage debt was thus counter-cyclical in downturns, and mildly pro-cyclical in upturns, until deregulation changed the way that MBS were constructed and who would buy them.

Securitization and Macro-instability

Financial deregulation in the 1990s and 2000s reversed the structural features through which the mortgage market helped stabilize the macro-economy after World War II. Post-war regulation had reduced interest rate risk and limited maturity mismatches, but both reemerged as deregulation proceeded. These old risks made mortgages and mortgage backed securities a potential force for instability. The peculiar American combination of subprime (non-conforming) mortgages bundled into collateralized debt obligations (CDOs) (XREF) was particularly destabilizing, because it magnified both interest rate risks and maturity mismatches. In effect, subprime CDOs turned the entire post-war mortgage system on its head, by using short term money to give long term mortgages to risky customers, and implicating the entire financial system in the process.

The CDO is a generic version of the CMO, produced by bundling a set of mortgage debts into a synthetic product. Deregulation allowed private investment and commercial banks to manufacture MBS and CDOs – so called private label MBS, in contrast to the GSE pass-through MBS. Private label MBS did not offer investors a pro rata share of payments from a given pool of mortgages. Instead, bankers took a pool of non-conforming mortgages, sliced them into different CDOs, and then assigned each CDO a specific legal priority (seniority) over the underlying flow of payments from the pool. Regardless of which mortgages made interest payments or principal prepayments, those payments were assigned first to the CDO with the highest legal priority (so-called 'super senior' tranches). This legal priority in claiming cash from the flow of payments is precisely what made some CDOs look low risk, even though the underlying mortgages might be subprime.

CDOs are very much a product of the post-fordist era. They took mortgages from non-conforming households (in all senses), allowed short term investors to speculate and earn differential returns, and shifted risks to debtors. Almost by definition, most of the mortgages going into the pool of non-GSE MBS were non-conforming or subprime. If those mortgages had been conforming, they would have been offered to Fannie Mae or Freddie Mac on account of their lower insurance and servicing costs. While not all non-conforming mortgages are subprime, almost all carry greater risks than do prime, conforming mortgages. As it turned out, the risk of default for subprime mortgages was roughly five to six times that

for prime mortgages. By 2007, private label MBS and CDOs accounted for a quarter of the outstanding \$11 trillion US residential mortgage debt.

The GSEs sold pass through MBS to long term investors, thus matching maturities. Investment banks sold CDOs to short term investors – often themselves – thus mismatching maturities. Banks set up subsidiaries to buy CDOs. These subsidiaries – special purpose entities or structured investment vehicles (SIVs) – deliberately funded their CDO purchases with money borrowed on a short term basis from money markets. Investment banks hoped to profit from this deliberate maturity mismatch. The banks used their SIVs to borrow short term, 90 to 180 day cash to invest in CDOs built on 30 year mortgages. SIVs were profiting from the spread created by the apparent maturity difference between the long term CDOs that they held, and the short term money they borrowed from money markets. Longer term debt generally carries higher interest rates than short term debt, and longer term CDOs did yield higher interest, not least because subprime mortgages paid higher interest. The entire benefit of the spread between short and long term rates fell into the banks' hands. Banks knew this strategy was risky, so they insured their operations through credit default swaps [XREF] from insurance companies like AIG.

Like 19th century banks, these subsidiaries were completely vulnerable to any sudden demand from those money markets (depositors). Like 19th century banks, they were vulnerable to any rise in interest rates that might close the spread between their short term liabilities and long term assets. Unlike the 19th century banks that crashed with lamentable frequency, these subsidiaries were tightly connected to the entire financial system, and thus created systemic risks. Not only were banks at risk, but also the entire short term lending system operated by the money markets (who were lending to SIVs) and also the insurance firms (who were insuring the SIVs). When subprime borrowers began to default, money market funds acted like depositors in a bank run. They refused to roll over their loans to SIVs (in effect asked to withdraw their deposits), forcing SIVs to liquidate their CDOs. As in prior crashes, forced sales led to falling asset prices and bankrupt banks. Deregulation thus permitted SIVs to turn a largely counter-cyclical system of mortgage origination and securitization deliberately built on matched maturities into a highly pro-cyclical and systemically dangerous system deliberately built on mismatched maturities.

Conclusion

Mortgages and mortgage backed securities are not inherently macro-economically stabilizing or destabilizing. What matters is who is exposed to the risk of default, and what the consequences of default are. Post-war systems of financial regulation generally encouraged an expansion of private home-ownership and thus of mortgage debt. But they did so in ways that matched maturities and largely removed maturity mismatches from banks' books. They also did so by selectively providing mortgages to households with stable incomes. By matching maturities and lending to prime borrowers they damped down the risks of large scale defaults and thus of financial crises. Post 1990 financial deregulation, especially in the United States, encouraged even more homeownership and yet larger mortgages. But deregulation allowed and encouraged private actors, particularly commercial and investment banks, to recreate the destabilizing maturity mismatches of the pre-regulation era. It also permitted banks to accept the risk of default, even though this was systemically destabilizing. The consequences in 2007-2009 are not surprising. But securitization, properly managed and regulated, can provide mortgage credit to the masses while making it possible for pension funds and insurance firms to find the long maturity assets they need to make their businesses work. This is inherently stabilizing macro-economically.

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