

**Joint Center for Housing Studies
Harvard University**

Alternative Forms of Mortgage Finance: What Can We Learn From Other Countries?

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August 2010
MF10-5**

Paper originally presented at *Moving Forward: The Future of Consumer Credit and Mortgage Finance* – A National Symposium held on February 18 and 19, 2010 at Harvard Business School in Boston, Massachusetts.

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Alternative Forms of Mortgage Finance: What Can We Learn From Other Countries?¹

Introduction

The U.S. mortgage finance system has gone from the envy of the world to a case study of failure in 2 short years. As recently as the 2003-2005 period the system generated an enormous volume of originations (nearly \$4 trillion) that contributed to a record level of homeownership (69.3 percent).² There were impressive gains in low income and minority rates of homeownership. The system was characterized by low mortgage interest rates, robust competition, particularly from non-bank lenders, buoyant house prices and low default rates. While the government role was significant, the major government supported institutions were losing market share. There were, however, ample warning signals that this rosy picture was about to end. Affordability was falling, concerns about predatory lending abounded, delinquencies in subprime lending were rising and numerous commentators warned of unsustainable house prices.

Fast forward to the 2007-2010 time period. Mortgage originations, while still relatively high by historical standards, are down significantly and only prime borrowers can obtain loans. The homeownership rate has fallen to 67.4 percent erasing all the gains since 2000. Conforming mortgage rates are relatively low but spreads to Treasury rates and non-conforming rates are much higher. There is reduced competition as most non-bank lenders have failed and the large banks dominate the market. House prices have been falling for three years and are off more than 30 percent nationwide. The country is experiencing record post-war default and foreclosure rates. The government role has expanded considerably – in fact the government backs nearly all mortgage lending. There is considerable uncertainty about when the recovery in the housing and mortgage markets will begin.

The economic recession that was sparked by the implosion of the U.S. subprime mortgage has been global in dimension. As such it has affected the housing and mortgage markets of many countries. Most developed countries had also experienced robust growth in their housing and mortgage markets during the first half of the decade. Many countries experienced record levels of house price inflation, increased competition and relaxed mortgage underwriting. But no major

¹ Helpful comments were received from Eric Belsky and Bertrand Renaud and several Symposium participants. Any errors are the author's responsibility.

² Harvard JCHS (2009)

developed market has experienced the severity of the house price decline, rate of mortgage default and foreclosure and change in its mortgage finance system as the US. What have these countries done differently?

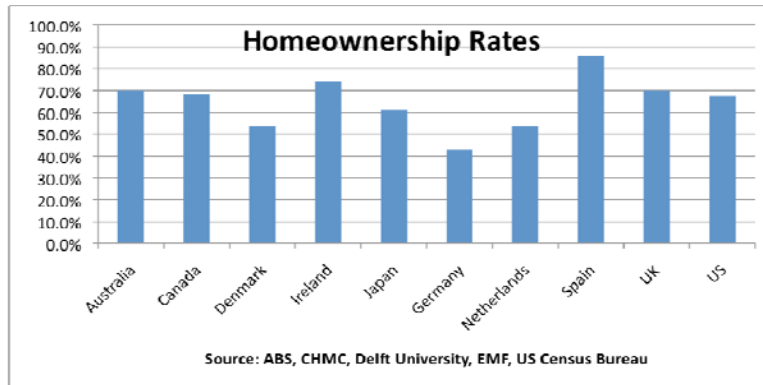
This paper will review the major characteristics and performance of a number of OECD country mortgage markets. The paper will compare and contrast the structure, principal features and performance of the primary and secondary market with that of the US. The comparison will include the types of lender and mortgage instruments in the primary market, institutions and instruments involved in the capital market funding of mortgages how loans are funded and how major mortgage risks (default and prepayment) are managed. The paper will compare and contrast the role of government in mortgage market regulation, consumer protection and in the backing of institutions and instruments through guarantees and ownership in the primary and secondary market. The goal of the paper is to extract ideas about how the US system can be reformed to improve performance and restore private capital market finance.

The paper is organized as follows. Section two provides international mortgage and select housing market comparisons. Section three provides comparisons of the role of government in the mortgage market. Section four details three alternative models of housing finance highlighting their strengths and weaknesses. The concluding section provides some thoughts as to what the U.S. can learn from the experience of other countries.

International Comparisons

The focus of this paper is the finance of owner-occupied housing. Figure 1 shows recent rates of homeownership among a number of OECD countries. The U.S. has a relatively high rate of homeownership but it is not the highest among major developed markets. In this comparison, Australia, Ireland, Spain and the U.K. all have higher rates of homeownership and Canada's rate is comparable to that of the U.S. This is noteworthy for as we discuss below these countries provide far less government support for homeownership than the U.S. Most western European countries have lower rates of homeownership in part due to strong social rental systems. Southern European countries like Italy, Greece and Spain have higher rates of homeownership reflecting cultural values, discriminatory policies towards private rental housing and weaker support of social rental housing.

Figure 1: Select Rates of Homeownership



Homeownership rates in most countries were stable in the 1999-2008 time period. Canada had the largest increase from 64 to 68 percent. Spain, the UK and the US each grew 2 to 3 percentage points.

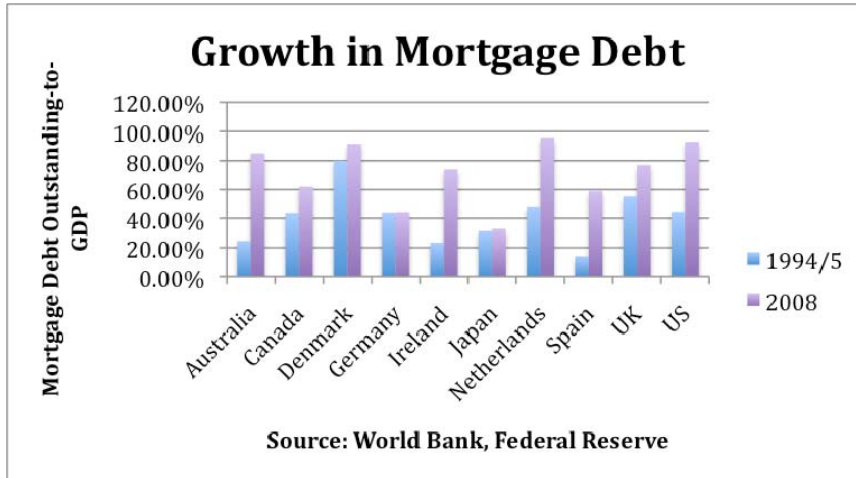
The housing boom was characterized by increased rates of housing construction in many countries. Several countries, notably Australia, Canada, Ireland, and Spain had higher real residential investment to GDP in the 2002-2007 time period.³ Ellis points out that a major difference between the US and other countries was that the increase in dwellings in the US was significantly greater than the increase in households or population, which created an excess supply of houses.⁴

Figure 2 shows the growth in residential mortgage debt outstanding-to-GDP between 1994/95 and 2008. The U.S. ratio grew from 44 percent to 93 percent, an impressive performance. But several other countries had a similar performance. Australia, Ireland and Spain had greater growth and the Netherlands has a higher ratio. All the countries except Germany and Japan had significant growth in their mortgage markets.

³ IMF (2009)

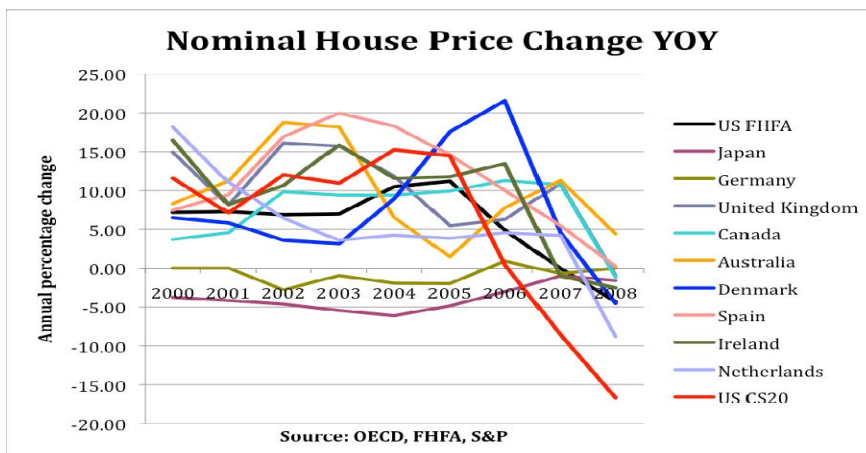
⁴ Ellis (2008)

Figure 2: Mortgage Debt-to-GDP



Although the US had an unprecedented run-up of house prices during the decade, it was not alone as shown in Figure 3. Many OECD countries had greater house price increases between 2000 and 2006 than did the US. Australia and the U.S. were the first of the bubble countries in which house prices fell – the Australian housing market has since recovered. The magnitude of the US house price fall as measured by the S&P Case Shiller 20 metro area index has been greater than other countries. IMF research suggests that the US housing market is more elastic than other countries as evidenced by a higher share of real residential investment and real house price variation explained by housing demand shocks (e.g., lower interest rates).

Figure 3: House Price Evolution



Mortgage interest rates in most countries declined during the decade except in Australia. The Reserve Bank of Australia increased interest rates in 2003 in part to head off a housing price bubble. The rates are specific to the dominant instrument. Australia, Ireland, Spain, and the UK are predominately short-term variable rate markets. Their mortgage rates declined more sharply than those in other countries during the crisis.

Figure 4: Mortgage Interest Rates

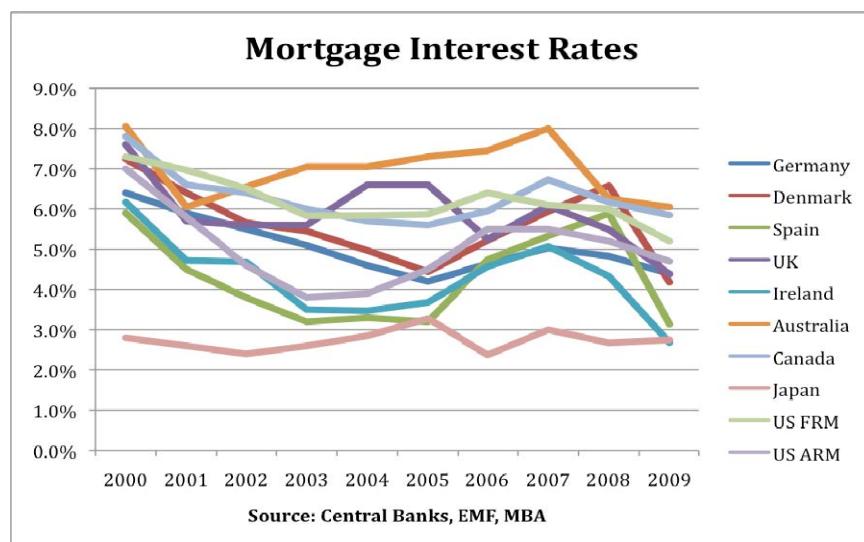
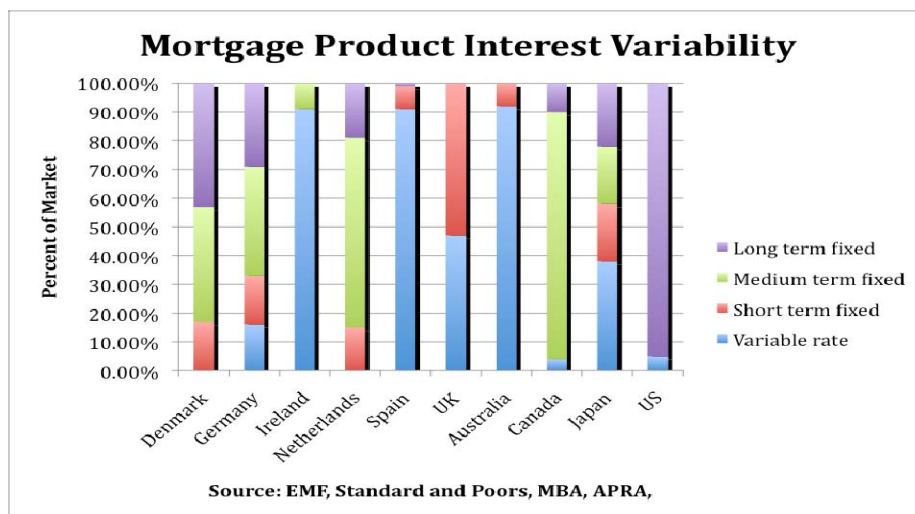


Figure 5 compares dominant mortgage product offerings by country in terms of interest rate variability. There is considerable difference in product types. Australia, Ireland, Spain and the UK are dominated by variable rate or short term (typically 1-3 year) fixed rate mortgages. ARM designs vary – in Australia and the UK the standard variable rate mortgage has a rate set by the lender at its discretion. Rates are changed for all borrowers at the same time. Spain and the US have indexed ARMs. Recently tracker mortgages which are indexed ARMs have become dominant in the UK. Initial fixed rate discounts are prevalent in Australia and the UK. The magnitudes of the discounts are less than those in the US during the boom – typically around 100 basis points lasting 1-2 years.

The US is unusual in the high proportion of long term fixed rate mortgages. The ARM and short term fixed (hybrid) share in the US grew during the boom – accounting for 30—35 percent of loans in the 2004-2006 period but the market has reverted to the fixed rate mortgage in

the crisis.⁵ Long term fixed rate mortgages used to be the dominant product in Denmark but relatively low and falling short-term rates have led Danish borrowers to shift to medium term (1-5 year) fixed rate loans in recent years. Rollover mortgages are the dominant product in Canada, Germany and the Netherlands. These loans have a fixed rate for up to 5 years (10 years in Germany) with a 25-30 year amortization period (briefly up to 40 years in Canada). At the end of the fixed rate period the rate adjusts to the new market rate. There is a substantial (as high as yield maintenance) prepayment penalty during the fixed rate period. A high proportion of Dutch loans are interest only to maximize tax benefits. About one half of Japanese loans are convertible (after the end of the fixed rate term the borrower can select another fixed rate period or switch to a variable rate).⁶ Some Spanish loans are part fixed and part variable rate.

Figure 5: Mortgage Products

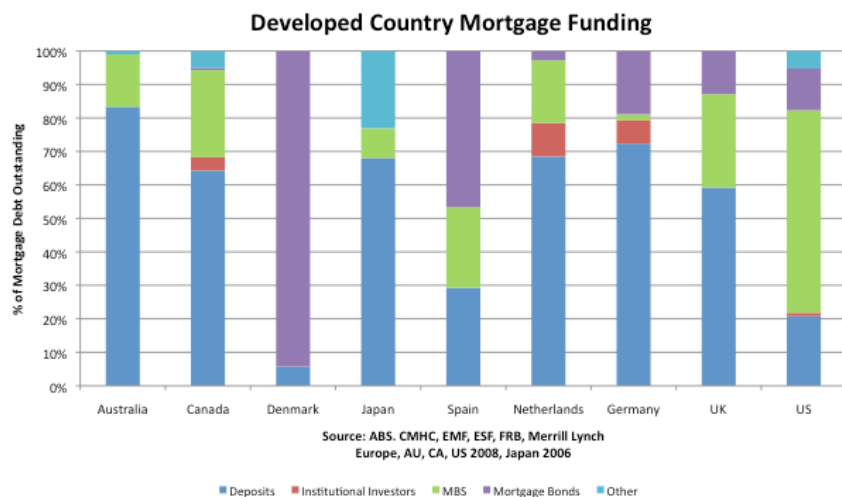


Mortgage funding comparisons reveal interesting differences. As shown in Figure 6, deposit funding dominates in most countries. The US is unique in terms of the importance of securitization. Over 60 percent of US residential mortgages have been securitized – the next closest countries are Canada, Spain and the UK with 24 to 28 percent securitized. Covered bonds are a more common funding mechanism in Europe. Ninety four percent of Danish funding and forty seven percent of Spanish funding come from this source. We will comment later on the role of covered bonds and the reason for their dominance in Denmark and significance in Europe.

⁵ Despite the fact that a 1 year ARM is 144 basis points lower than a 30 year fixed and a 3/1 ARM is 58 basis points lower as of 1/9/10 Wall Street Journal.

⁶ For more detail on Japanese mortgages see Standard and Poors 2009

Figure 6: Mortgage Funding

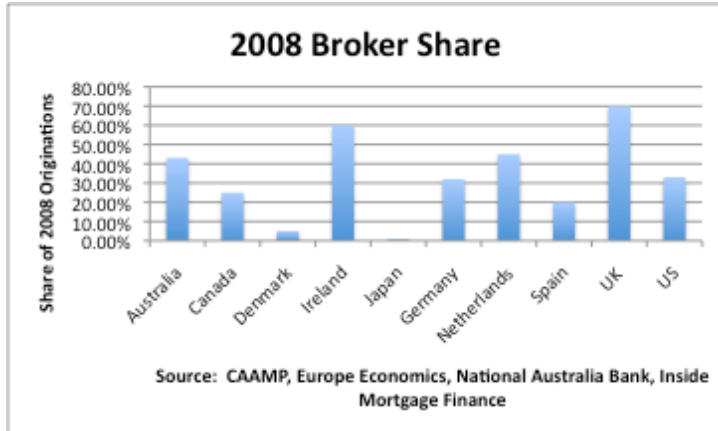


Mortgage lending tends to be dominated by banks and highly concentrated in most countries. The top five lenders have more than a 50 percent market share in Australia, Canada, Denmark, Netherlands and the UK. The top 5 are commercial banks except in Denmark where they are specialist mortgage companies (that are owned by or own commercial banks).⁷ Banks are the largest lender class in Germany and Spain but the individual institution market shares is much smaller. Savings banks (owned by the state governments) are the largest lenders in these countries followed by commercial banks in Spain and mortgage banks in Germany. In Europe all mortgage lenders must have a bank charter (which can be commercial, savings, cooperative, mortgage etc.). The market in Japan is rather fragmented but large city banks have the largest market share. As a result of the crisis the US mortgage market is beginning to look more like those in the other countries, dominated by large commercial banks.

Mortgage brokers play a significant distribution role in many countries. Figure 7 shows the broker share of originations varies widely across countries – as high as 60-70 percent in Ireland and the UK and as low as 1 to 5 percent in Denmark and Japan. The US number does not reflect correspondent lending, which accounted for 31 percent of 2008 originations. Australia and the UK have a small amount of correspondent lending as well. The broker share has fallen in the US as a result of the crisis.

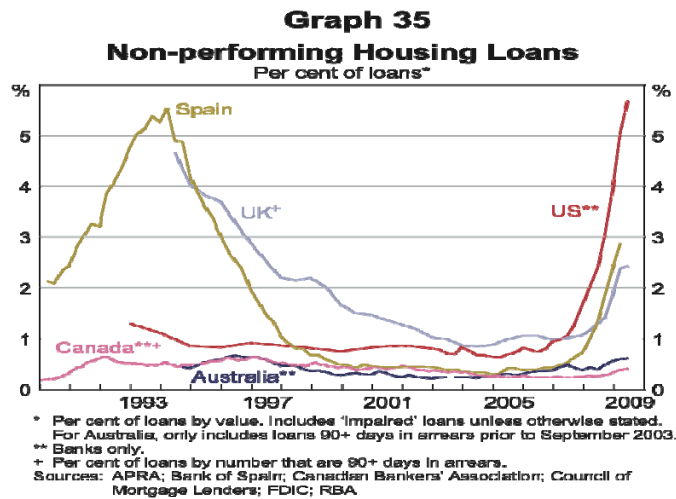
⁷ The Nationwide building society is a top 5 lender in the UK.

Figure 7: Broker Share of Originations



The recession has taken its toll on all mortgage markets but more so in the US than anywhere else. Figure 8 shows comparative mortgage default rates for bank portfolios in several of the subject countries. Mortgage default rates have risen but remain low in other countries.⁸ The U.S. has clearly had a worse bank mortgage portfolio performance than other countries.

Figure 8: Mortgage Performance Bank Loans



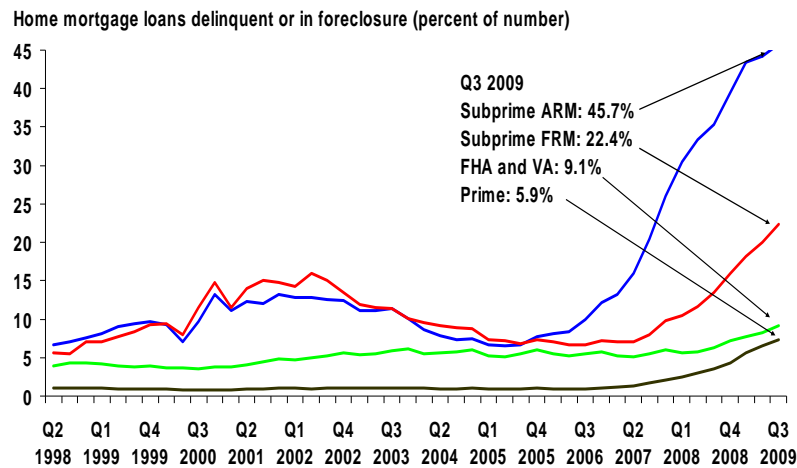
Source: Reserve Bank of Australia 2009

Mortgage performance has been worse for securitized mortgages in those countries with significant securitization. In large part this is due to the fact that subprime or non-conforming mortgages were the collateral for these securities. Figure 9 shows the performance of private

⁸ Danish arrears (not shown) are less than 2 percent and foreclosures 0.4 percent in 2008 (Boyce 2009). German and Japanese default rates are also quite low. Serious default rates on loan held or guaranteed by Fannie Mae and Freddie Mac were over 5.5 percent in early 2010.

label securitized loans in the US. Subprime loans have extraordinarily high default rates reflecting the decline in underwriting standards and risk layering. The recent increase in prime defaults reflects rising unemployment and falling house prices.

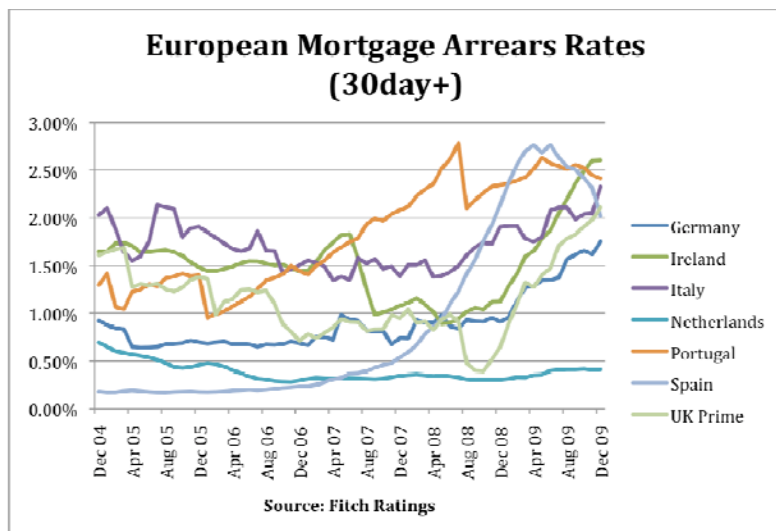
Figure 9: Performance of US Private Label Securitized Mortgage Loans



Source: Amherst Securities 2009

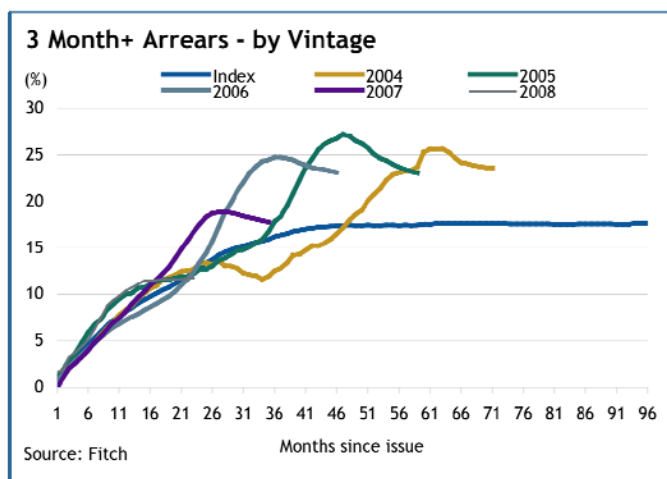
Figure 10 shows the performance of prime RMBS in Europe. Delinquencies on European securitized loans have increased during the crisis but remain well below those in the US. Default rates on Australian securitized loans are less than 1.5 percent and in Canada less than 1 percent. These results reflect the fact that sub-prime lending was rare or non-existent outside of the US. The only country with a significant subprime share was the UK (a peak of 8 percent of mortgages in 2006). Subprime accounted for 5 percent of mortgages in Canada, less than 2 percent in Australia and negligible proportions elsewhere. Subprime loans in Australia and Canada were more similar to US Alt A than true subprime loans.

Figure 10: Performance of European RMBS



The only comparable performance experience to the US is in UK non-conforming mortgages. UK lenders provided both loans to borrowers with adverse credit and with low documentation. UK non-conforming securitized loans have high delinquency rates (Figure 11) but foreclosure rate is far less than in the US.⁹

Figure 11: Performance of UK Non-conforming Securitized Loans



⁹ The UK homeowners mortgage support program assists with mortgage payment for unemployed borrowers for up to 2 years, which may contribute to lower foreclosures. As in the US lenders have been slow in repossessing houses – in part because house prices began rising at the end of 2009.

Role of Government

Tax Treatment of Homeownership

There are many ways government can provide incentives for owner-occupied housing. Perhaps the best known is favorable tax treatment. Figure 12 compares the tax treatment of owner-occupied housing for select OECD countries.

Figure 12: Tax Treatment of Owner-Occupied Housing

Tax Treatment of Owner-Occupation			
	Mortgage Interest	Capital Gains	Other
Denmark	deductible at 33% max tax rate	exempt	
Germany	non-deductible	exempt if held more than 10 years	
Ireland	deduct for 7 yrs. at 25% max tax rate falling to 20%	exempt	
Netherlands	full deductible	exempt	imputed income
Spain	capped at € 9015 @ 15% rate	exempt if reinvested or sale after age 65	
UK	non-deductible	exempt	
Australia	non-deductible	taxable w/ indexed cost base	first time buyer tax credit
Canada	non-deductible	1/2 of capital gain	
Japan	non-deductible	tax at 30% if <5 yrs., 15% if >5 yrs.	deduction of 1% of principal for 10 years
US	deductible limit \$1 million	exemption of \$250k/\$500k if principal residence 2 out of last 5 years	first time buyer tax credit in 2009

Source: EMF, Global Property Guide

The tax treatment of mortgage interest is varied. A majority of OECD countries do not allow a deduction and several that do cap it at low marginal tax rates. Denmark and the Netherlands have full or nearly full deductibility – however both countries tax imputed rent (albeit at low rates). Only the US allows nearly full deductibility without taxing imputed rent. In recent years those countries with deductibility have exhibited faster mortgage growth. Ireland and the Netherlands along with the US had the highest rates of growth in mortgage debt outstanding over the past 15 years and the Netherlands and the US have the highest levels. Note that countries that do not allow deductibility (Australia, Canada, UK) or cap it (Ireland, Spain) have equivalent or higher rates of homeownership than the US. Most countries exempt or reduce the tax on capital gains on owner-occupied housing. Ellis points out that interest deductibility combined with a lack of prepayment penalties in the US may have contributed to a growth in household leverage and mortgage indebtedness through cash out refinance and second mortgages.¹⁰

¹⁰ Second mortgages home equity lines of credit exist in other countries (e.g., Australia, Canada, UK) but in far less volume perhaps reflecting the lack of interest deductibility. The Netherlands has a relatively high incidence of second mortgages (13 percent of borrowers in 2002) reflecting full deductibility and high marginal tax rates.

Mortgage Guarantees and Institutions

The differences among countries in the presence of government owned or sponsored mortgage institutions are more striking. Figure 13 compares select countries in this dimension. The US is unusual in its use of all three types of government-supported mortgage institutions or guarantee programs: mortgage insurance, mortgage guarantees and government sponsored mortgage enterprises. Canada and Japan have government guarantee programs and Canada and the Netherlands have government-backed mortgage insurance programs.¹¹ The market share of government-backed institutions in Canada and Japan is significantly less than that of the US.¹²

Figure 13: Government-Backed Mortgage Institutions

Government Mortgage Market Support			
	Govt. Mortgage Insurer	Govt. security guarantees	Govt. Sponsored Enterprise
Denmark	No	No	No
Germany	No	No	No
Ireland	No	No	No
Netherlands	NHG	No	No
Spain	No	No	No
UK	No	No	No
Australia	No	No	No
Canada	CMHC	CMHC	No
Japan	No	JHF	Possible
US	FHA	GNMA	Fannie Mae, Freddie Mac, FHLBs

The role of government in Canada is more similar to the US than any other country. The Canada Mortgage and Housing Corporation (CMHC) is 100 percent owned by the government and enjoys an explicit guarantee of the Canadian government.¹³ It provides 100 percent mortgage default insurance through its National Housing Act program (similar to the FHA in the US).¹⁴ CMHC also provides timely payment guarantees on securities backed by NHA loans (similar to Ginnie Mae in the US). CMHC administers the Canada Bond Program, which is a trust set up to purchase CMHC-guaranteed mortgage securities funded by the issuance of mortgage bonds. The program eliminates the cash flow uncertainty caused by mortgage amortization and prepayment

¹¹ Australia had a government-owned mortgage insurer from 1965 – 1997. It was sold to Genworth in that year. For an analysis see Lea (2009).

¹² About 25% of Canadian mortgages are securitized through CMHC guarantees. JHF guarantees approximately 25% of Japanese mortgages.

¹³ www.cmhc-schl.gc.ca/en

¹⁴ The Canadian government also provides a 90% backstop guarantee for 2 private mortgage insurers – Genworth and United Guaranty.

through cash flow swaps executed with investment banks. CMHC does not lend to primary mortgage institutions or invest in mortgages.

The Japan Housing Finance Agency (JHF) is a government incorporated administrative agency.¹⁵ It operates in a manner similar to the guarantee functions of Fannie Mae and Freddie Mac, purchasing mortgages and issued mortgage-backed securities with its timely payment guarantee. It does not purchase loans for portfolio although it could do so within its charter. JHF replaced the former Government Housing Loan Corporation (GHLC) in 2007. The GHLC mainly provided loans to the public with funding from the Ministry of Finance. GHLC also securitized some of these loans. It ran into asset-liability mismatch problems that led to the creation of JHF.

The Netherlands has a government-owned mortgage insurer, the Homeownership Guarantee Fund (Dutch: Nationale Hypotheek Garantie (NHG)).¹⁶ NHG provides 100 percent mortgage default insurance and a temporary mortgage payment facility. The fund is a private institution with fallback agreements with the national and municipal governments. These agreements form the basis for interest-free loans to the Fund from the national and municipal governments at times when its assets are no longer sufficient to meet claims. This means that the Fund is able to comply with its payment obligations at all times. As a result, the Netherlands Central Bank (Dutch De Nederlandsche Bank) considers the NHG as a government guarantee.

Unlike Fannie Mae and Freddie Mac, none of the international, government-backed institutions have experienced exceptional loss or required government capital injections. None of these institutions has a formal affordable housing policy mandate. Also none of these institutions takes on much interest rate risk as they have limited or no portfolio accumulation.

Regulation

Government is heavily involved in mortgage market regulation both through consumer protection and safety and soundness in all countries. A major difference between the US and other countries is the absence of specialized housing finance safety and soundness regulators outside the US.

¹⁵ http://www.jhf.go.jp/english/about/pdf/main_1.pdf

¹⁶ Ministry of Housing, Spatial Planning and the Environment, www.vrom.nl

Historically building societies in Australia, Ireland and the UK operated in a similar fashion to savings and loans in the US. These institutions had a specialist regulator. Regulatory reform led to the creation of a single financial regulator: the Australia Prudential Regulatory Authority (APRA) in Australia (1999), the Financial Services Authority (FSA) in the UK (2001) and the Financial Regulator in Ireland (2003). The building societies are regulated the same as banks in these countries. The mortgage credit institutions dominate housing finance in Denmark regulated by the Danish FSA. Mortgage banks are significant residential mortgage lenders in Germany. They too are regulated by the single financial regulatory agency, the Bundesanstalt für Finanzdienstleistungsaufsicht (BaFin). Commercial banks dominate mortgage finance in the other countries in this survey – thus mortgage lending is not subject to specialist regulation.¹⁷ The US is unique in its fragmented regulatory structure with numerous specialized regulatory agencies.

The specialist mortgage guarantee and insurance institutions in this survey also do not have specialist regulators. The Ministry of Finance in their respective countries regulates CMHC and JHF. The Netherlands Ministry of Housing and the Association of Netherlands Municipalities supervise the NHG. An advantage to having a single financial sector regulator is the lower likelihood of regulatory capture or regulatory arbitrage but a disadvantage may be lack of sector specific expertise.

Consumer protection regulation is less clear-cut and in flux. There was significant product innovation and loosening of underwriting in most subject countries during the housing boom. Moderate versions of subprime lending appeared in Australia, Canada and the UK during the 2000-decade. Documentation requirements were relaxed in those countries as well creating a version of the Alt-A market. However, the extent of product innovation and underwriting relaxation did not approach the extent of the US. A study by the Australian Treasury Department in 2008 notes “The lax lending behaviour which gave rise to the sub-prime problem in the United States did not occur in Australia in part because the regulatory environment encourages a more cautious lending culture.”

¹⁷ The mortgage managers and centralized lenders are wholesale lenders funded by securitization in Australia and the UK respectively. They are not subject to bank safety and soundness regulation but are subject to consumer protection and business conduct regulation. Their market share has dropped significantly during the crisis.

In the current market environment, both lenders and regulators are tightening guidelines contributing to a fall in new lending of 40-50 percent in many countries.¹⁸ Lunde et. al. conducted a survey in early 2009 to assess the types of mortgage tightening taking place. As shown in Figure 14, underwriting criteria have tightened in 13 of the 14 countries surveyed.

Figure 14: Tightened Mortgage Underwriting

Change in Mortgage Product Characteristics, late 2007 - late 2008						
Country	Lower loan-to-value ratios	100% mortgages less available	Loan-to-income criteria tightened	Maximum mortgage term shortened	Reduction in Interest Only Loan Availability	Introduction of new loan types to deal with the crisis
Australia	x	x	x			
Denmark	x					
France	x	x		x		
Iceland						
Ireland	x	x	x		x	x
Netherlands		x	x		x	
Norway	x					
Poland				x		
Portugal			x			x
Russia	x	x	x	x		
Spain	x		x	x		
Sweden	x	x			lower max LTV	
UK	x	x	x		x	
US	x	x	x		x	

Source: Country expert's reports Lunde et.al.

In light of falling house prices in most countries, lenders are requiring larger downpayments and 100 percent LTV loans, common in a number of countries before the crisis, have disappeared. Swedish maximum LTVs have declined from 95 percent to 85-90 percent and the average LTV in the UK has fallen from 80 to 75 percent. Lender surveys also reveal tightening – the Netherlands reported 80 percent of lenders tightening in early 2009 and the US reported 65 percent. Affordability criteria have been tightened and all loans are now fully documented.

Most of these changes appear to be at the volition of the lenders. According to the European Mortgage Federation, regulators in several countries are mooting restrictions on products and maximum LTVs. However none have been promulgated. There is no European wide mortgage regulation. The merits of a Mortgage Directive that would create minimum standards for all countries have been debated for a number of years.

¹⁸ Lunde et. al. (2009)

However the industry has steadfastly opposed this approach and developed an industry-wide code of conduct to police transactions.¹⁹

The FSA in the UK has gone the furthest in Europe in contemplating tightened mortgage regulation. Their Mortgage Market Review of October 2009 lays out a number of proposals under consideration. Specifically they are contemplating increased capital requirements for lenders, new quantitative liquidity standards, increased regulation of non-bank (“high risk”) lenders and product regulation. The FSA notes, however, that LTV or debt-to-income (DTI) caps are not yet warranted by the evidence. In particular they point out that LTV or DTI caps are “. . . a blunt approach to achieving the outcomes we want”. They do recommend restrictions on risk layering (prohibiting loans that are a mix of high-risk factors, for example, prohibiting high LTV loans to credit-impaired borrowers who have an unstable income or other similar ‘toxic’ mixes) and requiring income verification on all mortgages. It should be noted that mortgage brokers (intermediaries) are subject to FSA regulation.

The FSA has promulgated suitability standards for mortgage lenders. Specifically, a product will be suitable if there are reasonable grounds to conclude that:

- The client can afford it over the repayment term.
- It is appropriate to the client’s needs and circumstances.
- It is the most suitable of those available within the scope of service provided to the client.
- Lender cannot recommend the ‘least worst’ product if it does not have access to a product that is appropriate to the client’s needs and circumstances. [www.fsa.gov.uk]

The FSA stresses that it expects a “common sense” approach. The lender or broker is expected to thoroughly document the research on and advice given to the client.

The FSA is looking into changing consumer disclosure requirements as well. Notably in their October discussion paper they state: “Our policy approach to date has been underpinned by a view that mortgage consumers will act rationally to protect their own interests. We believe that we need to change that approach, recognize the behavioral biases of consumers and be more interventionist to help protect consumers from themselves . . . Overall, we think that our regulatory strategy needs to change to one that

¹⁹ <http://www.hypo.org/Content/default.asp?PageID=449>

relies less on disclosure as a regulatory tool and looks to influence consumer behavior in a more sophisticated way.” The FSA is signaling that “for example, through banning products or prohibiting sales to those consumers exhibiting multiple high-risk characteristics or limiting the amount of equity that can be withdrawn” consumer protection can be improved.

The UK FSA is not alone in contemplating fundamental consumer protection reform. Australia is in the process of strengthening its consumer protections.²⁰ The Australian Uniform Consumer Credit Code (UCCC) has been in existence since the mid-1990s at the state level. The UCCC empowers the courts to set aside mortgage agreements where the lender could reasonably have known that the borrower would not be able to repay the loan without causing substantial hardship. There have been a number of cases that highlight the circumstances in which the courts have taken action to protect the interests of the borrower.

The National Consumer Protection Bill of 2009 was promulgated to create uniform nationwide legislation to replace existing (but varied) state legislation. The Australian Securities and Investment Commission (ASIC) was tapped to be the sole regulator of the new national credit framework with enhanced enforcement powers. The Code requires all providers of consumer credit and credit-related brokering services and advice to obtain a license from ASIC. It extended the scope of credit products covered by the UCCC to regulate the provision of consumer mortgages over residential investment properties. The Bill requires licensees to assess each consumer’s capacity to repay credit to ensure that the credit contract is not unsuitable for the consumer’s objectives, needs and financial circumstances. There is a planned second phase in 2010 that will reform existing disclosures.

The Financial Consumer Agency of Canada (FCAC) is an independent regulatory body working to protect and inform consumers of financial services.²¹ It was established in 2001 by the federal government to strengthen oversight of consumer issues and expand consumer education in the financial sector. As a federal regulatory agency, FCAC is responsible for:

²⁰ <http://www.treasury.gov.au/consumercredit/content/publications.asp>

²¹ www.fcac-acfc.gc.ca/eng/about/default.asp

- ensuring that federally regulated financial institutions comply with federal consumer protection laws and regulations;
- monitoring financial institutions' compliance with voluntary codes of conduct and their own public commitments;
- informing consumers about their rights and responsibilities when dealing with financial institutions; and
- providing timely and objective information and tools to help consumers understand, and shop around for, a variety of financial products and services.

Suitability standards are being introduced at the provincial level in Canada. The new Ontario Regulations requires lenders to take reasonable steps to ensure that a mortgage being offered to a borrower is suitable for the borrower “having regard to the needs and circumstances of the borrower”. The consumer regulator in Ontario does not provide specific guidelines to determine suitability but stresses that “it would be prudent, in more difficult or unusual situations, to document the process used to arrive at the selected solution, and why it is the appropriate one.”

What Can the US Learn From Other Countries

This brief survey has shown that mortgage finance systems differ significantly across countries in structure, funding, role of government and performance. The US is unique, however, in several respects. It has the highest level of government involvement, the greatest use of securitization, and its product mix is dominated by the long term fixed rate mortgage. These attributes are related. The long-term fixed rate mortgage has been the dominant instrument in the US since the Depression. Its dominance reflects consumer preferences, the ease of prepayment, past restrictions on ARMs and the emergence of the secondary mortgage market. However it results in the federal government absorbing most or all of the mortgage credit risk allowing investors to focus on management and pricing of the prepayment risk.

Despite the high level of government support, the US mortgage finance system has performed much worse than those in other countries during the crisis. Furthermore it does not produce higher rates of homeownership or levels of mortgage indebtedness than many other countries. Thus it is fair to ask whether this unique system is sustainable and

whether the US market would be more stable and effective in meeting the needs of borrowers and lenders with a different configuration.

There are four inter-related factors that should be considered in evaluating a housing finance system: the product, the underwriting, the funding and the role of government. These characteristics are so intertwined that it is difficult to evaluate them in isolation. Thus we will assess the merits of four different systems: the Danish Principal of Balance model, the European covered bond model, the Canadian/Japanese guarantee model and the Australian/UK depository model. Each of these systems has strengths and weaknesses and relevance for the US.

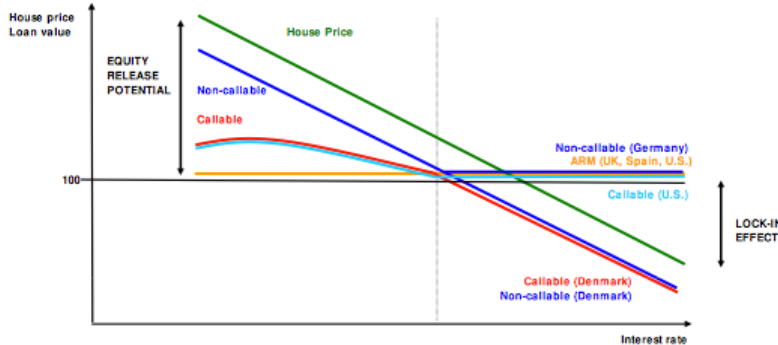
Danish Model

Denmark is the only country in the world other than the US in which the dominant product is the long-term FRM that can be prepaid without penalty. Like the US most its mortgage market is funded through the capital markets. The Danish system adds a couple of important attributes that are relevant for the US.

The Danish system is based on the Principle of Balance. When the borrower obtains a mortgage loan, the mortgage credit institution (MCI) issues a bond into an existing bond series. Thus there is a 1:1 equivalence between the loan and the bond. The Danish mortgage is cancelable at the lower of the market price or par. Like the US the borrower can refinance the loan at par if rates fall. But in the Danish system if rates rise, the borrower can buy her loan out of the mortgage bond at a discount and present to the MCI to repay the mortgage. This feature has several important benefits. It allows automatic deleveraging as rates rise and reduces the probability of negative equity. Figure 15 from Boyce (2010) demonstrates the difference between different mortgages as rates change.

Figure 15

Price/Yield Graph of Various Mortgage Risk Transfer Structures



Source: Boyce 2010

In the US, most mortgage loans can be called at par. However loans may not be redeemed at the market price when trading at a discount. This allows for equity release in the event of lower rates but subjects the borrower to a lock-in effect when rates rise. The Danish mortgage loan can be prepaid at par or redeemed by purchasing the bond at the market price thus eliminating the lock-in effect. For example, if the borrower has an outstanding balance of \$200,000 and rates rise, the value of the bond may fall to \$180,000.²² The borrower can go to the bond market (through the MCI) and buy back the bond and cancel the loan. Thus the borrower saves \$20,000 relative to the US case. Danish borrowers exercised this option in significant numbers in 2006 and 2007 when interest rates were rising, which may have reduced the likelihood of negative equity when house prices fell in 2008 and 2009.

The underwriting of Danish mortgages is more strict than that of the US. The maximum LTV is 80 percent and borrower income is fully documented. Importantly Danish loans are recourse – in the event of a deficiency the lender has recourse to borrower income and other assets. Danish borrowers have in the past been able to get loans over 80 percent through a top up loan system whereby commercial banks provide unsecured loans for the amount over the mortgage.

The MCI in Denmark specialize in residential, commercial and agricultural mortgage lending. The market is highly concentrated with 4 MCI providing over 80 percent of the market. There is no explicit government backing of the MCI or the bonds they issue.

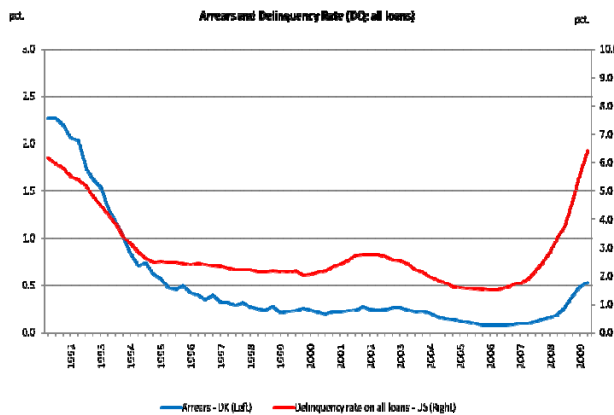
²² Svenstrum and Willeman (2006)

The MCI bear all the credit risk of the mortgages they originate. However they bear no interest rate risk due to their unique funding structure (below). The MCI are required to maintain a minimum 8 percent capital-to-assets ratio. The combination of a low risk structure and Danish FSA and covered bond regulation result in low risk institutions.²³

Danish mortgages are funded through the issuance of covered bonds. Individual loans are funded by selling the loan into a larger bond series. The direct link established between the borrower and the bond market facilitates redemption of the bond in the future. The MCI acts as a liability advisor to the borrower helping her obtain the lowest cost financing. Incentives are aligned in this system in that the borrower and lender have “skin in the game” and the lender serves the needs of the borrower. Prepayments are less cyclical as borrowers can exercise the option when rates rise or fall.

The Danish system has performed well throughout the crisis. Despite having a larger house price bubble (Figure 3) the Danish system has had far fewer defaults (Figure 16) and foreclosures (Figure 17). This can be attributed to less negative equity, absence of sub-prime lending, borrower recourse and strong regulation. The IMF notes that the Danish banking system including the mortgage credit institutions, have fared well despite a housing boom. They attribute this to conservative investments and sound regulation – in particular tight credit risk managements standards and limited market risk.²⁴

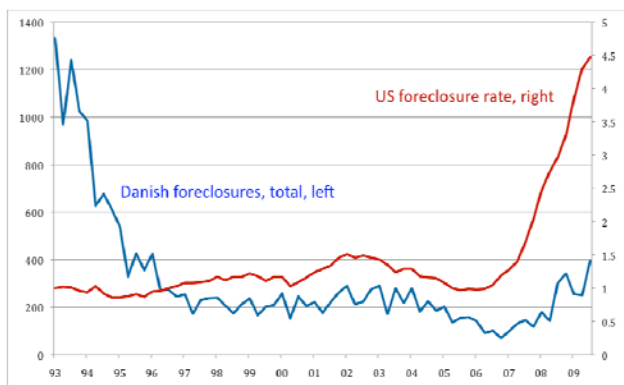
Figure 16: Danish and US Mortgage Delinquency



²³ Realkreditrådet (2009)

²⁴ IMF (2008)

Figure 18: Danish and US Foreclosures



Source: Boyce 2010

The Danish mortgage bond market has performed well. There has never been a mortgage bond default in its more than 200 year history and the market remained open without government assistance during the liquidity crisis of October 2008. The strengths of the Danish system are incentive compatibility, efficient risk allocation without government guarantees and the potential for automatic de-leveraging. The weaknesses are in the need for scale to ensure efficient execution – multi-lender issuers can create scale for smaller lenders.²⁵

The European Covered Bond Model

Covered bonds in other European countries differ from those in the traditional Danish model. Mortgage covered bonds are full recourse debt obligations of the issuing financial institution, secured by a pool of performing eligible mortgage assets (the cover pool) that remain on the balance sheet of the issuer.²⁶ Covered bonds are dual recourse instruments. Investors have a priority claim on the cover pool assets in the event of an issuer default as well as a general claim on the assets of the institution. Thus the lender bears the credit risk of the mortgage. The main difference is the collateral. In the Danish model there is a one-to-one correspondence between the loan and the bond whereas in the European model a dynamic portfolio of mortgage loans backs the bonds.

²⁵ Another weakness in all other models is the absence of forward rate locks and a TBA securities market that allows efficient management of pipeline risk.

²⁶ See European Covered Bond Council (2009) for a detailed explanation of general and country specific frameworks.

Underwriting requirements are strict in the covered bond model. The maximum LTV varies by country but does not exceed 80 percent. There are no legislative documentation requirements or debt service restrictions. As noted earlier, default rates have been low in most covered bond issuance countries. Mortgage loans are recourse obligations in most covered bond countries.

In the European covered bond model borrowers bear potentially significant interest rate risk. Covered bonds can be backed by variable rate mortgages (Spain, UK) or rollover mortgages (Germany, Netherlands, Sweden). European rollover mortgages have prepayment penalties during the period the interest rate is fixed. For example a common form of rollover mortgage has a 25-30 year amortization with a 5 year fixed rate period. During the fixed rate period there is a substantial penalty (typically yield maintenance) for substantial or total prepayment. Thus the borrower can't release equity if rates fall and is locked in if rates rise (the German example in Figure 15)

Most countries allow a partial prepayment (e.g., 20 percent) without penalty. At the end of the fixed rate period the loan rate adjusts to the current market rate. The borrower can manage the interest rate risk to a degree by adjusting the term of the new fixed rate period (e.g., switching from a 5 year to a 1 year if rates are expected to fall).

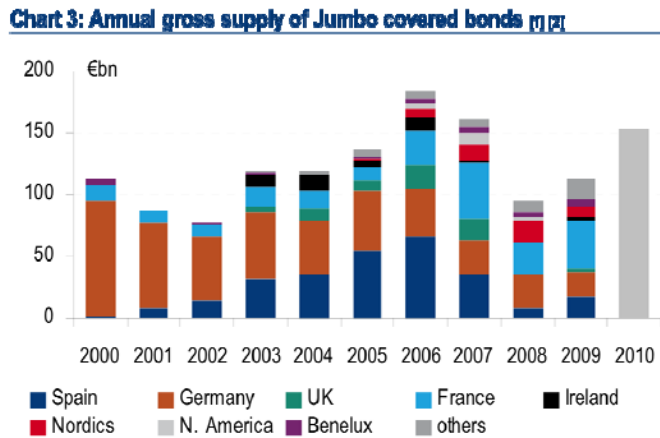
Lenders are also exposed to portfolio interest rate risk in the European model, as outside Denmark there is not a 1:1 match. Covered bond legislation stipulates Asset-Liability Matching requirements such as nominal balance, yield and/or net present value matching. Most European covered bonds also require some over-collateralization. However these requirements have not stopped lender failure due to asset-liability mismatch. Realkreditradet notes that the Irish, German and Belgian governments had to step in and rescue covered bond issuers that suffered losses due to an interest rate mismatch between their mortgage loans and bonds.

By legislation covered bond issuers must be regulated banks – commercial, savings, cooperative or mortgage. There has been a decline in specialist mortgage banks and in most countries covered bond issuers are lenders with a diversified funding mix.

The European covered bond markets were stressed during the crisis. Issuance of jumbo covered bonds (min €1 billion) dropped to near zero in the aftermath of the Lehman bankruptcy (Figure 18). It was only restarted in the first quarter of 2009 after the European Central Bank (ECB) announced a purchase program of up to €65 billion. One reason for the decline in issuance has been the widespread government guarantees of bank debt that have crowded out covered

bonds in most countries during the crisis.²⁷ Unlike the US Federal Reserve purchase program, which purchased more than the net new supply of agency MBS in 2009, the ECB program has been limited and private investors have returned to the market.

Figure 18: Jumbo Covered Bond Issuance



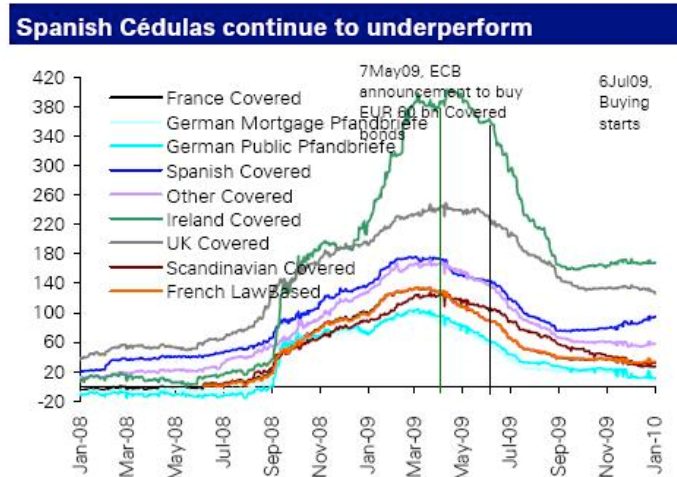
Source: BoFA/M. (1) The 2009 figure includes Jumbo gross supply until 17 November 2008. (2) The 2010 figure refers to the potential 2010 Jumbo gross supply if Jumbo net supply in 2010 would be zero.

Source: Bank of America Merrill Lynch 2009

Secondary spreads widened dramatically during the crisis and are still well above recent historical averages (Figure 19). Investors differentiate among covered bond countries. Those countries with weaker legislation and greater housing market turmoil (Ireland, Spain, UK) have seen much wider spreads.

²⁷ The RMBS market has been closed to new issuance with new issues retained by lenders and repo'd with central banks. Secondary spreads have decline but remain historically high – much higher than covered bonds.

Figure 19: Covered Bond Spreads



Source: Financial Times 2010

The strengths of the covered bond model are incentive alignment (for borrowers and lenders) and achieving capital market access without government guarantees. The weakness is in the allocation of interest rate risk. Borrowers have substantial interest rate risk as they face unlimited interest rate change at rollover and are locked in during the fixed rate term. The longest term is typically 10 years although there are 15 year fixed rate periods in France and Germany. Lenders have suffered losses from interest rate risk and legislative and regulatory asset-liability matching requirements have been tightened.

The AU/UK Depository Model

The dominant Australian and UK mortgage lenders are large diversified banks that fund with deposits and MBS issuance. In recent years UK lenders have also used covered bonds.

The dominant mortgage products in these countries are discretionary ARMs typically with a 1-2 year initial discounted fixed rate period. This product is ideal for depository lenders as they can match asset and liabilities effectively. Over time they have performed in a similar manner to US cost of funds indexed loans as lenders price mortgages at a margin over their average cost of funds. Basing interest rate change on lender cost of funds does shield the borrower from some interest rate risk (relative to ARMs indexed to short term government or money market rates) as the cost of funds is not as volatile as these rates. However lenders in the UK have been moving to indexed or tracker ARMs in recent years in part due to consumer complaints about the differential

treatment of new vs. existing borrowers. Both countries are notable in the absence of medium to long term fixed rate mortgages (see Miles 2005).

Although borrowers bear interest risk in this model the use of ARMs has cushioned the downturn. Both the British Building Society Association and Council of Mortgage Lenders attribute low rates of mortgage default to the exceptionally low mortgage interest rates. The question will be how borrowers respond to the inevitable tightening of credit and increases in interest rates. Australia has some experience as it was the first major country to begin raising rates coming out of the crisis. House prices have been rising in Australia and default rates remain low.

Mortgage loans predominately remain on the balance sheet of lenders in this model. Although there is no government guarantee or insurance in this model pre-crisis securitization accounted for as much as 25 percent of mortgage debt outstanding. In Australia about one-third of mortgages have 100 percent default insurance from private mortgage insurers. Almost all Australian securitization transactions had credit enhancement (loan or pool) from a mortgage insurer. Private mortgage insurance is available but not widely used in the UK and credit enhancement primarily comes from structuring.

Underwriting of mortgages in Australia and the UK was more liberal than that of continental European lenders but more strict than the US. Non-conforming loans in Australia were low doc or high LTV loans—very little true sub-prime loans were granted. The UK lenders provided loans to borrowers with adverse credit as well as low doc and high LTV. As noted earlier default rates on non-conforming product were much higher than bank originated conforming loans.

The regulatory performance in these two countries has been mixed. APRA and the Reserve Bank of Australia were credited with cooling a house price boom in the mid-2000s. The UK FSA has been criticized for its oversight and resolution of mortgage lenders such as Northern Rock and HBOS.²⁸

Both governments supported the market during the crisis with mortgage security purchase programs. In September 2008, the Australian government announced it would invest A\$4bn, which was then increased to A\$8bn in October via its asset management arm – the Australian Office of Financial Management (AOFM) – to purchase triple-A rated RMBS to shore up

²⁸ House of Commons (2008)

investor confidence in the sector and revive competition in the mortgage market.²⁹ The securitization market re-opened in September 2009 and more than A\$ 6 billion in securities have been purchased by private investors since that time. The UK government has broadened the eligibility guidelines for central bank repo's to include most AAA mortgage securities. Four RMBS have been issued in late 2009 and early 2010 with wider margins, significantly greater credit enhancement and puts to the issuer.³⁰

Although the Australian and (arguably) the UK mortgage markets have performed better than the US during the crisis, it is unlikely that US mortgage borrowers are going to accept adjustable rate mortgages in high proportions. But the US market may move in this direction as large banks have increasing market share.

Canadian/Japanese Guarantee Model

The Canadian and Japanese mortgage markets have had less dislocation than most other developed countries. They have avoided the high rates of default, lender failures and large house price declines evident in other countries. Commentators attribute this performance to more conservative lending practices, tighter regulation and government guarantees.³¹ Of course Japan has never truly recovered from the property boom and bust of the late 1980s and has had anemic economic performance since.

The Canadian model mixes attributes of the European and US models. The dominant instrument is the rollover mortgage – similar to that found in continental Europe. The maximum interest rate fixed period is five years although a few 10 year fixed terms were offered prior to the crisis. As in Europe there are significant penalties for early repayment. Thus most interest rate risk is borne by borrowers. Japanese borrowers have somewhat greater ability to manage interest rate risk with convertible mortgages.

Canadian borrowers have responded to falling and low short-term interest rates by switching to variable rate mortgages. Over 45 percent of new mortgages taken out in the first three quarters of 2008 were variable rate increasing the stock of such loans to 25 percent of the total.³² The ability to switch between variable rate and medium term fixed rate loans affords

²⁹ Bank of America Merrill Lynch (2009b)

³⁰ Bank of America Merrill Lynch (2010 a, b)

³¹ See Kiff (2009) for a Canadian discussion.

³² CMHC (2009)

Canadian borrowers some ability to manage interest rate risk. The Canadian government did offer interest rate insurance from 1984 to 1997 but it had a very low take up.

Lenders and the government hold credit risk in Canada. The government supports mortgage lending and funding through mortgage insurance and security guarantees, similar to FHA/GNMA in the US. Canada is unique in requiring mortgage insurance on all bank originated mortgages with LTV >80 percent. Approximately 45 percent of all bank-owned mortgages are insured and almost all securitized loans are insured. Requiring mortgage insurance has two benefits: It provides an outside review of lender practices and ensures risk capital in the origination process. CMHC guarantees have kept the MBS market functioning during the crisis. CMHC has no affordable housing goals comparable to the US GSEs. The JHF in Japan retains credit risk on loans it purchases and securitizes (approximately 25% of the market).

Canadian lenders and insurers are relatively conservative in underwriting. Payment affordability criteria are similar to the US prime market. There is a small Alt A market aimed at self-employed borrowers with difficulty documenting income. The maximum LTV is 95 percent and all bank owned loans with LTV greater than 80 percent are required to have mortgage insurance. Mortgages are recourse obligations. Kiff notes the differences in the relative treatment of prepayment in Canada and the US. Although Canadian lenders impose prepayment penalties the origination (transactions) cost to the borrower is less. His calculations suggest that the cost to refinance (penalty plus transaction cost) is comparable between the two countries. Prepayment penalties are not common in Japan and borrowers frequently make partial prepayments.

The Canadian financial regulatory structure is widely credited with enhancing the stability of the system. The IMF commended the Canadians on their highly effective and nearly unified regulatory and supervisory framework.³³ Freeland notes that conservative mortgage market regulation, including the requirement that all loans over 80 percent LTV have mortgage insurance has contributed to its stable mortgage market.³⁴

The government acted to support the MBS market during the crisis by committing to purchase C\$125 billion of CMHC guaranteed securities in October 2008. Issuance of CMHC guarantee MBS and Canada Bonds increased sharply in 2008 and 2009 reflecting the value of the guarantee and the Bank of Canada purchase program.

³³ IMF (2008b)

³⁴ Freeland (2010)

Conclusions

There is no ideal housing finance system. Individual country arrangements reflect history, market structure and government policy. However, almost all country housing finance systems performed better during the crisis than that of the US. In examining the different systems we can make several observations about what worked and whether it is applicable to the US.

The Danish system offers the prospect of real improvement in the US system. It retains the core long term fixed rate mortgage product but makes it more consumer and investor friendly by adding the option to repay the loan through the bond market if rates rise. This feature would have reduced some of the negative equity build up in the US system during the crisis and the significant extension risk faced by mortgage security investors today. As discussed by Boyce the Danish system could be implemented through the GSE cash purchase programs that were significant during the 1980s before being largely phased out in favor of swaps and bulk purchases from individual lenders.

The Danish model is also better at aligning incentives as the credit risk remains on the balance sheet of the lender with substantial capital requirements. In theory a Danish style covered bond model could replace the GSE funding model. Although dropping government guarantees) at the current time would be unwise and infeasible, as the crisis dissipates the US could move to a hybrid model in which Danish style mortgage bonds have a back up government guarantee (e.g., a GNMA wrap).³⁵ A model in which a private guarantor or issuer holds significant capital, combined with private mortgage insurance, would come close to achieving a similar allocation of credit risk as the Danish system. Restricting the government role to guarantees without portfolio accumulation of mortgages would reduce the systemic risk of the US housing finance system in line with the more targeted and stable Canadian system.

If the US wants to reduce the role of government in the funding of mortgages it could move towards a European style covered bond model. Although less desirable than the Danish model from an interest rate risk allocation perspective, it does align incentives and creates a liquid, simple and low risk security to fund housing. As noted above there is some flexibility for borrowers to manage interest rate risk and interest rate risk insurance products could be offered to further reduce borrower exposure. The rollover mortgage is a much simpler instrument than the

³⁵ Jaffee (2009)

US ARM, which lends itself to improved consumer disclosure and subjects the borrower to less short-term interest rate and payment volatility than a traditional US ARM.

An important feature of most developed country housing finance systems that would reduce credit risk for lenders, investors and the government is recourse. Research in Europe has found that the propensity to default in the face of an adverse income shock is closely related to the punishment incurred by doing so, which in turn depends on the legal framework.³⁶ Recent US research suggests that recourse decreases the probability of default when a borrower has negative home equity.³⁷

Government policy supporting homeownership could be adjusted to focus less on mortgage debt and leverage. Many developed countries achieve similar or higher rates of homeownership than the US without a mortgage interest deduction or government subsidies for mortgage debt (GSE support). The tax system in the US has contributed to excessive borrower leverage and the high degree of negative equity. The current homeownership tax credit program could be expanded to replace the mortgage interest deduction.

It is clear that the decline in underwriting standards inherent in sub-prime lending was responsible for extending and accentuating the housing boom in the US, worsening the housing bust and creating the spark that triggered the financial crisis. No other country experienced a similar decline in standards. Several countries started down this road but none created a market with as poor quality loans as the US. Several factors appear to be responsible. First no other country had as significant a shadow banking system as the US. In all other countries there was greater regulatory oversight of mortgage lending which may have slowed the move to lower standards. Having one financial regulator with responsibility for non-bank as well as bank lenders is an important attribute of regulation. Second, mortgage lending in most markets is dominated by large commercial banks. There is some evidence (e.g., in Australia) that large lenders avoided the excesses of non-conforming lending due to concerns about reputation risk. Third there was not as much government policy emphasis on homeownership in other countries – an emphasis that many commentators suggested was responsible for part of the subprime problem in the US. Finally requiring lenders to explicitly consider borrower affordability as is the case in many other countries would have reduced the prevalence of stated income loans and teaser ARMs.

³⁶ Duygan and Grant (2006)

³⁷ Ghent and Kudylak (2009)

Unlike most developed countries, the US is still mired in a housing and mortgage crisis. Continued and expanded government support of the mortgage market is essential to its current survival. But when the recovery begins, US policy makers should ask themselves whether it is desirable that most if not all of the US mortgage market is guaranteed by the taxpayer, whether it is necessary that a majority of US mortgages are securitized and whether homeownership should receive as much emphasis and policy support as it did before the crisis. Examination of the finance of housing from other developed countries suggests that alternative arrangements with far less support from the government can achieve outcomes that are more robust than that in the US.

References

- Australian Government Consumer Credit website
<http://www.treasury.gov.au/consumercredit/content/default.asp>
- Australian Government, “Financial Services and Credit Reform: Improving, Simplifying and Standardising Financial Services and Credit Regulation”, June 2008
- Bank of America Merrill Lynch, *European Structured Finance Markets 2009-2010*, November 2009
- Bank of America Merrill Lynch, *Australian RMBS Performance Update*, October 2009
- Boyce, Alan “The Danish mortgage system offers some practical tools for the GSEs”, presentation to the Center for Study of Responsive Law, January 2010
- Canada Mortgage and Housing Corporation, *Canadian Housing Observer 2009*
- Duygan, Burcu and Charles Grant “Household Debt Repayment Behavior: What role to institutions play”, FRB of Boston Quantitative Analysis Unit Working Paper No. 08-3, March 2008
- Ellis, Lucy “The housing meltdown: Why did it happen in the United States”, BIS Working Paper #259, September 2008
- Freeland, Chrystia “What Toronto can teach New York and London”, Financial Times January 29, 2010
- Europe Economics, “Study on Credit Intermediaries in the Internal Market” report to EU DG Internal Market and Services, January 2009
- European Covered Bond Council, *Factbook 2009*
- European Mortgage Federation, *Hypostat*, 2009
- European Mortgage Federation, *Quarterly Review 2nd Quarter 2009*
- Financial Consumer Agency of Canada website “Who We Are” <http://www.fcac-acfc.gc.ca/eng/about/default.asp>
- Financial Services Authority (UK), *Mortgage Market Review*, October 2009
- Financial Times, “Next Up for Europe: Covered Bond Catastrophe?”, February 5, 2010
- Global Property Guide, <http://www.globalpropertyguide.com>

- Harvard Joint Center for Housing Studies, *State of the Nation's Housing 2009*
- House of Commons Treasury Committee, "Run on the Rock" January 2008
- International Monetary Fund, "Canada Financial Stability Assessment Update", February 2008
- International Monetary Fund, "Denmark: 2008 Article IV Consultation – Update", December 2008
- International Monetary Fund, "The Changing Housing Cycle and Implications for Monetary Policy", World Economic Outlook chapter 3, October 2009
- Jaffee, Dwight, "The Future Role of Fannie Mae and Freddie Mac in the U.S. Mortgage Market" paper presented at the AEA/AREUEA session "The Future of the GSEs", Atlanta GA, January 3, 2010
- Kiff, John, "Canadian Residential Mortgage Markets: Boring But Effective", IMF Working Paper, WP/09/130, June 2009
- Lea, Michael "The Political Economy of Mortgage Insurance: The Australian Experience", paper presented at the Joint 2009 AsRES-AREUEA International Conference, July 2009
- Lunde, J. K. Scanlon and C. Whitehead, "Mortgage products and government policies to help troubled mortgagors: responses to the credit crisis", paper presented at the ENHR International Conference 'Changing housing markets: integration and segmentation' June 2009
- Netherlands Ministry of Housing, Spatial Planning and the Environment, "Housing Funds", <http://www.vrom.nl/pagina.html?id=37432>
- Realkreditrådet, *The Traditional Danish Mortgage Model*, 2009
- Reserve Bank of Australia, "Financial Stability Review", September 2009
- Standard and Poors, *Japan's Residential Mortgage Loan Characteristics And Trends, RMBS Outlook For 2009*, July 2009
- Svenstrup, M. and Willeman S., "Reforming Housing Finance: Perspectives from Denmark", *Journal of Real Estate Research*, 28, 2, 2006