

DISSERTATION

By

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Doctoral Candidate

2013



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A Typology for Forecasting Nonperforming Mortgage Loans in the United States, Ireland, China and Spain

Chapter 1

Introduction

Residential real estate market accounts for ten percent of the US economy and overall it has the same impact on world economy. In the last decade it became the largest growing segment for investments, both for private investors and institutional investors. As real estate market became integrated into the capital markets, it became riskier. Residential real estate is widely accepted as a separate asset class in the capital markets and as such, has to compete with other investment options, asset classes, such as bonds, equities.

Mortgage financing is heavily dependent on the overall economic situation in each country and since the markets are highly integrated, global economic situation. Just as the financial markets fluctuate, a residential real estate market fluctuates. The most recent example is a capital market phenomenon where prices spiked higher in 2005 -2006 based on a wall of capital moving into the real estate (MacKinnon 2010). A comparative study of commercial real estate in US and British markets discovered that Real Estate Investment Trusts trading on stock markets with the associated liquidity and price transparency are more efficient than the direct real estate market. (Barkham and Geltner 1995).

The financial markets, countries and people are still reeling from the largest residential real estate decline in history. There have been several phenomena that contributed the gradual increase and subsequent sudden decline in the real estate market. The gradual increase in residential real estate prices could be attributed to several interlinked events.

In US it was an investment opportunities, where real estate markets were considered an investment that would yield certain return in the future. House flipping became a popular form of money gains. This coupled with mortgage interest tax write offs and easy financing (that was achieved by creative financial mortgage schemes) provided a substantial demand for residential real estate. Increased demand, insufficient supply created a rapid growth in real estate pricing.

In Ireland, after entering the EEC in 1973 and going forward the government implements several very successful fiscal policies. One of them was “trilateral” wage agreement between unions, employers and the government that insured wage moderation, competitiveness and industrial peace which was instrumental in attracting foreign direct investment. This agreement resulted in wage increase by two-three times compared to the rest of the euro area. Annual gross wages in Ireland in 2007 were the highest in the euro area, except Luxembourg. (Regling and Watson, 2010) Sudden availability, relaxed banking created an ideal situation for real estate boom, since demand for housing exceeded the supply.

In both countries the sudden decline became just matter of time. As the demand soared and real estate prices increased, other industries became invested in this lucrative market. The construction sector became the largest growing industry, hiring new employees and creating more employment opportunities and income to large amount of people, in order to satisfy the demand. The mortgage industry became a large conglomerate that spanned

from small privately owned underwriting agencies to large banks. All of these were competing for the same assets and customers.

On the other hand the residential real estate in China is booming. The residential real estate prices are on the rise, increasing 25% in 2009. The Chinese government was concerned that similar situation will transpire on the real estate market as did in Western countries and proactively changed its residential policy with series of tightening. This has forced the real estate developers to slow down the building process and created shortage in supply and thus pushing the prices up. The major difference is also bank ownership. The government owns almost all the banks and when the global downturn in economy started, the government ordered to increase lending in order to stimulate the economy, effectively providing the economy extra 9.59 trillion Yuan. The government made it easier to borrow money thus further increasing demand for properties.

All countries faced the same issues. The originator (broker) and financing issues that stemmed from:

Credit rating - MBS are usually issued by large financial institutions with a great bargaining power which may indicate conflict of interest when it comes to credit ratings.(He, Qiam, Stratham, 2009)

Real estate appraisals - Originators compensation was tied directly upon originating loans. Because appraisals were used to estimate borrower's equity, over-valuation of collateral resulted in under-estimation of default risk. (Diaz and Hansz, 2010)

With another slowdown in the worldwide economic activity in the past quarter, the residential real estate market is facing yet another downward pressure. Inflation adjusted home prices declined on a year-to-year basis, coupled with low borrowing costs led to increased affordability. On average, US inflation adjusted home-prices declined by 6%, and Ireland by 14%. (Scotiabank Group, 2011). The US residential real estate market has a record affordability, but unemployment, lender apprehensiveness and backlog of existing properties on the market are slowing down the recovery. In Ireland, similar problems, such as unemployment and oversupply are hindering the residential real estate recovery.

Research Questions

I propose to create a theoretical model based on country's institutional data to determine their impact on the CMBS market and REIT (Real Estate Investment Trust) – namely mortgage defaults. Was the downturn in residential real estate due to economic factors? Each country has a slightly different financial structure and rules that govern mortgage financial markets. The mortgage lending structure changed and includes several more participants that each require to benefit from the process. Fees charged by real estate agents, lending companies, requirement to use the open financial markets in order to obtain sufficient funds for lending. Was the caused due to the new structure of lending? Based on recent studies and especially press coverage, it might appear that each of the countries has had the same issues. Although the results on the residential real estate markets of the cumulative problems are well known, the underlying issues might be different in nature for each country. By understanding and exploring the residential real

estate markets institutional and structural point of view, analysts would be better equipped to face the next downturn in the market.

If the downturn was caused by underlying economic factors and economic recession, than as the economic situation improves, the markets should correct themselves. However, if the downturn in real estate residential market was structural, the new way of lending was a faulty model to follow, than if the policy is fixed, the markets will correct themselves.

Research Scope

The research will be based on three case country case studies – USA, Ireland, and China to represent North America, EU, and Asian markets. The questions that should be answered are: Which economic variable has the most impact on the mortgage financial markets? How can we limit its impact in the future or at least be able to better predict the next housing downturn? Was the downturn structural, the new way of lending is flawed and the rules need to be changed?

Out of scope: the following regions will not be used in any of data or case studies: Africa and South America.

Hypotheses Related to Sub-prime Model of Lending

Hypothesis One (H1):

Fees charged by mortgage broker played a major role in the mortgage defaults in all three countries.

“According to the Broker Census conducted by Mortgage Strategy magazine, 64 percent of mortgage brokers now charge a fee for advice.” (Jones, 2010) Furthermore, 53 percent of all brokers are fee based. Because of the new complicated lending market, many buyers and sellers require more complex advice and correct connection to the appropriate lenders based on their need. These fees can range anywhere from 0.3 to 1 percent, depending on the amount of loan and its structure.

Hypothesis Two (H2):

Rating agencies revenues mortgage securities were responsible for faulty mortgage ratings and subsequent defaults in all three countries.

As the traditional model of mortgage lending disappeared, banks and other financial institution were forced to change their policies and procedures regarding lending. Their main source of revenue is interest income and fees. Since the bargain shopping for “no fees” services was prevalent among customers, financial institutions had to rely on the increase in interest income to cover their operating expenses. This created an unfavorable trend of relying on derivative securities for mortgage financing. Based on the result, create a “impact index”, that includes, fees and interest income from different investment options – which of those have the largest impact on financial institutions and how they can mitigate it.

Hypothesis Related to the Economic Factors

Hypothesis Three (H3):

The unemployment rate has the largest impact on the number of foreclosures in all three countries.

The economy across the world has contracted severely since 2008. Based on IMF data, world output has contracted by -0.7% in 2009 with the advanced economies taking the major downturn of -3.7% and emerging and developing economies at 2.8%. (Global Prospects and Policies, IMF, 2011) This major downturn has created unemployment across all the nations and the lack of personal income contributed in large to the number of foreclosures.

In our three case countries, the unemployment numbers have been climbing steadily since 2007. United States has had for a long time a fairly low unemployment rate. Until the mid of 2008, the rate held below or slightly above 6%, however by 2010 it had settled at just below 10% and remained above 8% to date. Ireland's unemployment rate was on average below 6% in years 2005 – 2007 and started to climb in 2008. It has reached 15% in the year 2010 has not declined since. China has no experience significant swing as the developed countries and the unemployment rate fluctuates 4% to 4.5% over the period of seven years from 2005 to 2012. However, again the highest unemployment rate has been recorded in 2010. Please see Appendix VI for more detail.

Hypothesis Four (H4)

Price of the real estate has a very important impact on the number of foreclosures in all three countries.

Home prices were soaring since 2001 and the real estate was used for turning profit quickly, not for long-term investment. During April 2005 the median home price jumped to \$206,000, up 15 percent in one year and up 55 percent over the past five years in the US market. Sales of new existing homes set records in 2004 and housing accounted for a quarter of the nation's GDP. (Time, 6/2005) In Ireland, the market peaked in mid-2007 and average asking price for a home was €366,000. It dropped 43.1% to €212,000 asking price in 2011. (Estates Gazette, 2011). In China, the real estate prices peaked a little later, more specifically in 2007.

Hypothesis Four (H5)

Interest rates and ease of lending have a large impact on the number of foreclosures in all three countries.

“One of the major factors contributing to the crisis the fact that interest rates were continuously below 3 percent from September 2001 to May 2005, having been below 3 percent for only 5 months of the previous decade.” (Friedland, 2009) Lower short-term rates increased the lower short term borrowing, but also enticed borrowers to enter into adjustable mortgage rate. Irish mortgage rates were dropping from 2001 to 2006 from average of 6% to average of 4% respectively. (Global Property Guide, 2011) The mortgage interest rates in China were also no following the typical flow of increase and decrease and affordability. The mortgage interest rates had been the lowest in 1999 and 2000 following as low as 5.31% for 5 and longer year terms. Since then the rates had been steadily

increasing to 7.40% in 2008. Only this year the Chinese banks and the government finally relaxed the long-term mortgage rates by 7.05%

Hypothesis Four (H6)

Nations personal savings rate has an impact on foreclosures in all three countries.

The personal savings rate has been steadily declining not only within US, but also in other advanced economies. “Personal saving has declined from about 10 percent of disposable income in the early 1980s to 1.8 percent in 2004.” (Garner, 2006) This trend continued and in 2005 the savings rate was negative for the first time since the Great Depression.

Household savings ratio increased from 4.7% in 2002 to 11.1% in 2008. As the crises continued, household savings rate in Ireland continued, the household saving rate further increased to 14.7% in 2009 (CSO, Ireland, 2010) China however had led an opposite trend of saving rate. The household saving rate increased from 17% in 2005 to 27% by 2011 (Chamon, Liu, Prasad, 2011).

Motivation for the Research:

Throughout my studies in the doctoral program I have been thinking about my dissertation and how to merge it with the real-life knowledge I have about financial markets. As a former senior business analysts and derivative specialist in a large financial corporation I have been in daily contact with mortgage securities. I have seen firsthand the impact of write-offs, bankruptcies and payoffs on a real-estate mutual funds or just a mutual fund that holds mortgage backed securities. Taking into account the turmoil in the economy and the volatility in the residential real estate market in the last four years I have decided to concentrate on this area.

Chapter 2

Survey of Literature

The Survey of Literature is focused in three areas as that are explored in the research model. The survey starts with marketing theory overview, continues with mortgage financial markets history and current situation and finishes with institutional overview of determining factors.

Traditional Mortgage Lending Model

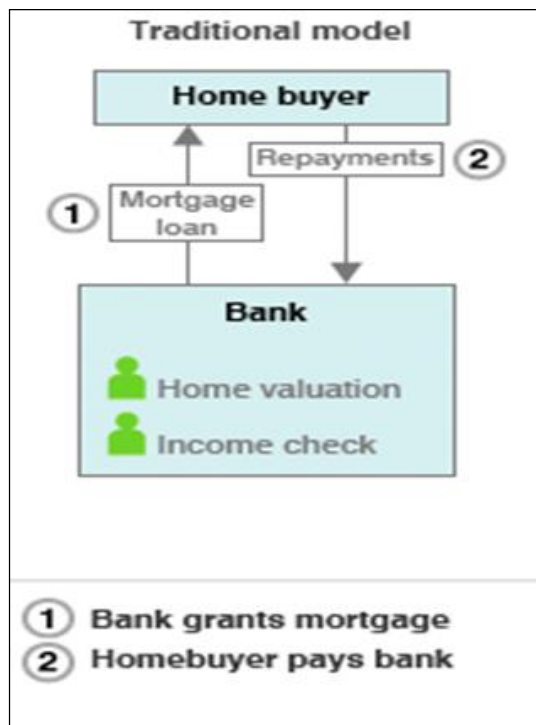


Figure 1 - Traditional Model of Mortgage Financing (source: BBC.com – Special Reports, Mortgage Meltdown)

Mortgage lending always required two interested parties – lender and borrower. Typically the lender was a bank and the borrower, a new home owner. Traditional lending only involved two parties and it was a fairly safe process with checks and balances in place. But this has also limited the amount of lending the banks were able to do.

The money flow was from the customer's Bank directly to the borrower and borrower repaid money directly to the bank. In case of insolvency, the money stopped flowing and bank wrote off amount. There were several safeguards in place directly verified by the bank.

Home Valuations

Home Valuations have represented of the problems that lead to the current real estate issues. In traditional mortgage model, the bank was the responsible party for hiring a qualified and independent appraiser. The appraisal was directly at the property and the paperwork with the actual value was provided to the bank. Only if requested directly by the home buyers, the appraisal was sent to them.

These appraisals should have been done based on the property's location, size, amenities, school systems and market they were located in. Since the beginning there has been a bias in residential real estate appraisal. Appraisers can be subjected to many influences from the clients, previous opinions about the property, value opinions of other appraisers, values of comparable properties and also previous price offers on the property.

Cho and Megbolugbe (1996) discovered that 95% of the appraised values were greater or equal to the pending sale prices. Appraisers revealed on the postal survey/ experiment by Kinnard, Lenk and Worzala (1997) that they felt pervasive client pressure and had a tendency to succumb to it especially when exerted by important clients and regard-less of the size of the desired adjustment. Levy and Schuck (1999) found that both sophisticated pressures, based on the use of property and market information, and unsophisticated pressure, based on the threat of withholding fee payments or future assignments, were applied to appraisers.

More importantly, based on Wolverton and Gallimore (1999) findings, appraisers responded that while they viewed their own role as estimating market value, they believed that clients (lenders) viewed the appraiser's role as validating a pending sale price.

Income Verification

Income Check (income verification) was done directly by the bank and included listing of home buyer's assets, work income and throughout credit check. Since the bank was the primary lender and carried all the risks associated with it, it was in their interest that the home buyer is solvent and will be able to repay the provided loan.

Interest Rates

Interest Rates in the traditional model represented the current market situation, the risk associated with the home buyer's credit and the banks' financial positions on the market. The riskier the home buyers' credit standing was the higher interest rate. The way fixed

interest rate amortization schedule was set-up, guaranteed that banks will receive return on their initial loan within the first third of the loan term.

Example: A home owner takes a 30 year loan \$100,000 loan, with 5% fixed interest rate. The principal payment will be fully repaid in 15 years, this includes all the interest and the entire principal paid to the bank. However, majority of the payment in the first 15 years goes towards the interest. In the first year, only 1.48% of principal payment has been repaid or \$1,475, while in interest payment, the home owner paid \$4,966. Please see Appendix I for more detail.

“In 1984, commercial banks and savings and loan associations have responded to the highly unstable interest rate environment of the past decade by introducing variable interest rate financial instruments. Variable rate instruments reduce the interest rate risk of intermediaries by transferring this risk to savers and investors. This transfer may not be in the best interests of the economy as a whole.” (Hess, 1984) This statement truly reflects the current state of affairs. Hess (1984) also noted that by introducing variable interest rates, banks and loan associations transferred the risk reduction to savers and investors.

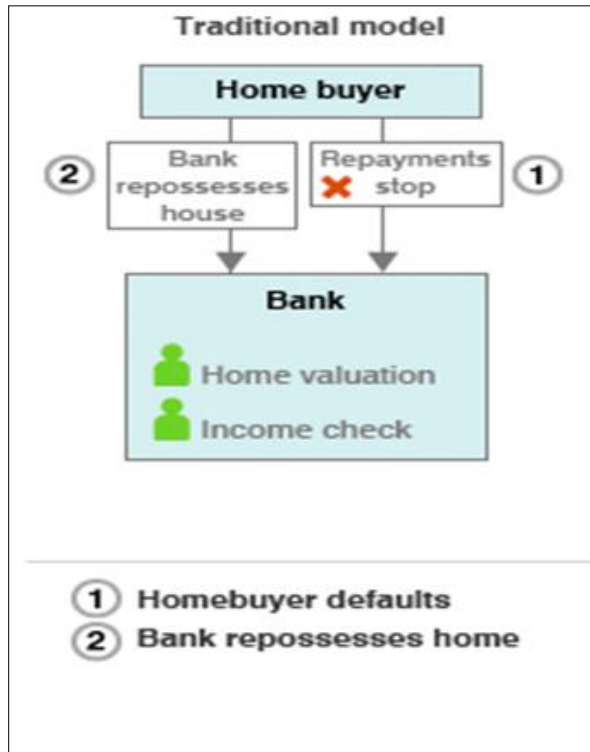


Figure 2- Traditional Model of Mortgage Financing- default scenario (source: BBC.com – Special Reports, Mortgage Meltdown)

Homebuyer Defaults

In traditional lending model, banks and loan associations carried all the risk in case buyer defaulted on their mortgage payment. Thus they tend to be more cautious of the money they lend and to extra checks and balances. Based on the US Census bureau, the delinquency rate for traditional model lending averaged 4.5% between 2000 and 2006. This rate increased slightly in 2007 to 5.4% and jumped exponentially in 2008, 2009 and 2010 to 6.9%, 9.4% and 9.3% respectively. Delinquency rate is defined as number of loans delinquent 30 days or more. (<http://www.census.gov/>) Please see Appendix II for more detail.

Limitations of this Traditional Lending Model

Primary banking business depends on the willingness of customers to deposit money into particular institutions. Banking institutions use these deposits to generate additional capital by depositing this money in more lucrative investment vehicles. But the availability of capital in the hands of private customer has been declining since the end of 1980s. The lack of private money deposits limits the available capital that banking institutions can lend out to private home owners for mortgages or loans.

Savings Rate

The personal savings rate in the 1980s was about 10% of disposable income and dropped to 1.8% in 2004. (Garner, 2006) Personal savings rate has declined across all developed nations, but in US this decline has been most pronounced. During the real estate boom in 2005 and 2006 it dropped to 1.6% and 2.6%. In the later years 2008, 2009 and 2010 the rate slowly recovered, as consumers started economizing, but only reach 5.3% in 2010 before it started dropping again as consumers gain more confidence in the economy. Eisinger (2006) worried that the United States will end up with “zombie consumers” similar to the “zombie companies” that littered the Japanese economic landscape in the 1990s.

This drop in saving rate wasn't significant only in the US market for the period of real estate boom, but also globally. The Eurostat reported that Irelands' saving rate declined to 1.7% in 2007, but recovered to 10% in 2010. This has wave of saving inconsistencies has been very consistent through the entire Eurozone.

One exception was China. “After remaining relatively flat during the early 1990s, the average saving rate of urban households relative to their disposable incomes rose from 18% in 1995 to nearly 29% in 2009.” (Chamon, Liu, Prasad, 2011)

Lending Institutions Hoarding Money

In the last four years, lending institutions globally and they have enough money to lend, yet they are still not willing to do so. In 2011 European Central Bank provided a financial injection into the EU banking system, loaning the banks \$625 billion and helping prevent credit crunch in the region. Almost all of the money had been lent to 523 euro-area lenders in December 2010. (Bloomberg, 2011) Morgan Stanley and Royal Bank of Scotland Group Plc estimate that the ECB loans will serve to pre-fund 2012 and some of 2013’s bank’s refinancing needs, but it will not likely trickle down to actual household borrowers. Also, loans are getting costlier for customers. In US the Fed has been creating money base and now the excess reserves in depository institutions exceeded \$1.4 trillion (Ryan, 2011)

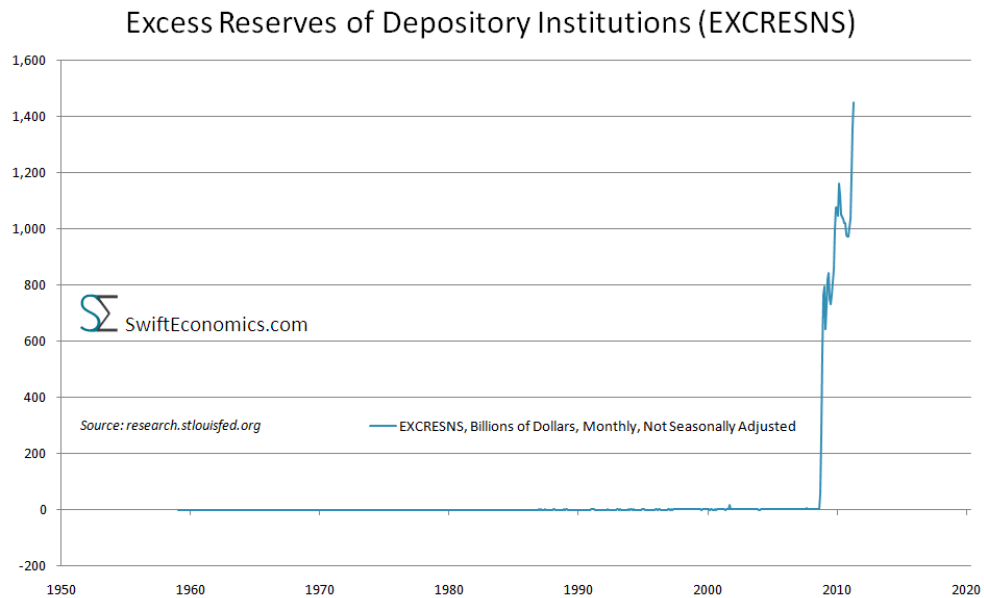


Figure 3 – Swift Economics, 2011

Sub-Prime Mortgage Lending Model

Introduction

In the last decade, banks have moved to a new model that made additional borrowing much easier to fund. But this also led to widespread abuse as the banks no longer had the sole authority or incentive to check carefully the mortgages they have issued. The private sector has expanded its role in the mortgage bond market and stopped being dominated by government backed agencies such as in US Freddie Mac and Fannie Mae, in Ireland the Central Bank.

In US, the two large lenders Freddie Mac and Fannie Mae shunned the borrowers with poor credit histories and weak proof of income, on the other hand the new private sector embraced them. Due to high real estate prices, especially in metro areas such as

Washington DC, Boston, New York City and most of California, a "jumbo" mortgage business sprang up. Typically Freddie Mac had a borrowing ceiling of \$417,000 which during the height of the real estate boom wasn't enough. (McConnell 1977)

"China's fixed exchange rate, the accumulation of reserves in Sovereign Wealth Funds, all helped to fill the liquidity reservoir to overflowing. The overflow got the asset bubbles and excess leverage under way." (Blundell-Wingnall, Atkinson, Lee, 2008) Second issue was the imbalance of trade, imbalance in savings and investments between the Anglo-American economies and the rest of the world, especially China and oil producing countries. The combination of low interest rates and large volumes of investment funds from outside the United States and the United Kingdom supported massive investment in debt securities in New York and London designed to produce an appealing combination of perceived safety and attractive yields. (Arner, 2009)

The financial crisis in Ireland in the recent years, especially the banking crisis of 2008, has been the worst that Ireland has ever experienced. Rapid growth, increase in population created an unprecedented demand for properties. Loan approval rose from €4.4 billion in 1997 to €31.4 billion in 2006. This growth wasn't without issues, as many of the borrowers treated their properties as capital investment and with the vision of significant and quick capital appreciation underestimated the risks of property markets. (O'Sullivan, Kennedy, 2009)

Brief Overview

This new model spread the responsibilities of checks and balances among other involved parties, Banks, Home Appraisal, Rating Agencies, and Mortgage Brokers. (www.bbc.com). All of these were in the market to make money from lending fees and turned a blind eye on several inadequacies when it came to borrower. This led to a wide spread defaults that had impacted the global investment and financial world.

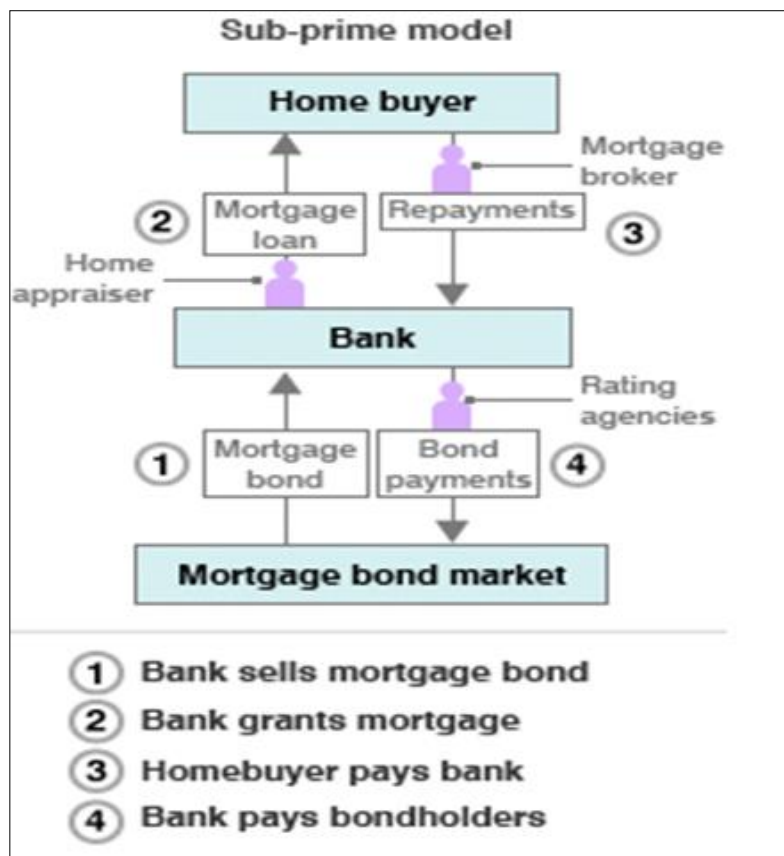


Figure 4- Sub-prime Model of Mortgage Financing (source: BBC.com – Special Reports, Mortgage Meltdown)

In comparison to the traditional model of mortgage financing, the sub-prime model added additional agents that benefited from every real estate transaction. Every single part of the

model should be explored in detail in order to present a clear picture why there was so much potential for miss-management that eventually led to the market collapse:

- 1) Home Buyer – many buyer underestimate their income potential and also treated real estate as a easy capital gain
- 2) Home Appraiser – frequently overestimated the value of the properties in order to gain more income from fees
- 3) Mortgage Broker – gained a very negative reputation during and especially after the real estate boom. Because of the commission that each closed deal carried with it, they have committed racial profiling, income overestimation and other unprofessional acts.
- 4) Rating Agencies – incorrectly estimated risk of the mortgage backed securities and rated them higher than they should have been.
- 5) Bank – in order to gain additional market share and earn money through investment, entered the mortgage back security market and invest in it.
- 6) Mortgage Bond Market – the most important piece of the entire operation. The securities made easy financing available and affordable.

The biggest risk and most unpredictable risk in the entire transaction presented the actual Home Buyer. The entire market was dependent on an individuals and their ability to make monthly payments. Once they stopped paying, and each buyer could have had a different reason for defaults, the entire system collapsed.

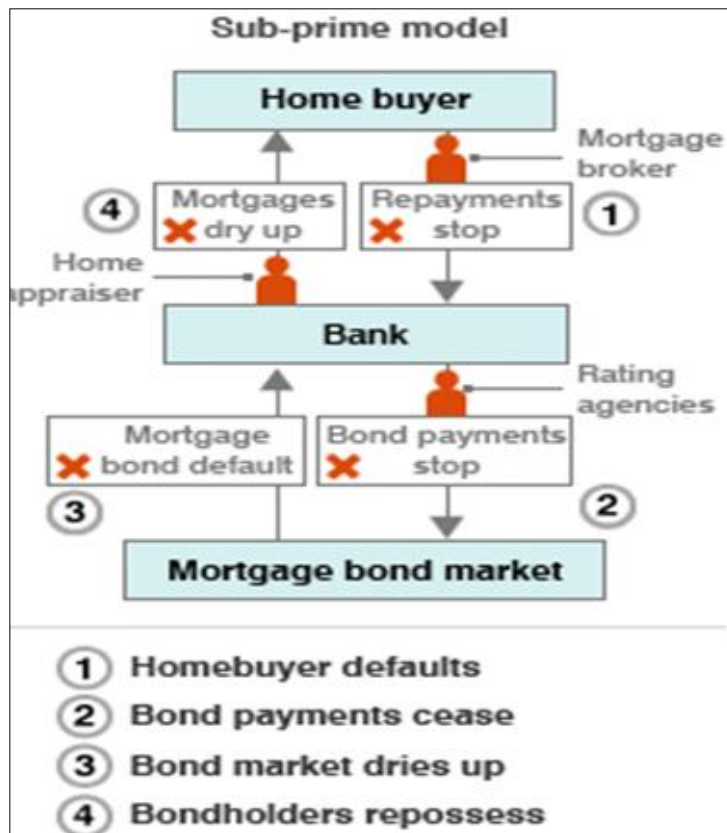


Figure 5- Sub-prime Model of Mortgage Financing – default scenario (source: BBC.com – Special Reports, Mortgage Meltdown)

Home Buyer

United States ranked and ranks to date as number one in industrialized nation in home ownership. Owning a home is considered the ultimate socio-economic achievement. It is so engrained in our culture that being a homeowner is one aspect of being American. Very often it is referred to as the American Dream. Homeownership rate was steadily increasing from 1989 from 63.8% to its high 69.2% in 2004. The homeownership rate declined in 2009 for the fifth straight year, holding at 66.9% in the second quarter of 2010. (U.S Census Bureau, Housing Vacancies and Homeownerships).

Another important aspect of real estate buying in US was that home buyers treated a house as investment option for retirement. Many homeowners were thinking of their home the same way as a Wall Street arbitrageur is thinking of a lucrative trade. Home a family lives in became part of the retirement portfolio. A US couple that had purchased their home in their 30's in 1970's can easily clear could easily obtain on average \$100,000 in gain. This is after taking into account the recent the drop in real estate prices. The decision to own instead of renting was clear.

In Ireland, there were three major causes that contributed to the housing bubble. The first one listed is the demographics. Compared to other European countries, Ireland had its post-war baby boom later, circa 1960s to 1970s and reached its peak in 1980s. (Fahey and Russell, 2001) When the economic situation in Ireland improves in the middle of 1990s, the strong generation was beginning to reach maturity and this strong demographic wave gave the real estate market a big push. (Fahey, 2004)

The second factor was the rapid rise in real disposable income. This was due to married women entering the workforce and thus almost doubling the family income. Another big influence was the drop in the tax marginal rate, which decreased from 60% in 1986 to 42% in 2001. "Among homeowners with a mortgage, the increase in real spending power between 1987 and 2000 was over 50% in real term" (Fahey, 2004)

The third factor was sharp decrease in mortgage interest rates. "Since 1960, it was only for a period in the late 1980s and early 1990s that rates rose above five percent in real

terms” (Fahey, 2004) Interest rates for long-term loans were on average 1.5% below the EU standard in December 2003, 3.65% compared to 5.14% (Kelly, 2004) The abundance of income and the drive for real estate created a market for variable interest mortgage interest rates. “In 2003, 78% of new business was at variable rates and two-thirds of fixed-rate mortgages were fixed for terms of one to three years” (Kelly, 2004)

China is another example of real estate market that increased rapidly in the last 5 years. “China is becoming a nation of homeowners with the rate of homeownership reaching 82 percent in Chinese cities in 2007, compared to less than 20 per cent in the 1980s” (According to the National Bureau of Statistics (NBS) of China, approximately 6.6 per cent of urban households owned two or more homes in 2002” (Youqin and Chengdong, 2011) This number further increased to 15% in 2007. This is an impressive statistics, considering that prior to mid 1980s, most of the real estate was owned by the government and majority of the population lived in state-rent controlled apartments.

There are couple of reason behind the real estate market expansion in China. The first one is the privatization of previously state owned properties that have been rented out during the strictly socialist economy. For many families, these homes or apartments are considered a primary residence and their sale is heavily subsidized by the Chinese government. However, because of discounted price, these property owners had to accept limited property rights. Thus many of them are unable to subsequently resale these properties to another owner creating an opportunity for a second home ownership. (Youqin and Chengdong, 2011)

Another reason (the more significant) for an increase in mortgage market and home ownership in China is the widespread purchase of secondary residences. Secondary residence can be classified as second, third or even fourth property a family owns. The following phenomena contributed to the wide spread second home ownership: (Youqin and Chengdong, 2011)

- Lack of property tax – owner only pays fees when selling or buying the property, otherwise there are no additional fees associated with owning the property (just regular monthly bills such as electric etc.)
- High returns on the second property – strictly treating it as an investment
 - With the amount of migrant workers coming to large urban areas, renting a home close to work became very popular
 - Competitive school systems creates a demand for housing close to good schools

In order to understand why second homes are a necessity for a Chinese buyer, we need to examine at *hukou* system. This system could be traced back to Mao-era and it is named after an institution that originated in 1958 and it its sole responsibility was to issue hereditary residency rights – sort of like an internal passport. “The *hukou* system has created two classes: on the one hand, an urban class whose members have basic social welfare and full citizenship; on the other, an underclass of peasants with neither of these privileges. Rural migrants work and live in the city but they are not part of the urban class – not now and not in the future, no matter how many years and how hard they have worked in the city. This” (Chan, 2011) Migrant workers (peasants) have primary

residence in the rural areas and are forced to rent from the secondary home market, thus fueling the boom in second home ownership and mortgages.

The three countries listed above are just a brief example of the real estate boom and subsequent doom. As global society became a mobile society and middle class strengthen, the real estate purchasing increased across the world. Businesses worldwide drove the economy and with it the new age population migration. People moved for work and this brought many shifts in demographics in different areas within many countries around the world. Business concentration and job availability or scarcity had a large impact on home values. Homeowners were no longer tied to the land and the property they owned. Thanks to creative financing options, many homeowners no longer held a 30 year mortgage till the maturity date. They often moved within the first five years of owning a home.

Home Appraiser

Another issue in the new subprime mortgage lending model was real estate appraisals. Diaz and Hansz looked at bias into induced bias in residential real estate appraisals and found that residential mortgage originators influenced the appraisers. Originators compensation was tied directly upon originating loans. Because appraisals were used to estimate borrower's equity, over-valuation of collateral resulted in under-estimation of default risk. Residential mortgage originator passed on inflated default risk by selling residential originations to secondary mortgage market, such as FNMA or GNMA. Since loan originators bear little risk, but profit the most from this transaction in a short term on

fees, they had a strong motivation to quietly maintain a system of incentives and pressures to overprice mortgage based assets and misinterpret the level of risk. (Diaz, Hansz, 2010)

The appraisal market throughout the world followed three basic principles (Cannon, 2002)

- 1) The *sales commission approach*, which reflected: prices paid in the market. These economic and appraisal principles are applied: substitution, supply and demand, balance and externalities
- 2) The *income producing approach*, where the real estate may be considered an investment (that was the prevalent technique) when the investors views the earning power of property as the major determining factor. The basic principle in this case is: higher earnings, higher the value of the property, but keep the risk constant.
- 3) The *income (capitalization) approach*, these economic and appraisal principles are applied: anticipation and change, substitution, supply and demand, balance and externalities, property rights, economic forces, and principals.

The principles for valuation are described below (Cannon, 2002)

- Principle of anticipation is the perception that value is created by expectation of benefits to be derived in the future
- Principle of supply and demand reflects the price of a commodity, good, or service which varies directly, but not necessarily proportionately with demand, and inversely, but not proportionately with supply

- Principle of competition is the interactive efforts of two or more potential purchasers to secure a purchase
- Principle of substitution represents when several similar or commensurate commodities, goods, , or services are available and the one with the lowest or best price attracts the greatest demand and widest distribution
- Principle of opportunity cost is the cost of option foregone as the opportunity was not chosen.
- Principle of contribution states that the value of a particular component is measured in terms of its contribution to the value of the whole, or in absence would detract from the value of whole
- Principle of surplus productivity is the net income that remains after the cost of labor, capital, and management or coordination have been paid
- Principle of conformity holds that value is created and sustained when the physical characteristics conform to the demands in its market
- Principle of externalities reflects economies reflects economies or diseconomies outside a property may have a positive or a negative effect upon its marketability

The above described real estate appraisals is guide that should be followed by professionals in the field. (Please see a detail flow chart in Appendix IV) During the years of the real estate boom, sales for commission and investment appraisal were the prevalent appraisal techniques. Common pitfalls included an inappropriate comparable property that might have increased (inflated) the value of the property and also small number of comparable properties. More than three need to be used in order to provide

more reliable value. “When reviewing an appraisal, one should watch out for calculation errors. A real estate appraisal can pose a significant challenge for any real estate investor, banker or lawyer. To meet the challenge, one must be familiar with the uniform standards that appraisers follow, the approaches to valuation that appraisers utilize, the proper method of engaging an appraiser, the legal and regulatory framework that applies, and the common pitfalls to avoid.” (Krazter, 2004)

It should be noted, that each country has a separate set of real estate appraisal rules. Chinese Ministry of Construction has formulated “Real Estate Appraisal Code” together with the relevant departments on the basis of the requirements of the “1998 Plan for the Formulation and Revision of National Standards for Engineering Construction has been jointly reviewed by the relevant departments and has been approved as recommended state standards, serial no. GB/T 50291–1999, and is implemented as of June 1, 1999. The Ministry of Construction is in charge of administering this code, the China Institute of Real Estate Appraisers is in charge of specific interpretations thereof, and the Standard Quota Research Institute of the Ministry of Construction has charged the Ministry of Construction Building Industry Press with the publication of these specifications.”(Ministry of Construction, 2011)

In United States appraisers and assessors have to adhere to the rules set in Uniform Standards of Professional Appraisal Practice set forth by Appraisal Foundation. Most specifically, Standards 1,2,3 4, 5, 6, 7, 8 and 9 which describe in detail how to treat real

property, personal property, consulting, business appraisal and development. (Cannon, 2002)

Mortgage Broker

After the real estate “bubble burst” many home owners, politicians and economist across the globe were looking to pass the blame on them and find an immediate fix for the broken mortgage system. There were several reasons behind this mindset. First of all, mortgage brokers are lightly and inconsistently regulated. Secondly, since their compensation was based on the services they provide, they charged consumer a fee for their services. LaCour-Little (2009) suggested that loans that have originated from brokers cost borrowers on average 20 basis points and that this premium is higher for low income, low credit borrowers.

Lastly, since the mid-1990 there has been an unspoken and unwritten “turf-war” between institutional vs. entrepreneurial lenders. (Walden, 1995) Institutional lenders, the large banking mortgage specialists were trying to capture back the lost from small and medium mortgage bankers. In order to win, many had perfected the art of “personalized service” for mortgages. The larger, more structured banks, with more bureaucracy were unable to readily adjust their policies.

As the real estate prices increased, the brokers benefitted from higher commissions which increased the competition and ruthlessness in the field. The sales in the field increased from 2006 to 2007 in all three case countries. These numbers were still increasing well

into the year 2008 in all three case countries. (Please see Appendix V for exact numbers) In order to gain market share, mortgage brokers engaged in some very questionable techniques. Unfortunately, these marketing methods have been legal and only in the past two years are borrowers taking action and suing some of the brokerage companies for misconduct.

Fisher (2010) wrote a study in Brooklyn about *deceptive marketing practices* by subprime mortgage lenders and brokers. Certain subprime lenders deliberately sought out financially vulnerable borrowers for deceptive sales tactics and predatory mortgage loans. This was further extended to minority borrowers. *Target marketing* was a tool used to divide potential mortgage customer into categories. One tool called P\$YCLE (Claritas Inc., 1996) divided people into fifty-eight segments, each with memorable name, rated from the wealthiest to poorest.

Several lawsuits have been filed against lender, originator for their predatory marketing practice. Some the examples include: Barkley, 2007 WL 2437810 (denying motion to dismiss in property flipping case with claims against scammers under 42 U.S.C. §§ 1981.82, 1985(3)). In one variation, predatory property flippers, working with mortgage brokers and others, would solicit first-time minority homebuyers with “*one-stop shopping*” schemes that involved purchasing and financing sales of substandard homes.

Another technique employed by marketing strategists in subprime lending was *solicitation and aggressive overbearing sales tactics* employed against financially

unsophisticated target population. Guest and Meric (1989) in their research proved that Fortune 500 companies promote employees to Sales managers mainly based on their dominance and personal impact and intellectual ability. This might have been one additional contributor to the mortgage marketing issue. Borrowers in foreclosure or those with low income, but high equity in their property were solicited for refinancing. At the end of the transaction they were faced with exorbitant closing cost and mortgages that far exceeded the market value of the property.

Predatory lending and consumer fraud occur when loan terms and fees cross the threshold of decency or when borrowers are enticed by deceptive sales practices and misrepresentation. Subprime lenders facilitated discriminatory lending by using discretionary pricing policies that encouraged mortgage brokers and loan officer working in minority neighborhoods to oversell. The typical consumer targeted by predatory marketers is living paycheck-to-paycheck and have-less than perfect credit. Several promotional strategies are used to attract new consumers. One marketing technique involves the use of “live checks”, which serve as unsecured loans when cashed at terms that are very unfavorable and may exceed 200% annual interest rate. Representatives of lenders usually attempt to “up-sell” these consumers to secured products like home equity credit lines, with the promise of lower monthly payments and more available cash. (Hill, Kozup, 2007)

Speed and Smith (1995) presented an interesting argument about marketing in financial industry in the UK. The common knowledge argues that marketing success comes from doing better than the competition and offers a better method to cope with problems of

increasing competition and turbulence. The alternative argument is that marketing leads to increased competition and market turbulence. As competition increased better and better deals had been offered to maintain the customer base. Also the greater competition and improving offers served to undermine the traditional customer loyalty found in financial business and customers took their business around to the market to search for better deals. This has been true during the high of the mortgage boom where marketing creating a hype of customer shopping for the best deals, not realizing that they are seriously jeopardizing their credit and financial standing by doing that.

Vanniarajan and Kannan (2008) provided a detailed analysis of what are customers obtaining a new mortgage looking for and what type of bank would they choose based on their offer or what they market that they offer. The data suggest that bank marketers for mortgages should strive to improve the implemented service quality programmes and develop ones to ensure customer satisfaction with service encounters and the various dimension of service quality. The bank marketers should establish a system of gathering information of the customer's expectations and design their products according to the customer's expectations and design their product accordingly. This system should be updated continuously to accommodate changes in customer's expectations. This is one flaw that could have been seen during the mortgage boom where bank and mortgage providers were accommodating a large amount of customers who had great demands, but low asset base.

Rating Agencies

A well-managed credit risk rating system promotes bank safety and measures credit risk. Differentiates individual credits and groups of credit by risk they pose. Credit risk ratings perform several additional important functions. Credit approval and underwriting is one of the more important ones and determine how much credit is extended and held. Risk ratings should guide price setting to avoid risk/return imbalances. A credit risk also determines how management relationship is administered. (Campbell, Hilscher and Szilagyi, 2008) Allowance for loan and lease losses and capital adequacy, portfolio management information systems and board reporting, traditional and advanced portfolio management are other risk rating roles.

More banks than ever are using multiple methods to asses' risk. One of the methods is Pass Risk Ratings, where larger institutions require the use of several more pass grades to achieve their risk identification and portfolio management objectives. Dual rating system emerged because a single rating may not often support deal structuring and administration. Public rating agencies provide independent credit ratings and analysis to keep the investment public informed about the credit conditions of the obligors and instruments they rate. Banks are using these public ratings to create credit models and to fill gaps in their own default and loss data. (SEC, 2008) The other important parts are automated scoring systems, most of which attempt to estimate an obligor's probability of default and to assign a quantitative risk score based on those probabilities.

Rating agencies play an important role in the credit derivatives market. As noted in a recent central bank research report, the structured finance market, including the credit derivatives market, relies heavily on ratings (Committee on the Global Financial System, 2005). Given the complex nature of many credit derivatives, many investors rely on rating agencies to assess the credit risk of a particular transaction. However, according to that report, large institutional investors do not rely solely on ratings for making investment decisions.

The debate over the role of rating agencies in the market for complex credit derivatives has two sides. On one side, it can be argued that rating agencies were fully transparent in the methodologies they used to rate synthetic CDOs. They published detailed criteria reports that were available to the general public without charge, and in some cases they allowed their models to be freely downloaded. They implicitly acknowledged that their ratings of structured finance transactions were fundamentally different than their ratings of corporate debt, for example, by compiling and publishing separate default and migration statistics for the two groups, rather than pooling them into a single group. (Gibson, 2007) This should have discouraged investors from treating an AAA rating on a structured credit derivative exactly like an AAA rating on a corporate bond.

Rating agencies have been sharply criticized for the problem that is behind the rise and fall of MBS market. For rating agencies the various types of new fixed income products provided tremendous new business beyond the traditional markets. For example, in 2006, 44% of Moody's revenues came from rating structured financial products, which

exceeded 32 % of revenues from rating corporate bonds. There is evidence that rating agencies offered price discounts for large and frequent issuers of corporate bonds, which in turn meant that rating agencies offered the same discount for issuers of structured products such as MBS. MBS were usually issued by large financial institutions with a great bargaining power which may indicate conflict of interest when it comes to credit ratings. (He, Qian, Stratham, 2009)

As financial markets became integrated, the rating problem was spread to other countries, impacting especially major European banks. Asset that originated in US were widely purchased by European banks, most of the times being helps of the balance sheet as a special purpose investment vehicle with low capital endowments. When the payment dates occurred, many banks were unsure about the value of these “toxic” assets. Many bank’s balance sheet impacted, however, the extend of the impacts were unclear, since the total notional amount were off-the-balance sheet items. (Regling, Watson, 2010)

Banks

During the subprime market boom the banking industry faced major challenges. Banks financial supervision and governance was weak and banks competed in the real estate mortgage lending business. Especially impacted was the bank’s credit risk controls. They have failed to successfully avert the bank’s exposure to individual borrowers and had not provided sufficient default account estimates. “The response of supervisors to the build-up of risks, despite a few praiseworthy initiatives that came late in the process, was not hands-on or pre-emptive. To some degree, this was in tune with the times. The climate of

regulation in advanced economies had swung towards reliance on *market risk assessment*.” (Regling, Watson, 2010)

Another important fact during the years 1990 – 2007, there was wide deepening global financial market integration. Banking institution became more globalized and started the same practices around the world. “Within the euro area, given the absence of exchange risks and the growth of common market infrastructures, it became easier to fund private and public sector deficits across borders through wholesale market borrowing. In the EU more widely, there was a strong growth in the number of cross-border banking establishments (mainly subsidiaries), notably in the “peripheral” economies. And cross-border portfolio diversification continued to increase.” (Regling, Watson, 2010)

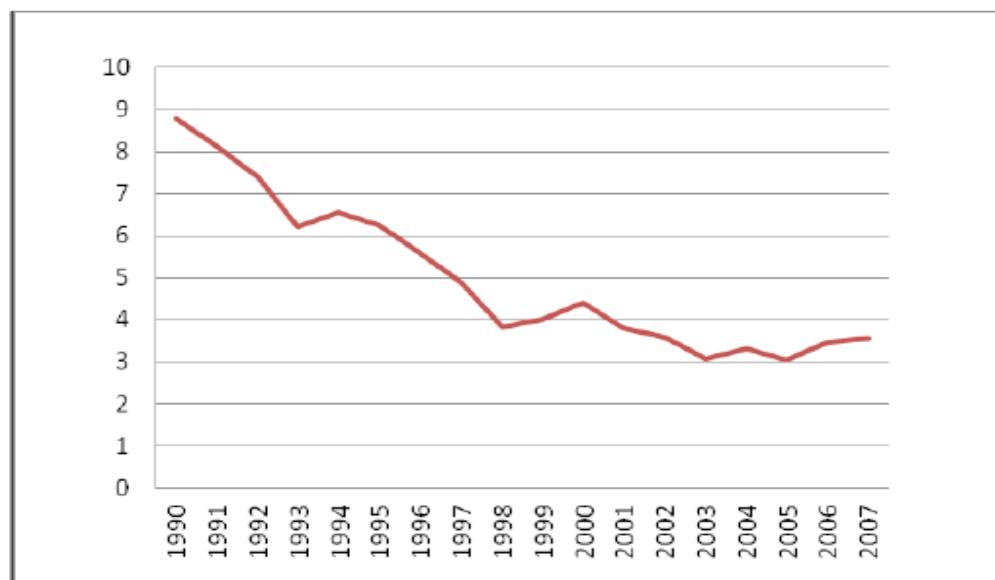
US Banks

The market adjustment was a calculated risk by companies, since all subprime securities have to be booked and priced at market value. It is financially impossible to price at a book value, since accounting can’t go back and restate book values for securities when there is market adjustment. However, pricing at market was like pricing at fair value (Enron was the specialist) and it was very hard to estimate the correct value of the security. This was especially difficult, since the banks has no previous past precedence for as many loans in subprime and were inadequately equipped to deal with markets risk.

First contributor to US financial crisis was the *low interest rate*. The Fed in order to stimulate the economy decreased the interest thirteen times between January 2001 and

January 2003. The Federal fund rate ultimately decreased to all time low of 1% in June 2004, dropping an astounding 5.3%. This drop in the interest rate provided a high liquidity which supported the subprime market lending. However, to curb this liquidity the Fed decided to increase the federal Fund rate and from June 2005 to June 2006, the rate went from 1% to 5.25%. Since many of the subprime mortgage lending was based on or different adjustable rates, the average mortgage payment based on adjustable rate increased 20%-25%, making it very hard to a borrower to make the monthly payments. (Meng, 2009)

Long-term interest rates in percent*



Source: OECD

*Long-term government bond yields (10 years).

Weighted average of the US, Japan and Euro Area.

Figure 6 – Long Term Interest Rates

With the *abundance of “cheap” money* on the market, banks and other lending institutions relaxed their lending policies. Since subprime was always considered more

risky. There were several assumptions that were associated with subprime lending. The interest rates for subprime borrowers were always at least 2 basis points higher. The credit score from three rating agencies, especially the FICO score was between 600 and lower. The lower credit scores the higher the down payment. Many of the properties required 20% down payment. The higher the down payment the lower the value of the home the borrower could afford. Also as the creditworthiness of the borrower was low, the insurance on the property was high.

The mid 2000's, between 2000 and 2003 the share of *borrower with credit score* between 700 and 800 increased by 14 to 22%. Lender of subprime loans have also been increasing the loan amounts and shifting the down payments (Chomsisengphet, Pennington-Cross, 2006). Since the subprime lending was extended to "less risky borrowers" based on their credit scores, the down payment requirement on higher amounts borrowed have also decreased. Better score means fewer down payments, even though the amount of the loan is high.

Ireland's Banks

Ireland and its banking institutions are in dire straits. At this point, the banking industry is dependent on the European Central Bank for bailout money to bridge their defaulting loans. ECB raised their loan rate last year by 1 percent and that had a significant impact on the Irish banks, since 40% of their loans are provided by ECB. In March 2010, "Anglo-Irish bank posted losses of €12.7 billion, said to be largest in corporate loss in the country's history." (Smith, 2010)

Based on a comprehensive Ireland's banking industry review by OECD, there were several oversights that should have been addressed. The first problem for Ireland was the rapid integration of financial markets, especially in Europe, creation of Euro as a currency, and its subsequent expansion to other EU countries, that had weaker economy. These new EU members with less developed banking markets experienced a new wave of lending from foreign banks. Unfortunately, the cross-border structures of regulation and supervision in Europe didn't keep up.

“Many of the sea-changes that were taking place in financial markets and the real economy seemed permanent, presenting bankers with a perceived “new paradigm” that combined low inflation, a cheaper global supply of goods, and a drop in the risk premia required by lenders, with risks perceived as more widely and efficiently spread. In peripheral EU economies, moreover, there was an accelerated catching-up of income which seemed to validate higher levels of debt among banks' corporate and household clients. Some of these changes in the banking environment, of course, proved more durable than others. The banking market in Ireland was far from unique in these respects.”(Regling, Watson, 2010)

To expand their balance sheet and fund lending the bank applied the following strategies:

- Rise in wholesale borrowing
- Lending on commercial and residential property (this was especially not very highly competitive)

- Bought large amounts of complex securities based on US mortgages and placed them in special vehicles where they could minimize the capital cover that regulation obliged them to set aside
- Mortgages (both residential and commercial) were instrument of choice for balance sheet expansion

It would be unfair to argue that risks analysts, regulators and supervisors in the banking industry were not aware of the risks associated with these new trends in the financial market. They were all aware of the risk of falling real estate prices, but they provided four sound reasons for not acting up front. Regling and Watson (2010) summarized as follows:

- 1) They did not consider it their job to react to the macroeconomic component of the problems that were potentially building up
- 2) In the euro area, financial integration and interdependency were goals of the policy, and the side-effects on vulnerability were not strongly emphasized
- 3) It was unclear to many supervisors what instruments to use to counter macrofinancial risks
- 4) Many supervisors – faced with complex assets and operations, and with banks' ability to work around specific rules – moved to rely more on banks' own risk assessment systems and to supervise processes and principles, with some moving very far in the direction not just of "principles-based" but of "light-touch" supervision

Chinese's Banks

Beijing was and is very cautious when it comes to financial policies. The government realized that it needs a different financial policy than US and other developed countries. So far the housing market has not gone through a deep recession such as US or Ireland. For the past thirty years the Chinese government promoted “grow-at-all-costs” policy which promoted extensive government held banks lending to government supported organization and subsidizing “export-and-building” model. (Miller, 2011)

“In 1998 and 2004-05, loans totaling about \$500 billion were classified as nonperforming, and state officials transferred them to special investment vehicles in an attempt to create the appearance of containing the problem. But because the state, which owns the biggest banks--and thus the people's savings-ultimately pays the price of any write-off, households bear the cost of the cleanup. Chinese banks are the original too-big-to-fail financial institutions.” (Miller, 2011)

Another great problem is the debt ratio of Chinese urban households. The ratio in Beijing has reached 122%, compare that to the height of the “loan obsession” in US, when the debt ratio was 119%. Other major cities in China are struggling with the same problem; Shanghai, Qingdao and Hangzhou have reached uncomfortable levels of 155%, 95% and 91% respectively. Any changes in family income would upset the payment structure and increase defaults. Chinese banking also has a phenomenon called “fake mortgage” where several “real estate developers or individuals obtain mortgage loan from banks based on false real estate purchase agreement.” (Meng, 2009)

“Currently vacant rate of commercial apartments in China has increased and over the risk control line. In term of the absolute number, area of vacant houses in China has reached 164 million m² in 2008, 21.8% increased than last year, in which vacant commercial houses accounted for 65.55 m² with 8.7% higher than last year, and year-round vacant houses accounted for over 50% and tied up funds of more than 65 billion yuan, ranking first among all types of non-performing assets in various sectors of China” (Wu, Hou, 2004) This is the same pattern that was observed in the US market before the real estate collapse and thus many economists believe that which might be the first indication that Chinese real estate market is heading towards a decline.

Chinese government learned from the US subprime financial crisis and acted swiftly. “In early-March 2006, Vice Premier Zeng Pei-yan had brought out clear requirements on establishing alarm & forecast system for real estate market during his speech in the economic situation seminar of five provinces and cities which was held in Hangzhou.” (Meng, 2009) In July 2008, the preliminary estimate for the alarm and forecast system for real estate market has been approved by the National Development Reform Commission.

Mortgage Bond Market

During 1970, MBS were developed to create a liquid market for mortgages as investments. An MBS is a security created by pooling mortgages and selling interests or participations in the resulting pool. Mortgage originators, such as savings and loan associations, first originate mortgage loans and later sell the loans to intermediaries who create mortgage pools. The mortgage originator usually services the underlying mortgage in exchange for a fee. The mortgage servicer is responsible for remitting principal and interest payments from the pool of mortgages to the MBS holder in proportion to the interest held by each holder. By selling MBSs, originators are able to obtain funds that allow them to issue new mortgages and to reduce capital requirements. Thus, the ability to pool mortgages and sell MBS interests provides liquidity to the originator and provides investors with more mortgage-related products in which to invest. Most MBS are guaranteed either by federally sponsored agencies or private guarantors.

There are four stages of evolution of credit derivative market (Mengle, 2007):

- 1) The first defensive stage was late 1980s and early 1990s, and was characterized by ad hoc attempts by banks to lay off some of their credit exposures. In addition, products such as securitized asset swaps bore some resemblance to credit default swaps in that they paid investors a credit while providing for delivery of the underlying asset to the investor in the event of a default.
- 2) The second stage began about 1991 and lasted through mid-to late-1990s, saw the emergence of an intermediated market, in which dealers applied derivatives technology to the transfer of credit risk while investors entered the markets to

seek exposure to credit risk. Another innovation during this phase was synthetic securization structure.

- 3) The third stage saw maturing of credit derivatives from a new product into one resembling other forms of derivatives. Single-name credit default swaps emerged during this period as the “vanilla”, or generic, credit derivatives product, while structured finance groups combined credit derivatives into “arbitrage” CDO packages geared to investor demands.
- 4) Fourth stage is presented by development of liquid market. A new set of Credit Derivatives Definitions was published in 2003 and dealer began to trade according to certain standardized practices that went beyond those adopted for other OTC derivatives. This stage also saw the entry of hedge funds on a large scale as both buyers and sellers. Hedge funds use credit use credit derivatives in their convertible bonds arbitrage activities in order to strip out unwanted risk.

By 2007, the credit derivative market was in full operation. ISDA posted that as of September 26, 2007 notional amount outstanding of credit derivatives grew by 32% in the first six months of the year to \$45.46 trillion from \$34.42 trillion. The annual growth rate for credit derivatives is 75% from \$26.0 trillion at mid-year 2006. Notional amount outstanding of interest rate derivatives, which include interest rate swaps and options and cross-currency swaps, grew by 21 percent to \$347.09 trillion from \$285.73 trillion. This compares with 14 percent growth during the second half of 2006. The annual growth rate

for interest rate derivatives to mid-2007 was 38 percent from \$250.83 trillion in mid-2006. (<https://www.isdadocs.org/conf/index.html>)

Additionally, the notional amount outstanding of equity derivatives, which consists of equity swaps, options, and forwards, grew by 39 percent from \$7.18 trillion to \$10.01 trillion. This compares with 13 percent growth during the second half of 2006. The annual growth rate for equity derivatives to mid-2007 was 57 percent from \$6.38 trillion at mid-year 2006.

Basic Types of MBS, the most used in the financial markets

Credit Default Swap (CDS):

CDS is the most popular derivative. It is a contract that provides insurance against the risk of default by particular company. The company is known as reference entity and a default by the company is known as a credit event. The buyer of the insurance obtains the right to sell bonds issued by the company for their face value when a credit event occurs and the seller of the insurance agrees to buy the bonds for their face value when credit event occurs. The total face value of the bonds that can be sold is known as the credit default swap's notional principal. The total amount paid per year, as a percent of notional principal, to buy protection is known as the CDS spread. Several large banks are makers in the credit default swap market. CDS like most other swaps is worth close to zero at the time it is negotiated. Later it may have positive or negative value; we call this marking to market a CDS. (Mengle, 2007)

Credit event is commonly defined as the occurrence of one or more of the following:

- 1) failure to meet obligations when due
- 2) bankruptcy
- 3) repudiation
- 4) material adverse restructuring of debt
- 5) obligation acceleration or obligation default

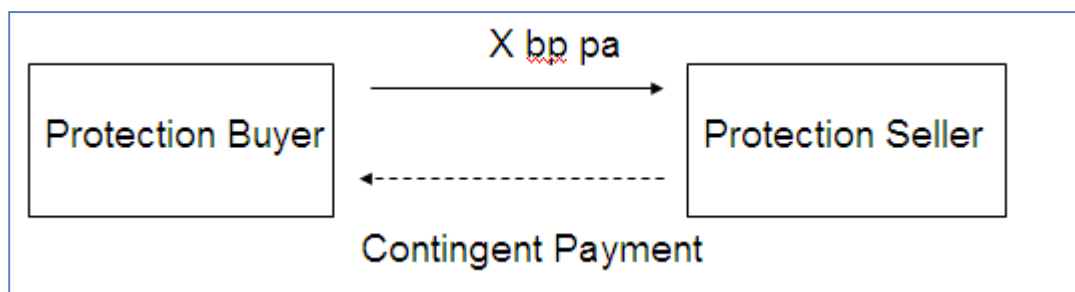


Figure 7 – CDS Flow Chart, Mengle, 2007

CDS provides the base for additional derivatives that are more structured and used in more complex hedging and investments. One of those was a:

Basket Credit Default Swap (CDX): derivative that contains number of reference entities. An add-up basket CDS provides a payoff only when the first default occurs. A second-to-default CDS provides payoff only when the second default occurs. More generally an nth-to-default CDS provides a payoff only when the nth default occurs. Payoffs are calculated in the same way as for a regular CDS. One can think of the first-to-default basket structure is similar to senior/subordinated collateralized bond obligation (CBO) or a senior/subordinated collateralized loan obligation (CLO). The credit default protection

seller is like an investor in the subordinated tranche of the CBO or a CLO. The default protection seller takes a risk of the first loss in the structure. (Huang, Zhou, 2007)

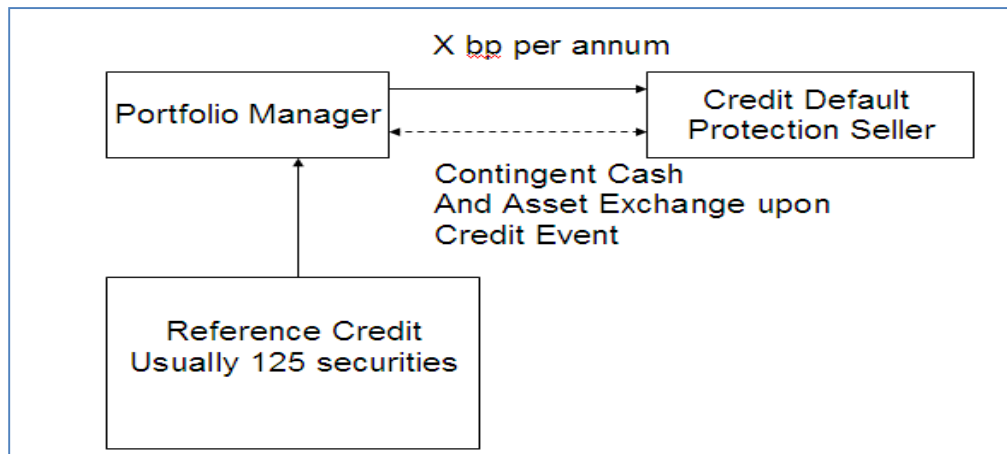


Figure 8 – CDX Flow Chart, Huang and Zhou, 2007

Credit Linked Notes (CLN) is a funded balance sheet asset which offers the holder an artificially created, or synthetic, credit exposure to a particular credit (known as the reference credit) in a structure designed to resemble a synthetic bond or loan. Credit risk can be transferred in return for payment of interest, premium, etc. Financial institutions and other investors utilize credit-linked notes to “buy” credit risk protection (or alternatively, to “sell” credit risk exposure). This allows them to remove credit exposure from their balance sheets while retaining ownership of the assets. (Hall-Barber, 2001)

Credit-linked notes have become increasingly popular because they are on-balance sheet, cash market instruments. Investors who are not authorized to use credit derivatives can (1) gain access to the credit derivatives market by purchasing credit-linked notes and (2) can customize maturity structures that may not otherwise be available in the cash market.

Additionally, they offer some financial institutions a hedge against credit risk and investors a higher yield for buying a credit exposure synthetically. (Hall-Barber, 2001)

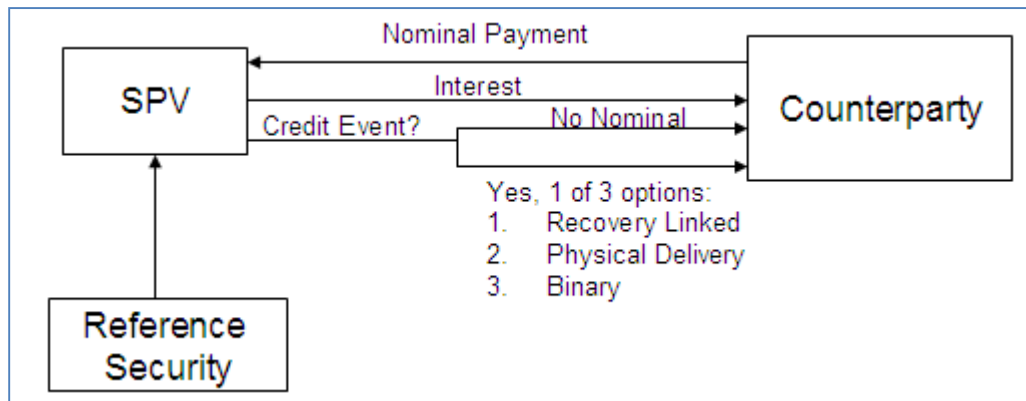


Figure 9 – CLN Flow Chart, Hall-Barber, 2001

Collateralized Debt Obligation (CDO) (used Picone, 2001) is a way of creating securities with widely different risk characteristics from a portfolio of debt instruments. A CDO is a special purpose company or vehicle (SPV), complete with assets, liabilities and a manager. Typically, the CDO's assets consist of a diversified portfolio of illiquid and credit-risky assets such as high yield bonds (CBO) or bank leverage loans (CLO). The CDO structure allocates interest income and principal repayment from a pool of different debt instruments to a prioritized collection of securities notes called tranches. Senior notes are paid before mezzanine and lower rated notes. Any residual cash flow is paid to the equity piece. This makes the senior CDO liabilities significantly less risky than the

collateral.

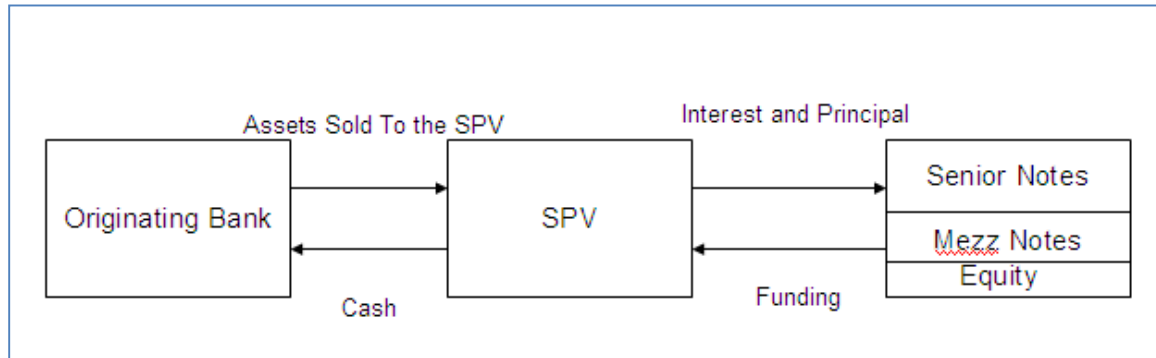


Figure 10 – CDO Flow Chart, Picone, 2001

On every payment date, equity receives cash distributions after the scheduled debt payments and other costs have been paid off. The equity is also called the “first-loss” position in the collateral portfolio. This is because it is exposed to the risk of the first dollar loss in the portfolio. The typical CDO consists of a ramp -up period, during which the collateral portfolio is formed, a reinvestment period, during which the collateral portfolio is actively managed, and an unwind period, during which the liabilities are repaid in order of seniority using collateral principal proceeds.

Most CDOs can be placed into either of two main groups: arbitrage and balance sheet transactions.

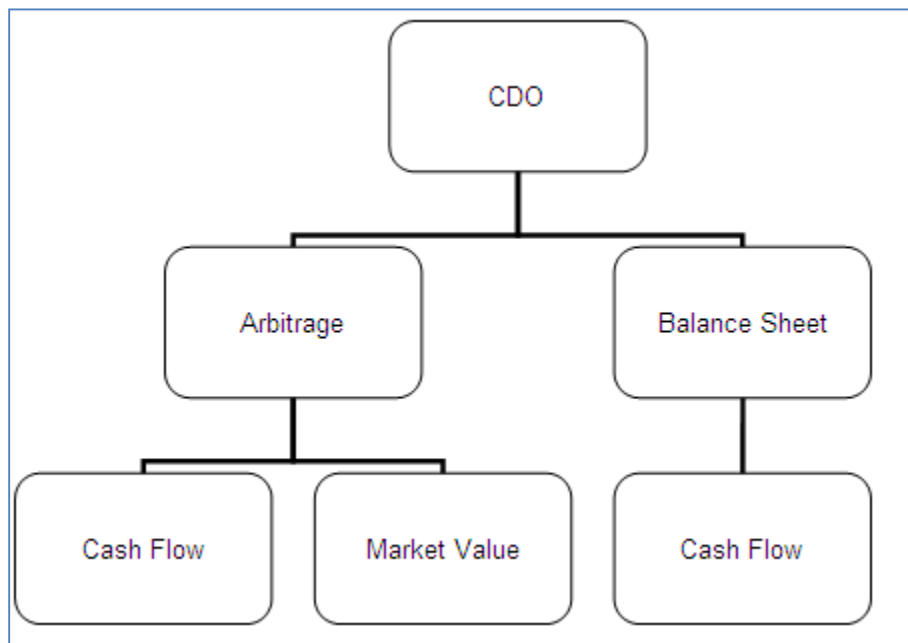


Figure 11 - CDO Flow Chart, Picone, 2001

Variations on MBS – Stripped Mortgage Backed Securities

A Stripped Mortgage Security backed Security (SMBS) is a created security that takes advantage of several trends in derivative products that have been introduced and advanced by the financial community over the past decade. The idea of SMBS is to allocate 100% of the interest received from a MBS to one class of investors and to allocate 100% of any principal received to second class. These classes are called Interest Only (IO) and Principal Only (PO). The cash flow and nature of these two instruments are completely different from and each satisfies different objective.

A Principal Only (PO) is a deeply discounted security that will receive only the principal payment and principal prepayment from a MBS that is the collateral for this certificate. It is looking somehow like a zero coupon Treasury bond, the duration of a PO is very long and they are extremely volatile from pricing standpoint. PO are very vulnerable to changes in interest rates. Generally, the lower the rates, the better for refinancing and total principal repayments. There are several investment uses for POs:

- Bull market play – as an investment with a high duration overall portfolio duration can be effectively adjusted with zeros or Pos.
- Maximize overall return – pension plans and insurance companies often take a long term view towards growth and return. The PO offers the ability, through the prepayments at par, to pick up a total yield advantage.
- Asset Mix – the PO can be used in conjunction with other investments in the portfolio.

- Hedging vehicle – the PO can be used to hedge the PSA (prepayment) speed risk. Hedging prepayment risk may not appear to be necessary, but sometimes MBS may have been purchased at a premium. An increase in prepayment speed would lead to negative convexity and a decline in price.
- Hedge servicing agreement – the originators of the MBS may be making a profit on the servicing agreement. This is based on a percentage of the assets. If prepayment speeds increase, there will be a decrease in servicing fees. The PO can offset this situation.

The Interest Only (IO) – the important concept to understand about IO is that the total amount of the cash flow generated is based completely on the life of the collateral. Without the principal there is no interest. One of the characteristics of IOs is that of negative duration. As interest rates decline prepayment speeds increase, leading to lower principal, less cash flow from interest on a decreased base. If interest rates increase the IO will gain in value. The total return on IO increases as the average life of its cash flow is extended. IOs have a number of investment uses:

- Bear market play: the value of an IO is enhanced when interest rates rise; the collateral is not reduced by prepayments and large refinancing
- Yield enhancement – in neutral to bearish markets, the IO offers cash flow and a good total return
- Hedge for interest rate sensitive investments – the IO is very effective hedging vehicle for investment that might be interest sensitive with a positive duration. As the IO has a negative duration the offsetting relationship can be utilized.

Trading of IOs and Pos

Theoretically an IO and a PO combined should equal the original MBS. This does not always occur. An investor can take advantage of an arbitrage situation when the market displays inefficiencies in the pricing of the pieces, versus the whole MBS. One trading concept that is used concerns “trading on the cusip”. When the CPR begins to accelerate due to refinancing the security is said to be trading on the cusip. This would occur as the MBS approaches the threshold or refinancing; when current mortgage rates are approximately 200 basis points beneath rates held by the borrowers. The rate on MBS is after servicing fees and is not the mortgage rate on the underlying mortgages in the pool. The PO will increase in value as the market anticipates this refinancing and increase in prepayments to occur as it slides on the cusip. If interest rates increase where refinancing slows down, the investment is seen as “off the cusip”. At this time the price of IOs will increase, coming off the cusip, as IOs have a negative duration.

Collateralized Mortgage Securities

Basic design: The most basic design feature of a CMO is its ability to divide the investment into different classes, and by predetermined formula, segment the principal paydowns into these classes or tranches. The CMO starts with creation of a trust. The collateral for the trust is the MBS. Common size is \$2,000,000 as a total amount of the collateral in the trust. The monthly cash flow from the homeowner to the bank providing the servicing to the mortgage pool remains unaltered. A basic design would start with a CMO trust of \$100 million. The interest and principal payments would flow in a mortgage backed security to the holders of the trust. A CMO design divides the recipients

of the interest and principal into separate classes or tranches. If this example used four tranches, each tranche might represent \$25 million. (Davidson et al, 2007)

One of the key advantages of the CMO is the ability to more accurately predict the life of a CMO tranche versus a MBS. Although the same problems remain with the prediction of the prepayment speed of the underlying collateral, the investor buying tranche A can at least have the understanding that the life of that investment will be very short term, maybe 2 – 4 years, versus the buyer of tranche D, who knows that the investment will be closer to the equivalent of a very long term bond.

Tranches: The sizes of the tranches within the CMO can vary. In the case of a \$100 million CMO tranche A could be \$10 million versus \$25mm. The smaller tranche allows for a more accurate means of looking at the life and duration of that tranche for the investor. All principal prepayments for the entire collateral will be used to first satisfy tranche A due to smaller amount, the life has been shortened considerably. Larger tranches have opposite situation. Taking longer to completely pay off the life of the investment is not clearly defined. Investors in the \$10mm tranche may know exactly when all principal will be paid but they will have a better idea than investors in a larger tranche. One of major disadvantages of MBS has been that of negative convexity or investment being “worst of both worlds”. If the interest rates rise, prepayments slow and the MBS will lose value like any fixed income security. An interest decrease, the prepayment speeds will pick up, thus keeping the MBS from increasing in value fast. The tranche design of CMO allows the investor to partially overcome this by investing in

tranches that approximate when principal prepayments will occur. Each tranche will specify different interest rate. Although collateral in the CMO trust may be GNMA 10's not all tranches receive the same rate. The interest rates are set by the originator of the trust and defined in the CMO prospectus for the buyer information. (McConnell, Singh, 1993)

The pricing of CMO tranches is first done by estimating the life of that particular tranche and then obtaining the current treasury yield curve. Pricing of a tranche with a life of 2.1 years would be made obtaining the yield on a 2 year treasury note and setting the CMO higher by 80 basis points. The spread on a 5 year tranche to a 5 year note might be 115 points and so on. (McConnell, Singh, 1993)

CMO Collateral: Most CMOs have been rated AAA by the rating services. Collateral used is usually GNMA because they offer greater stability and prepay more slowly than other types of collateral for the following reasons (Fidelity Investments)

- 1) The FHA/VA subsidizes GNMSA backed mortgages so that they cost the homeowner 40-50 basis less than conventional mortgages.
- 2) The mobility of GNMA holder is assumed to be less due to a lower income, lower cap on the amount of mortgages and statistics showing that homeowners eligible for VA loans move less frequently.
- 3) There are servicing differentials on GNMA mortgages versus the agencies. GNMA's charge about 50 basis points for servicing arrangements versus 40-250 basis

points for FNMA and FHLMC. Thus a 9.5% GNMA could be composed of 10% mortgage notes while a 9.5% FNMA could be 10.5% notes. Decreases in interest rates will affect FNMA mortgages first, affecting prepayment speeds of the CMO collateral and subsequent affect on the tranches.

CMOs can be a combination of issues, for example; 25% FNMA/75% FHLMC or 30% 15 years/70% 30 years; or 40%GNMA 9's/60% FNMA 10 ½'s. This makes it almost impossible to accurately track in terms of the future prepayment performance.

Benefits of CMO (Wells Fargo Advisors)

- 1) A choice of average life/maturities for investors – segmentation of cash flows by tranche offers maturity selection possible in MBS investments
- 2) Monthly, quarterly, semi-annually, annul payments – most MBS pay interest and principal only.
- 3) AAA – the collateral receives the rating, not the issuer, due to the trust setup of a CMO. A CMO trust is administered by an independent trustee.
- 4) Decrease in payment uncertainties – the tranche segmentation offers limited protection against callability.
- 5) Large size/density – the size of most CMOs is large enough to offer better predictability in prepayments than an individual pool.
- 6) Spread vs. Treasuries – the yield on CMOs versus the yield curve varies maturity but is very attractive for an investment of this quality. CMO yields can be more attractive than good quality corporate issues.
- 7) Active secondary market.

In summary: What are CMOs?

- Securities backed by a pool of mortgages structured to have several classes (tranches) each having a different weighted average life and expected cash flows
- Ownership represents cash flows from underlying pools of mortgages
- Each tranche has different investment risks
- Created by a market which demands greater certainty for cash flows
- Mortgage investors looking for greater certainty in mortgage backed cash flows due to the negative convexity of mortgage backed securities.
- Freddie Mac (FHLMC) issued the first CMO in 1983. It was the first multi-class mortgage security.

Typical Structure:

Type	Description	Typical Underlying Loans
CMO	Collateralized Mortgage Obligation	Residential Properties
CMBS	Commercial Mortgage Backed Security	Industrial, Retail and Multi-Family Properties
ABS *	Asset Backed Security	Credit Card Loans, Auto Loans, Home Equity Loans

- All agency CMS's have the backing (GNMA), or implicit backing (FNMA & FHLMC) of the United States Government
- Non-agency, or whole-loan, CMS's are not backed by the United States Government
- Generally, tranches receive regular interest payments *, but principal * is paid in a predetermined sequence
- Most agency CMS's have a AAA rating while whole-loans can vary from investment grade to non-investment grade

- Issuers of whole loan CMS's include banks, financial and mortgage institutions, insurance companies.
- Since prepayment rates are unpredictable, average life forecasts are made for each CMS

Risk associated with investment: (Krahn, Wilde, 2006)

- Only way for a failure of a CMS backed by an agency would be for a total collapse of the Housing Industry combined with the US government not being able to honor its guarantees
- Private Label (Whole-Loan) CMSs do not conform to agency requirements, and are backed by private institutions rather than the US government and can incur principal losses
- The credit quality of a whole-loan security is based on the credit quality of the underlying loans, not the issuer
- Prepayment Risk: Expected cash flows can decrease significantly if underlying mortgages pay sooner than expected
- Risk can vary by tranche
- Senior vs. Subordinate
 - Tool used to enhance credit rating
 - Senior tranches have higher ratings
 - Subordinated tranches have lower ratings

SENIOR	CLASS	PMT SCHEDULE
↓ SUB	A	Receives all payments first
	B	Receives payments after A
	C	Receives payments after A & B

Hypothetical Average Life:

CLASS	EXPECTED LIFE
A - Preferred by Banks	1.2 to 4.3 years
B - Preferred by Investment Managers	3.4 to 11.7 years
C - Preferred by Insurance Companies	5.3 to 23.4 years

Prepayments:

- Prepayment is a payment greater than the amount due or payment in full prior to final due date.
- Prepayments are a common occurrence in most mortgage backed securities. Unless there are restrictions in the underlying mortgage, prepayments can occur at any time.
- Causes of prepayment include: refinancing, moving or expiration of restrictions.
- Predicting the prepayment rate is the biggest hurdle for investors.
- Typically, historical data is used to predict future prepayments
- Prepayment speeds are mathematical models based on historical information
- PSA: Prepayment Speed Assumption
- CPR: Conditional Prepayment Speed
- Not reasonable to think that speeds are 100% accurate, only offer the best estimate
- Many factors can impact the rate at which mortgage securities pay:
 - Changes in interest rates
 - Recession
 - Thriving economy
 - Inflation, etc.

Valuation of a Mortgage Backed Security

The process below describes a typical accounting treatment of a mortgage backed security that was sold to a pool in a mutual fund available on secondary market. . Although the names in the securities are listed as Fannie Mae, it is for instructional purposes only. These securities were treated the same by GAAP (US accounting system) as well as IASB (International accounting systems). Generally they were accounted for in the mutual funds and many shareholders across the world didn't realize that they hold in their portfolio MBSs.

Valuation of a MBS is a complicated process. The complexity is primarily due to the fact that a mortgage may prepay all or a portion of the principal at any time, and generally without a penalty. First prepayment shortens the life of an MBS to something less than contractual period. Second, principal prepayment reduced the amount of interest the investor will receive.

Prices provided by brokers or pricing agents, stated in increments of 1/32 of 1% of par, would be reviewed to ensure that the prices are consistent with, among other things, changes in market and demographic factors that affect the cash flow of the underlying mortgages. The following process follows the Jacoby et.al method (1993)

Step by Step example of an MBS Investment:

Accounting for an MBS based on the following variables:

Security description – FNMA

Cusip Number – 31366RX21

Coupon rate – 6.042%

Issue date – June 1, 2007

Original Face - \$2,069, 379

Buy Trade Date – June 22, 1992
 Buy Settlement Date – June 26, 2007
 Purchase Price – 102.1875
 Buy Date Current Face - \$2,069,379
 Buy Date Monthly Factor – 1.0000

Sell Trade Date – July, 2007
 Sell Settlement date – July 29, 2007
 Sales Price – 103.63

1) *Purchase of MBS* – the investment company records the purchase of the FNMA and accrued interest on the day following the trade as follows:

Date	Account	Debit	Credit
6/23/2007	Investment at ID Cost	\$2,114,646.67	
	Interest receivable	\$6,862.77	
	Payable for Investment Purchased		\$2,123,329.44
	To Record the Purchase of FNMA CUSIP 31366RX21		

Where:

- Investment at ID cost = Current face * Purchase price = \$2,069,379 x 1.021875 (because it's a bond, price is divided by 100; if this was institutional or equity, price would stay as is ex. \$34.67). = \$2,114,646.67
- Interest Receivable = (Current Face * Coupon rate) x (Days in accrual period/360) = (\$2,069,379 * 6.042%) x (25/360) = \$8,682.77. Interest on MBS is paid monthly based on 360-day year and security begins accruing interest as of the settlement date.

2) *Recognition of Income* – the investment company records income on a daily basis as follows:

Date	Account	Debit	Credit
Daily	Interest receivable	\$347.31	
	Interest income		\$347.31
	To Record the daily Interest Income of FNMA CUSIP 31366RX21		

Where Interest Income = (Current face x (Coupon Rate/360)) = (\$2,069,379 x (6.042%/360)) = \$347.31 This daily rate changes when a new current face is calculated.

3) *Paydowns* – Paydown represents monthly principal payments. If the MBS was acquired at premium or discount, a paydown results in a gain/loss equal to the amount of premium or discount associated with the principal payment. Prior to receipt of monthly paydowns, bond services provide the current month's factors, FNMA current monthly

factors are usually provided by the 6th business day of the month, assuming the bond service reports a current, or July 1, 2007, factor of 0.99906831 on July 8, 1992, the paydown and related loss is recorded as follows:

Date	Account	Debit	Credit
7/8/2007	Receivable for Paydowns	\$1,928.02	
	Gain/loss on Paydowns	\$42.18	
	Investment at ID Cost		\$1,970.20
	To record estimated paydown based on bond service factor		

Where:

- Receivable for Paydowns = (Prior factor – Current factor) x Original Principal = $(1.00000 - 0.99906831) \times (\$2,069,379) = \$1,928.02$
- Gain/Loss on Paydowns = (Prior factor – Current factor) x Premium/Discount = $(1.000000 - 0.99906831) \times (\$2,114,646.67 - \$2,069,379) = 0.00093169 \times \$45,267.67 = \$42.18$

When the new current face is known, the following entry is made to reverse the estimated interest income:

Date	Account	Debit	Credit
7/8/2007	Interest Income	\$2,431.17	
	Interest Receivable	\$42.18	\$2,431.17
	To reverse estimated income booked from 7/1/07 to 7/7/07 based on prior month's current face.		

Where Interest Income = Daily income accrual for June x days in accrual period = $\$347.31 \times 7 = \$2,431.17$

Date	Account	Debit	Credit
7/8/2007	Interest Receivable	\$2,428.91	
	Interest Income		\$2,428.91
	To record interest income for period 7/1/07 to 7/7/07.		

Where:

- Current Face = Original Current Face x Current Month's Factor = $\$2,069,379 \times 0.99906831 = \$2,067,450.98$
- Interest Income = (Current Face x Coupon rate) x (7/360) = $(\$2,967,450.98 \times 6.042\%) \times (7/360) = \$124,915.40 \times (7/360) = \$2,428.91$

Beginning July 8, 2007, the following entry is made to record daily income based on the new current face:

Date	Account	Debit	Credit
Daily	Interest receivable	\$346.99	
	Interest income		\$346.99
	To Record the daily Interest Income of FNMA CUSIP 31366RX21		

Where Interest Income = (Current face x (Coupon Rate/360)) = (\$2,067,450.98 x (6.042%/360)) = \$346.99 This daily rate changes when a new current face is calculated.

Actual paydown cash is on FNMA is received on the 25th of the month following the month of accrual. When a paydown is received, the entry to record the estimated paydown is reversed and the actual paydown is recorded. If the actual payment from the custodian was different from the amount booked based on the factor, an entry must be made to further adjust 1) Investment at ID Cost 2) Paydown Loss, and 3) Interest Income for period July 1 to July 25, 2007. Upon receipt, the cash is recorded as follows:

Date	Account	Debit	Credit
7/25/2007	Cash	\$12,347.34	
	Receivable for Paydowns		\$1,928.02
	Interest Receivable		\$10,419.32
	To record receipt of principal and interest for the month of June, 2007.		

Where the interest receivable = Purchased Interest + Accrued Interest = \$8,682.77 + (5 days x \$347.31. per day) = \$10,419.32

4) Sale of MBS

Date	Account	Debit	Credit
72/8/2007	Receivable for Investment Sold	\$2,152,215.09	
	Investment at ID Cost		\$2,112,676.47
	Interest receivable		\$9,715.64
	Gain/Loss at ID Cost		\$29,822.98
	To record sale of FNMA CUSIP 31366X21.		

Where:

a. Receivable for Investment Sold = (Current face x Price) + Accrued Interest = (\$2,067,450.98 x 1.0363) + (28 x \$346.99) = \$2,152,215.09

b. Investment at ID Cost = Original Cost – Principal Payments – Paydown loss = \$2,114,646.67 - \$1,928.02 - \$42.18 = \$2,112,676.47

c. Interest receivable = (Current Face x Coupon Rate) x (28/360) = (\$2,067,450.98 x 6.042%) x (28/360) = \$9,715.64

d. Gain/Loss at ID Cost = (Proceeds – Interest Sold) – ID Cost at Date of Sale = (\$2,152,215.09 - \$9,715.64) - \$2,112,676.47 = \$29,822.98

On the settlement date the following entry will be recorded:

Date	Account	Debit	Credit
7/29/2007	Cash	\$2,152,215.09	
	Receivable for Investment Sold		\$2,152,215.09
	To record proceeds from sale of FNMA 31366RX21.		

Using Derivatives for Risk Management

Derivatives were designed to hedge risk, but in no way they eliminate it. Derivates only shift the risk around. As a result, when the credit cycle turns and default rates rise, someone, somewhere, will lose money. Although credit derivatives cannot eliminate losses from credit risk, they can transform credit risk in intricate ways that may not be easy to understand. Many commercial banks, investment bank and even investors used credit derivatives for risk management, but as the need for additional financing arise, they used as an investment vehicle.

Commercial banks use credit derivatives to tailor their credit risk exposure. Broadly speaking, they shed credit risk via credit derivatives. Banks have used credit derivatives and other means of credit risk transfer, such as securitizations, to shed risk in several areas of their credit portfolio, including large corporate loans, loans to smaller companies, and counterparty credit risk on over-the-counter (OTC) derivatives. Banks use single-name CDS to shed the credit risk of issuers to whom they have a large exposure. Banks can transfer the credit risk of a portfolio of exposures to investors via

securitization transactions, such as collateralized loan obligations (CLOs). Joint Forum (2005), reporting on interviews held in 2004 with about 60 market participants, found that the largest commercial banks had shed a material, but small, amount of credit risk via credit derivatives, mainly to their large, investment-grade corporate customers. The Joint Forum also reported that a number of commercial banks had scaled back their credit hedging activity.

However, these conclusions no longer hold. The amount of credit risk shed by banks was rising, and hedging had spread to categories of credit risk beyond investment grade corporate loans. A number of banks, mainly European, had done large hedging transactions in between 2005-2007. These transactions represented the equivalent of \$88 billion notional amount of credit risk shed by eight large international banks over 2005-07. In many of these transactions, and in contrast to similar transactions in the late 1990s, the issuing bank sold off the first-loss equity tranche of the credit risk. The categories of credit risk shed included not only loans to large corporations, but also loans to small and medium-sized enterprises, loans to emerging markets, and counterparty exposure on derivatives. (Partnoy, Skeel, 2007)

An investment bank can use credit derivatives to manage the risk it incurs when underwriting securities. An underwriter assumes credit risk for the short time between when it takes the risk on its own books and when it sells the risk into the market. By virtue of the growth of credit derivatives, the underwriter may now be able to hedge some of that credit risk more easily.

Non-agency residential mortgage backed securities (RMBS) have been a rapidly growing market for securities underwriting in recent years. In 2006, \$574 billion of securities were underwritten and issued in this segment, up from less than \$100 billion in 2000 (SIFMA, 2007a). The rise in issuance volume naturally lead to a rise in credit risk carried by underwriters, because underwriters must warehouse residential mortgage loans on their books during the time it takes to assemble a large enough pool to launch a securitization.

Underwriters must find a way to cope with the potential increase in credit risk, which given the numbers cited above might be so large as to discourage them, at the margin, from taking on additional underwriting business. One way for underwriters to cope with such a potential increase in credit risk is to hedge more of it.

New credit derivative instruments appeared to have proved useful to underwriters who wanted to hedge the risk of a residential mortgage loan warehouse. Beginning in mid-2004, dealers began to trade credit default swaps on asset-backed securities (referred to as ABS CDS). By mid-2006, industry estimates put the size of the ABS CDS market at more than 125 billion in notional amount outstanding and growing rapidly. (Krahn, Wilde, 2006)

Investors are the third group that uses credit derivatives for risk management. An investor can use credit derivatives to align its credit risk exposure with its desired credit risk profile. Credit derivatives can be more flexible and less expensive than transacting in cash securities “Investors” are a heterogeneous group and they participate in the credit

derivatives market in different ways. One way that investors differ is whether they are a “buy and hold” investor who seeks to earn a return from a broad exposure to issuers of fixed income securities, or an “active trader” who seeks to earn a return by predicting short-term price movements better than other market participants.

The advantages of credit derivatives as a risk management tool are different for the two groups. Traditionally, insurance companies and pension funds were thought of as “buy and hold” investors, and hedge funds were thought of as “active traders.” But the distinctions between different types of asset managers are becoming increasingly blurred. A given asset manager may place some of its assets in a “buy and hold” index strategy, place some with an in-house team of “active traders,” and place the remainder with external managers who could pursue either type of strategy. While the asset-backed securities market includes securities backed by a range of collateral, including credit card loans and auto loans, nearly all ABS CDS contracts reference RMBS or commercial mortgage backed securities. (Gibson, 2007)

Closing

Over the past decade there had been many changes on in the financial markets and the world went through the worst recession since the Great Depression in 1930s. There are several reasons that contributed to the collapse and the major one is the large increase in derivative securities.

I would like to use quote from Warren Buffet and his opinion on credit derivatives that he expressed in 2002, way ahead of the current crisis *“I view derivatives as time bombs, both for the parties that deal in them and the economic system. Basically these instruments call for money to change hands at some future date, with the amount to be determined by one or more reference items, such as interest rates, stock prices, or currency values.”*

This dissertation will be focusing on current issues in the mortgage lending markets. This dissertation should serve as a model or a guide for legislator, companies or even consumers on what to avoid in the future when it comes to derivative securities and mortgages. Although interest rates are historically the lowest they have in a century, the spending power is limited, since banks are avoiding lending to consumers. This led to an extensive real inventory of homes across the country.

On the other hand, financial companies are reeling from their losses and have successfully breached the breaking point and are raking in profits. This could lead to another boost in subprime lending as it doesn't have “real” money requirement behind it. Across the United States and across much of the world, the construction industry creates

large amount of jobs and income. It is in dire need of boost and ultimately the entire economy would benefit from its resurrection. However, this needs to be done with caution and with proper financial backing. Thus it is important to analyze what was the main culprit in the previous downfall and how to minimize it or avoid it altogether.

Derivatives and their impact on the financial market created a fear in banks, investors and are generally very negatively viewed. However, the financial world might not be able to simply stop using them. House (2008) argued that derivative products should not be regulated to non-existence. However, they should be used for borrowers who are knowledgeable about the process and not on a fixed income.

Chapter 3

Methodology

In order to evaluate what was the main cause or what have contributed the most to the mortgage meltdown and with it correlated recession, this dissertation will evaluate data in three separate countries. Two of these countries real estate markets have been hit by foreclosures and economic downturn the hardest in the developed world – USA and Ireland. China on the other hand started early preventive measures and has not suffered almost any foreclosures.

Case Study Methodology Justification

Case study analysis is a popular one across many disciplines, but once used, can be hard to replicate and generalize on any additional cases. (Taylor, Dossick, Garvin, 2011)

Yin (1984) defines a case study as “an empirical inquiry that: (1) investigates a contemporary phenomenon within its real-life context, especially when (2) the boundaries between the phenomenon and context are not clearly evident.” Yin continues his definition with a technical distinction between the method and the characteristics of data collection and data analysis strategies. He argues that with case studies there will be many more variables of interest than data points, and therefore, case studies require collecting and triangulating data from multiple sources of evidence.

Most often, case-study observations are considered as qualitative research; however, researchers from engineering, business, and social science disciplines alike have shown that case studies are often mixed-method projects with both qualitative and aspects (Esteves and Pastor 2004).

There are two criticisms that are voiced against the case study models. The first one was focuses on how investigators can justify making generalizations from a limited number of samples (Flyvbjerg, 2006). In this paper only three countries – United States, Ireland and China. “For those who work primarily in the statistical domain, the limited number of data points is intuitively a statistical significance problem.” (Platt, 1992) “A second criticism is that many case-study research projects are executed with insufficient precision, quantification, objectivity, or rigor in which investigators have not followed standard procedures or have allowed a biased view to influence the direction of the findings.” (Taylor, Dossick, Garvin, 2011)

In order to avoid both of these biases, each Lending Model will be analyzed using different methodology. The Traditional Mortgage Lending Model will be analyzed using a decision tree.

Decision Tree – Traditional Lending Model Analysis

The Traditional Lending Model will be analyzed using a decision tree approach. The traditional decision tree analysis has been criticized for requiring a lot of calculations and, therefore, being inefficient. (Zebda, 2011) To address the inefficiency of the traditional

decision trees, some researchers have provided modified decision trees, including Game trees (Shenoy, 1995) and Scenario trees (Shenoy, 1995). These decision trees attempt to preserve the advantages of the traditional trees while improving the efficiency of the solution.

A typical use of decision analysis is in evaluating new market opportunities. As such, it is an appropriate tool for this research. Decision analysis is especially well suited to research based decision making in conditions where significant investment is at stake. (Nugent Jr., 2008) It is unreasonable to think that the real-estate market and investment funding can be supported only by traditional lending. Since the majority of US investors doesn't save into saving accounts, but invests in mutual funds, there just simply isn't enough backing in the banks to provide all the financing. With the disposable income at all time low during this recession, the chances of saving for a house are almost non-existent. This will certainly create another way to raise capital and provide funding.

The decision tree analysis will analyze options of lending institution to increase their lending funds availability.

There are several options that play a significant role in the decision:

- 1) Increasing the personal savings rate, this has been happening across all of the three countries, with China leading the way. From the three countries used in this research, China has the largest amount of fund saved by households. Ireland and US personal savings are more inline.

2) If central fund and inter-banking lending interest rates remain low for the next couple of years, it would be more profitable to lend money to customer for mortgages for higher profits

3) Cash hoarding attitude in the banking industry will change. Banks will refinance their existing debt and eventually in one or two years start lending money again.

The analysis should establish if there is a need for non-traditional lending. That would provide enough cash flow for effective lending. However, there should be a strict regulation and detailed guidelines provided restricting the lending. Some regulation about the lending process, so far only interagency guidance has been adopted in California.

“The lender must provide a borrower with a complete” analysis of how the loan compares with the following:

- A similar 30 year, fixed-rate, fully amortizing loan;
- A loan that is interest only for the first five years and that fully amortizes over the remaining 25 years;
- A fully amortizing 5/1 ARM;
- An interest-only, fixed-rate loan for the first live years that becomes in ARM; and
- An adjustable rate loan that amortizes over the full term.

For each of these scenarios, the lenders must calculate and disclose the following:

- The minimum monthly payment for the first five years;
- The monthly payment in the sixth year with no change in rate;
- The monthly payment in the sixth year with a 2 percent increase in rate;
- The minimum monthly payment;

- The monthly payment in the sixth year with a 5 percent increase in rate;
- The borrower's remaining loan balance after the first five years of payments; and
- Whether the original loan balance has been reduced during the first five years (and, if so, the amount by which it has been reduced).

And for each possible permutation, the lender must also calculate the difference between the minimum payment and the borrower's gross monthly income.” (House, 2008)

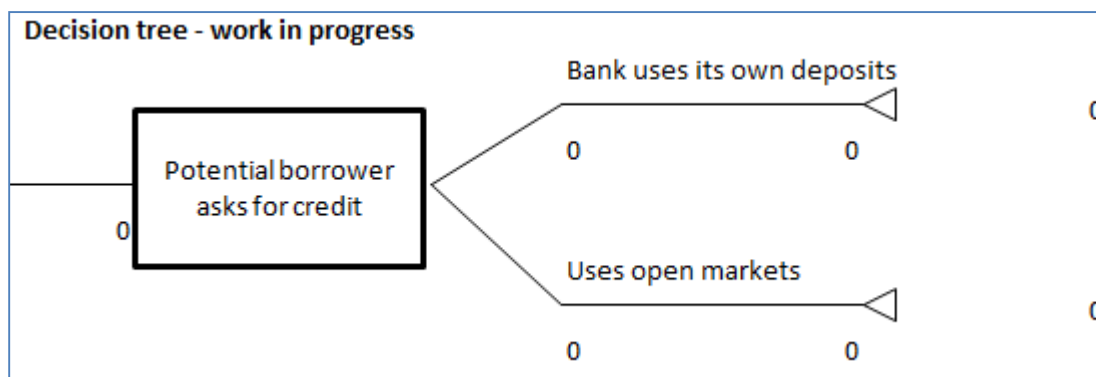


Figure 12 – Decision Tree – treeage.com

Vector Autoregression Model (VAR) – Subprime Lending Model Analysis

The Subprime Mortgage Lending Model will be analyzed using VAR Model – described in detail below. In order to provide clear and undisputable results, this paper needs to provide clear and convincing results and should expand beyond the simple definitions. Thus a detailed statistical research that is specifically designed to analyze data and be flexible to accommodate multiple variables is best suited for this specific kind of research.

The data analysis will be analyzed using the Vector Autoregression Model (VAR). It is one of the most successful, flexible and easy to use models for the analysis of multivariate time series. The VAR model has proven to be especially useful for describing the dynamic behavior of economic and financial time series and for forecasting. (Zivot and Wang, Volume 13)

Variables: The selection of variables is based on the actual model and economic data and statistics. The table below shows the dependent variable and the explanatory variables in terms of the models and economic data used in the subprime lending model. The data will be collected for the following years: 2006, 2007, 2008, 2009, and 2010 (5 years in totals). All data collected will be for monthly statistics.

The Dependent Variable			
Short Name	Detailed Explanation	Measure	Period
FORECLOSURES	The number of defaults in each country	Percentage	Monthly
The Explanatory Variables			
Short Name	Detailed Explanation	Measure	Period
FEESMTG	Fees charged by mortgage brokers on each real estate transaction	Percentage	Monthly
REVRAT	Revenues received by rating agencies from rating MBS	Dollar amounts	Monthly
UNMPLOY	Unemployment rate in each country	Percentage	Monthly
REALPRICE	Average Real Estate Price in each country	Dollar amounts	Monthly
INTRATE30	Interest Rate on mortgages - fixed 30 yrs.	Percentage	Monthly
INTRATE15	Interest Rate on mortgages - fixed 15 yrs.	Percentage	Monthly
SAVINGS	National Savings Rate	Percentage	Monthly

Figure 13 – Table of Variables

The general format of the panel data model can be expressed as (general regression analysis):

$$Y_{it} = \alpha + \beta_k X_{k,i,t} + u_{i,t}$$

Y_{it} denotes the number of defaults, which is the dependent variable of the model; β_k represents the parameters to be estimated with $k = 1, 2$ and so on showing the independent variables; $u_{i,t}$ represents the stochastic error term. The dimension of cross-sectional units is represented by i and that of time-series is represented by t . Additionally to the regression model testing, Modified Wald test for heteroskedacity and Woolridge Test for Autocorrelation will be run to verify estimation and autocorrelation respectively in our model. (Woolridge, 2003)

E-views software will be used to analyze collected data. “E-views is a spreadsheet software used for various types of data analysis. It has some similarity to the commonly used Microsoft Excel and does support this type of files. We are able to conduct some data analysis in Excel, E-views enables you to do traditional Excel analysis, like descriptive statistics, but also more advanced calculations, regressions and simulations, which you won’t find in Excel. In addition to its increased functionality, it also operates at a much faster pace, both in terms of calculation time and in terms of ease of use. Especially Eviews data series analysis functions are superior to many of its competitors” (Thomsen, Sandager, 2010)

Chapter 4

Case Studies

Case One – United States of America



Figure 14 – google.com/maps

General Overview

United States of America is the “largest and most technologically powerful economy in the world, with a per capita GDP of \$49,800.” (cia.gov/factbook) It is one of the most democratic countries in the world with a very diverse population. It is the third largest country by size and population in the world which provides and ample opportunity for residential real estate market.

“The USA is the world's foremost economic and military power, with global interests and an unmatched global reach. America's gross domestic product accounts for close to a quarter of the world total, and its military budget is reckoned to be almost as much as the rest of the world's defense spending put together. The US contains a highly diverse population, the product of numerous and sustained waves of immigration. Ethnic and racial diversity - the "melting pot" - is celebrated as a core element of the American ideology.

- Full name: United States of America
- Population: 313 million (UN, 2011)
- Capital: Washington DC
- Largest city: New York City
- Area: 9.8 million sq km (3.8 million sq miles)
- Major language: English
- Major religion: Christianity
- Life expectancy: 76 years (men), 81 years (women) (UN)
- Monetary unit: 1 US dollar = 100 cents
- Main exports: Computers and electrical machinery, vehicles, chemical products, food and live animals, military equipment and aircraft
- GNI per capita: US \$48,450 (World Bank, 2011)

Politics: Barack Obama, America's first black president, was re-elected in November 2012.

Economy: The US is the world's leading industrial power. Its recovery from the 2008 economic crisis has been sluggish.

International: The US has a leading role on the world stage, militarily and diplomatically. Its combat troops are set to leave Afghanistan by late 2014.”

Source: www.bbc.com/coutryprofiles

Current Mortgage Market Situation

The residential mortgage market has been struggling along for the last six years since 2007. “After almost four years of house price falls, the much-awaited U.S. housing market recovery is finally taking place:

- House prices are rising again.
- Demand is returning, with home sales increasing.
- Construction activity is picking up.
- The delinquency rate is stabilizing.
- Foreclosures are falling.

The U.S. seasonally-adjusted purchase-only house price index rose by 4.75% (3.01% in real terms) during the year to August 2012 - the largest annual growth in house prices since September 2006, according to the Federal Housing Finance Agency (FHFA). On a quarterly basis the index increased by 1.48% (1.23% in real terms) in August 2012.

The S&P/Case-Shiller home price indices were also encouraging:

- The S&P/Case-Shiller seasonally-adjusted composite-10 home price index rose 1.3% year-on-year (y-o-y) to August 2012 (-0.39% in real terms). Quarter-on-quarter (q-o-q), the index rose by 1.64% (1.39% in real terms) in August 2012.

- The wider S&P/Case-Shiller seasonally-adjusted composite-20 home price index rose by 2% y-o-y to August, better than the 1.2% annual rise seen the previous month.

In August 2012, the median sales price of new homes sold in the U.S. increased by 17% y-o-y to US\$256,900. Foreclosed home prices are rising rapidly. Average foreclosed-home prices rose by 12% month-on-month in September 2012, to US\$194,681, according to RealtyTrac, the leading U.S. online foreclosure properties marketplace. New foreclosed home listings fell by 40% in September 2012 from the previous month, to 106,328 units.

In October 2012, the U.S. home builder sentiment rose to its six-year high, according to the National Association of Home Builders” (www.globalpropertyguide.com)

Governmental Rules and Regulations Governing Mortgage Industry

2013 - “Qualified Residential Mortgage rule will fundamentally reshape who can lend and who can borrow because banks will probably make only those loans that conform to the new standards. The CFPB offered strong legal protection for loans on which borrowers’ debt payments are no more than 43 percent of their income. Points and fees for such mortgages can’t be more than 3 percent of the total loan amount. Loans backed by the government through Fannie Mae (FNMA), Freddie Mac, and the Federal Housing Administration automatically qualifies for legal protection for the next seven years.” (www.bloomberg.com)

January 2013 - The Dodd-Frank Wall Street Reform and Consumer Protection Act:

- *“Require Lenders to Make a No-Point, No-Fee Loan Option Available:* Under the proposed rule, creditors would have to make available to consumers a loan without discount points or origination points or fees, unless the consumers are unlikely to qualify for such a loan.
- *Require an Interest-Rate Reduction When Consumers Elect to Pay Upfront Points or Fees:* Consumers can pay points, which are expressed as a percentage of the loan amount, and fees to covers costs associated with origination or prepaid interest charges.” (www.consumerfinance.com)

2008 – Z Loan Originator Compensation and Steering 12 CFR 226 changed how mortgage brokers are compensated, ostensibly to safeguard consumers from “unfair practices” involving brokers and loan originators.

“The rule prohibits a creditor or any other person from paying, directly or indirectly, compensation to a mortgage broker or any other loan originator that is based on a mortgage transaction’s terms or conditions — the only factor determining pay is the amount of credit extended. The rule also prohibits any person from paying compensation to a loan originator for a particular transaction if the consumer pays the loan originator’s compensation directly.

The rule prohibits a loan originator from steering a consumer to consummate a loan that provides the loan originator with greater compensation, as compared to other transactions the loan originator offered or could have offered to the consumer, unless

the loan is in the consumer's interest. The rule provides a safe harbor to facilitate compliance with the prohibition on steering.” (mintlife.com)

Lender Position in the Residential Mortgage Industry

United States government has four core laws governing the mortgage lending that all lender are required to follow. They are as follows:

“The Real Estate Settlement Procedures Act (RESPA) requires lenders to give a "good faith estimate" of all closing costs you are likely to pay. The idea is to keep the borrower from being forced to pay "hidden" fees at closing.

The Truth In Lending Act (TILA) also known as Regulation Z, requires that annual percentage rate (APR), term of the loan and total costs must be disclosed to a borrower prior to extending credit to the borrower. This information must be conspicuous on documents presented to the consumer before signing, and also possibly on periodic billing statements.

The Equal Credit Opportunity Act (ECOA) prohibits discrimination in lending based on race, creed, religion, national origin, sex, marital status or age. It also ensures that all consumers are given an equal chance to obtain credit. This doesn't mean all consumers who apply for credit get it: Factors such as income, expenses, debt, and credit history are considerations for creditworthiness.

The Fair Credit Reporting Act (FCRA) promotes the accuracy, fairness and privacy of information in the files of consumer reporting agencies. When you apply for a mortgage, the lender pulls a credit report. The FCRA guarantees you will have access to that report.” ([www. mortgageauditonline.com](http://www.mortgageauditonline.com))

The Dodd-Frank Wall Street Reform and Consumer Protection Act changes for mortgage originators:

“Set Qualification and Screening Standards: Under state law and the federal Secure and Fair Enforcement for Mortgage Licensing Act, loan originators currently have to meet different sets of standards, depending on whether they work for a bank, thrift, mortgage brokerage, or nonprofit organization.

- Character and Fitness Requirements: All loan originators would be subject to the same standards for character, fitness, and financial responsibility;
- Criminal Background Checks: Loan originators would be screened for felony convictions; and
- Training Requirements: Loan originators would be required to undertake training to ensure they have the knowledge necessary for the types of loans they originate.

Prohibit Payment of Steering Incentives to Mortgage Loan Originators: In 2010, the Federal Reserve Board issued a rule that was designed to curtail the practice of loan

originators directing consumers into higher priced loans based not on the consumer's interest, but on the possibility that the loan originator could earn more money.

Place Restrictions on Arbitration Clauses and Financing of Credit Insurance: The proposal implements Dodd-Frank Act provisions that, for both mortgage and home equity loans, prohibit including mandatory arbitration clauses in loan documents and increasing loan amounts to cover credit insurance premiums.”

(www.consumerfinance.com)

Buyer Position in the Residential Mortgage Industry

“The buyer's position in the US mortgage market is improving slowly and steadily. about 10.8 million Americans or 22.3% are “underwater” on their mortgages in 2012 — these are homeowners who owe more than their houses are currently worth. This number should be about 5% in a healthy real estate market. The high number of underwater homeowners is a potential obstacle in the way of the Federal Reserve's efforts to stimulate the economy. The Fed has pledged in 2012 to buy up \$40 billion worth of mortgage-backed securities each month between now and the end of the year in order to reduce mortgage-lending rates. The hope is that many homeowners will refinance at the lower rates, putting more money into their pockets so that they can go spend and stimulate the economy. But underwater homeowners often have difficulties refinancing, which puts a damper on these efforts.” (www.washingtonpost.com)

“As the nation's housing market shows signs of bottoming after years of declining prices, many first-time buyers are getting a rude awakening. Instead of having their pick of homes to buy in some markets, they're losing houses to cash buyers and bidders with bigger down payments, or they're facing bidding wars spurred by shrinking numbers of homes for sale. Cash buyers accounted for almost one third of existing home sales just in two short months in March and April 2012.

First-time buyers who use FHA loans might be in for the toughest time. They're frequently low-down-payment bidders. FHA loans might also require sellers to do more home repairs than do other loans, such as fixing chipped paint on older homes, Realtors and lenders say. If sellers receive multiple offers, they may avoid FHA offers. Nationwide, 35% of existing single-family home buyers in April were first-timers, according to the National Association of Realtors. In healthier times, first timers account for 40% to 45% of the market.” (www.usatoday.com)

“The Campbell/Inside Mortgage Finance HousingPulse Tracking Survey, released last week, found that first-time home buyers were purchasing only 34.7 percent of the homes sold in October. That's down from 37.1 percent in September, and is the lowest percentage ever recorded by the survey.

This decline surfaces as purchases of non-distressed homes—houses that are not in foreclosure—have increased dramatically in 2012. The report shows that the vast

majority of the homes being sold are regular purchases—accounting for 64.7 percent of all houses sold in October, up from 55.7 percent in February. The increase is a sign of strength in the housing market, as fewer people are buying homes in foreclosure” (www.usanews.com/money)

Statistical Data Set and Data Results

United States real estate market is getting stronger supported by favorable employment statistics and it is still growing supported by favorable governmental policies. Another big boost to the real estate market is the improvement and increase in the stock market returns. Many investors recuperated their investment losses and found new jobs. This in turn slowed down the foreclosures as many of the home owners were able to refinance and catch up on their payments. Also, the home prices stabilized and became overall more affordable to purchase. Currently, the average price of a home is worth about 5-times the average yearly salary which is almost the lowest ratio in the developed world (NYTimes.com).

The following data, which was collected for period of eight (8) years monthly from January 2005 through December 2012, will help us analyze which of the following factors has the largest impact on the foreclosures. The results should provide a clearer picture of dependence between several key variables on the US real estate market. Originally planned exploration of Mortgage Broker Fee independent variable is unfortunately impossible to analyze. It is considered a privileged client/broker data and

it differs from one transaction to another. There is a new law since 2010 governing this process where both parties are required to sign a contract that specifically states the percentage fee. (Please see detailed numbers in Appendix VII)

The Dependent Variable			
Short Name	Detailed Explanation	Measure	Period 01/2005 – 12/2012
FORECL	The number of foreclosed in US	Number of Homes	Monthly
The Explanatory Variables			
Short Name	Detailed Explanation	Measure	Period
REVRAT	Revenues received by rating agencies from rating MBS	Percentage	Monthly
UNMPLOY	Unemployment rate in USA	Percentage	Monthly
INTRATE30	Interest Rate on mortgages - fixed 30 yrs.	Percentage	Monthly
INTRATE15	Interest Rate on mortgages - fixed 15 yrs.	Percentage	Monthly
HOUPRICE	Median Home Price	USD	Monthly
PERSAVING	Personal Saving Rate	Percentage	Monthly
CPIUSSL	Consumer Price Index –All Consumers	Index	Monthly
DISPERINC	Disposable Personal Income	USD Billion	Monthly

Figure 15 – Data set for USA

Foreclosures (Number of Homes): The data set represents the number of homes that were foreclosed on by the banks. This data is tracked in the United States only from the beginning of the year 2005 in response to the current real estate situation. The foreclosure data is tracked by a private company Realty Trac: Foreclosure Real Estate Listing (www.realtytrac.com). The data was obtained from the monthly press releases.

Revenue Received by Rating Agencies (Percentage): It was obtained from Moody's yearly SEC financial fillings (10K) (www.moodys.com). The percentage represents the amount of Structured Finance revenue per year. The percentage revenue was consistent throughout every month of the year.

Unemployment rate (Percentage): "In the United States, the unemployment rate measures the number of people actively looking for a job as a percentage of the labor force."(www.tradingeconomics.com)

Median Home Price (US Dollar): It represents the median home price as calculated for the entire United States real estate market. Data was obtained from YCharts (ycharts.com).

Interest on Mortgage (Percentage): two monthly independent variable data sets. One is for *15-year fixed mortgage* rate and the second for *30-year fixed mortgage* rate in United States as reported by Freddie Mac agency. (www.freddiemac.com)

Personal Saving Rate (Percentage): "In the United States, Personal Saving Rate correspond to the ratio of personal income saved to personal net disposable income during a certain period of time" (www.tradingeconomics.com)

Consumer Price Index for All Urban Consumers: All Items (Index): It is a measure of the average change in prices over time of goods and services purchased by households.

Urban consumers cover all wage earners in the United States. Data was obtained from Federal Reserve Bank of St. Louis (www.stlouisfed.org)

Disposable Personal Income (USD Billion): Disposable Personal Income in the United States is reported by the U.S. Bureau of Economic Analysis (BEA). It was obtained from www.tradingeconomics.com.

Data Results:

In order to either accept or reject original hypothesis in this dissertation a multiple linear regression model has been run with one dependent and multiple independent variables. A SPSS statistical program has been used for this analysis. Detailed results of this analysis are located in Appendix VIII.

This analysis begins with the goodness of the fit for this data. Our r-squared has been at a respectable 0.940, thus the data in our regression that were chosen are a good fit for explaining the dependent variable.

A Pearson product-moment correlation coefficient was computed to assess the relationship between our dependent Foreclosures and independent variables. The correlation between the dependent variable Foreclosure and independent variables are as follows: Unemployment has a strong positive, $r = 0.732$, $n = 96$; Personal savings

has a positive, $r = .773$, $n=96$; CPI has also a positive correlation $r = 0.601$, $n=96$ and the last positive correlation is Disposable Personal Income $r = 0.604$, $n=96$. Revenues from rating Structured Finance has a negative $r = -0.672$, $n=96$ as well as 30-year Fixed mortgage rate a negative $r = -0.373$, $n=96$, 15-year fixed mortgage rate $r = -0.362$, $n=96$. Housing prices have a strong negative correlation $r = -0.608$, $n=96$. We can conclude that all the data we have selected has correlations to foreclosures.

The Durbin-Watson test has been performed for autocorrelation and with a value of 0.989 it is above the threshold of correlation, however it is lower than ideal number 2. The F-value is 83.89 and it indicates that our independent variables do have validity in fitting and they are not purely randomly selected. The F-value does confirm that they are good explanatory variables for foreclosures in United States. Based on the t-statistics in this model, most of the absolute values are significantly large in order to confirm that none of the parameters are zero. One exception is CPI, which has absolute value of 0.105 and thus there is a significant likelihood that the parameter is zero and might not impact our dependent variable.

The Regression analysis from the statistical results based on unstandardized data, meaning percentages and dollar values data were analyzed together to determine the impact on Foreclosures.

$$\begin{aligned} \text{Foreclosures} = & -522,617.519 - 3,348.424(\text{REVRAT}) + 32,832.773(\text{UNMPLY}) - \\ & 241,664.702(\text{INTERATE30}) + 297,937.496(\text{INTERATE15}) - 0.863(\text{HOUINDEX}) + - \\ & 4,743.956(\text{PERSAVING}) - 333.637(\text{CPIUCSL}) + 69.87(\text{DISCPERINC}) \end{aligned}$$

Based on our regression line, we statistically prove the impact of each of the independent variable on Foreclosures in the United States. Unemployment has a negative effect on the rise of arrears, where the unemployment rate decreases by 1%, the number of foreclosures decreases by 32,832 per month. Also, a decrease by a 1% in average long term 30 year fixed mortgage rate charged by the financial institutions would results in a very substantial decrease in the nonperforming category by 241,665 primary dwellings. On the other hand, increasing short term rates would be disastrous with almost doubling the amount of foreclosures by 297 thousand. Charging fees for rating mortgage back securities and depending on the ratings for revenues and thus providing favorable rating could increase foreclosures by 3,350 per month. Price of homes had not such a significant impact as I would have expected. It might be that the owners are unable to sell and stay rather than take a loss and pay the mortgage. Personal saving played a role in the foreclosures with 4,750 homes foreclosed on every 1% decrease in the savings.

Two of our independent variables had less significant impact. The disposable personal income is actually not contributing to foreclosures as much as predicted and based on

the data would have almost no impact. Consumer Price Index or increases in day to day prices in United States does not significantly impact the mortgage market.

Conclusion:

In conclusion, the United States mortgage market has managed to weather the worst period in 2009 and 2010 where the number of foreclosures was averaging 320,000 per month. Since then it stabilized and dropped, however as we could see, if the mortgage rates were not kept low and they suddenly spiked, it would have a very significant impact on the foreclosures. Fed will continue to keep then prime rate low till 2014 and thus prevent some of the foreclosures. The mortgage back security market has stabilized and the rating agencies are more cautious when it comes to providing more accurate ratings. Also new GAAP rules where the exact amount of structured finance has to be reported in Revenues helped with this issue. Consumers were not prepared to have a six month saving in case of emergency and thus without personal saving were unable to pay their mortgages and were foreclosed faster than in other countries where the social benefits are higher. Overall, the government had done some significant steps to control the situation and there is positive downward trend in foreclosures. Based on our data it natural since the rates went down, saving up a unemployment has decreased.

Case Two – Ireland



Figure 16 – google.com/maps

General Overview

“Ireland emerged from the conflict that marked its birth as an independent state to become one of Europe's economic success stories in the final decade of the twentieth century. It was in 1922 that 26 counties of Ireland gained independence from London following negotiations which led to the other six counties, part of the province of Ulster, remaining in the United Kingdom of Great Britain and Northern Ireland.

Partition was followed by a year of civil war.

Relations between Dublin and London remained strained for many years afterwards.

Northern Ireland saw decades of violent conflict between those campaigning for a

united Ireland and those wishing to stay in the United Kingdom. In an unprecedented and concerted effort to resolve the situation, the Irish and UK governments worked closely together in negotiations which led to the Good Friday Agreement on the future of Northern Ireland in 1998.

Ireland's economy began to grow rapidly in the 1990s, fuelled by foreign investment. This attracted a wave of incomers to a country where, traditionally, mass emigration had been the norm. The boom that earned Ireland the nickname of "Celtic Tiger" faltered when the country fell into recession in the wake of the global financial crisis of 2008. The property boom had been fuelled by massive lending from the banks, and when this collapsed - and lenders were unable to repay - the Irish banking system was plunged into crisis.

The Irish economy underwent one of the deepest recessions in the Euro zone, with its economy shrinking by 10% in 2009. In November 2010, Ireland and the EU agreed a financial rescue package worth 85bn Euros, ending weeks of speculation about a bail-out.

- Official name: Ireland (Irish: Éire)
- Population: 4.5 million (UN, 2011)
- Capital: Dublin
- Area: 70,182 sq km (27,097 sq miles)
- Major languages: English, Irish
- Major religion: Christianity
- Life expectancy: 78 years (men), 83 years (women) (UN)
- Monetary unit: 1 euro = 100 cents

- Main exports: Machinery and equipment, chemicals, foodstuffs
- GNI per capita: US \$38,580 (World Bank, 2011)

Source: www.bbc.com/coutryprofiles

Current Real Estate Market Situation

Based on the summaries in Global Property, the Ireland's housing market is improving.

"Ireland's residential property price index fell by 4.5% (-5.7% in real terms) during 2012, the slowest year-on-year decline since May 2008, based on figures released by the [Central Statistics Office Ireland](http://www.cso.ie) (CSO). Property price were actually unchanged (rose by 0.4% in real terms) during the latest quarter.

During the year to December 2012:

- House prices fell by 4.2% (-5.3% in real terms)
- Apartments experienced a sharper year-on-year price decline of 12.3% (-13.4% in real terms)

Ireland's house price boom was one of the longest and biggest in Europe, with prices of second-hand homes surging by around 330% from 1996 to 2006. But when the bubble burst in 2008, it was the world's biggest property bust.

- In 2008, property prices fell 12.4% (-13.4% in real terms)
- In 2009, property prices fell 18.6% (-14.3% in real terms)
- In 2010, house prices fell 10.5% (-11.6% in real terms)

Demand is now beginning to increase. Total transactions increased 17% in the first three quarters of 2012, to 14,000 (from 12,000 in 2011) - still a decline of 7% from 15,000 transactions in 2010. In 2011, house prices fell 16.7% (-18.7% in real terms). Ireland's economy was estimated to have expanded by 0.9% in 2012, and is projected to grow by 1.5% in 2013. But the average variable interest rate on new housing loans rose to 3.35% in November 2012, the highest level since September 2011, and outstanding loans for house purchases were 5.6% down in November 2012 on the same period the previous year.” (www.globalproperty.com)

“House prices are still 50 percent below their peak, compared with 30 percent in the United States. And more than half of Irish mortgages are underwater, meaning the house is worth less than the outstanding debt. While some of those borrowers can afford to keep making payments, more than a quarter of mortgage debt on first homes, roughly \$39 billion, is in default or has been modified by lenders. Irish banks have foreclosed on very few borrowers. While Ireland's leaders have considered it socially unacceptable for banks to seize large numbers of homes, they also feared the fiscal cost of foreclosures. This approach creates doubt about the true level of bad mortgages at Irish banks. And borrowers, unsure of whether they will keep their homes, remain in a state of financial paralysis.”(nytimes/dealbook)

Governmental Rules and Regulations Governing Mortgage Industry

2012 (EU) - Ireland as a member of the EU has currently its own mortgage lending rules and regulation. However, since the housing market collapse in multiple EU markets, the EU commission started drafting about caps of 40% loan-to-value indicator. The new rule would have the following impact: the buyer of a €100,000 flat would be able to obtain a mortgage of up to €40,000 at normal interest rates. If the buyer asks for more, he or she will have to face higher rates, and the credit institution itself will be forced to put aside a higher amount of capital against what will become *de officio* a higher risk. (www.euroactiv.com)

2011 - One of the most significant changes was the Code of Conduct on Mortgage in Arrears and Pre-Arrears that was enacted in 2011 and later updated in 2012. It is the response to increase in mortgage defaults and the rigid rules when it comes to filing for personal bankruptcy in Ireland. This new code is described in detail in the section below under Lender Practices.

2012 – law to write-down mortgages. “Ireland is different from the United States and most countries. During the financial crisis, Ireland bailed out the banks, and the government still has large ownership stakes in some of the biggest mortgage lenders. So taxpayers are already responsible for mortgage losses. In other countries, the burden of principal forgiveness would largely fall on privately owned banks. Irish banks have

foreclosed on very few borrowers. While Ireland's leaders have considered it socially unacceptable for banks to seize large numbers of homes, they also feared the fiscal cost of foreclosures. This approach creates doubt about the true level of bad mortgages at Irish banks. The other worry has been that some borrowers who can afford their mortgages will stop making payments to take advantage of a bailout. Banks have also been reluctant since they could face unexpected losses." (NY Times Dealbook)

Lender Position in the Mortgage Industry

As described in the section above, the one major code that governs Conduct on Mortgage in Arrears: "the main Central Bank code of relevance to people whose mortgage is in arrears or in danger of slipping into arrears. It requires lenders to wait 12 months before taking legal action about mortgages in arrears. However, this requirement does not apply if a borrower is deliberately not engaging with the lender. The CCMA applies to mortgages on primary residences only. It defines primary residence to include a residential property in this State which is the only residential property owned by the borrower as well as the more common definition of "the residential property which the borrower occupies as his/her primary residence in this State". The purpose of this wider definition is to apply the protections of the CCMA to people who are trying to maximize their income to help pay the mortgage on their main residence or home, whether or not they actually live in the Code also covers borrowers in pre-arrears.

The CCMA sets out the framework that lenders must use when dealing with borrowers in mortgage arrears or in pre-arrears. It requires lenders to handle all such cases sympathetically and positively, with the objective at all times of helping people to meet their mortgage obligations.

Under the CCMA, lenders must have the following:

A Mortgage Arrears Resolution Process (MARP) to be used when dealing with arrears and pre-arrears customers. The 5 steps for the MARP are:

1. Communication
2. Financial information
3. Assessment
4. Resolution and
5. Appeals

Lenders must also:

- Ensure that communications with borrowers are presented in a clear and consumer-friendly manner
- Make an information booklet available to borrowers in arrears (or pre-arrears) including details on the MARP, relevant contact points for arrears issues and details of websites with mortgage arrears information
- Provide a dedicated section on their website for borrowers who are in or facing financial difficulties. This section must include the above booklet and links to the above websites.

- Ensure that the level of contact and communications from them, or from any third party acting on their behalf, is proportionate and not excessive
- Wait at least 12 months before applying to the courts to commence legal action for repossession of a property (this does not apply if the borrower is not co-operating with the lender).

Lenders must not:

- Initiate more than 3 unsolicited communications with a borrower, by whatever means, in a calendar month, other than correspondence required by the CCMA or other regulatory requirements
- Require a borrower to change from an existing tracker mortgage to another mortgage type, as part of an alternative arrangement offered to the borrower in arrears or pre-arrears.” (Central Bank Of Ireland)

Buyer Position in the Residential Mortgage Industry

“The Irish government expects to pass a law this year that could encourage banks to substantially cut the amount that borrowers owe on their mortgages, a step that no major country has been willing to take on a broad scale. Under the new rules, it will be less onerous to declare bankruptcy, making it easier for people to walk away from their homes altogether. As the threat rises, banks are more likely to reduce homeowners’ debt, rather than risk losing the monthly income and getting stuck with the property. To

qualify, borrowers will have to prove that they are in a precarious financial position and cannot afford to pay” (NY Times Dealbook)

“In Ireland, where filing for bankruptcy means waiting 12 years before you can be discharged from your debts, many are taking advantage of a European Union law that allows them to file for bankruptcy anywhere in the EU. Their destination of choice is the UK, where they can be free of their debts within 12 months. In order to file for bankruptcy there, all they have to do is reside in the country for six months to prove that the UK is their centre of main interest.

There is no record of the number of Irish people who have filed for bankruptcy in Britain, but as few as 29 people filed for bankruptcy in Ireland in 2010, as opposed to 79,000 people in Britain. Many of these are people from other countries such as Germany making use of the UK's less rigid bankruptcy laws. Bankruptcy tourism has become so popular that insolvency professionals are now very much in demand.”
(www.guardian.com)

Statistical Data Set and Data Results

Ireland real estate situation has not recovered or turned for the better as it did in the US and also has received more governmental support than in US. Irish home price have decreased in some areas by as much as 49% (www.globalpropertyguide). The Irish

homeowners are struggling with negative equity (underwater mortgages), high unemployment rate and reduction in salaries.

The following data, which was collected for period of eight (8) years monthly from January 2005 through December 2012, will help us analyze which of the following factors has the largest impact on the Mortgage Arrears. The results should provide a clearer picture of dependence between several key variables on the Irish real estate market. (Please see detailed numbers in Appendix VII)

The Dependent Variable			
Short Name	Detailed Explanation	Measure	Period 01/2005 – 12/2012
MORTARR	Number of Mortgages in Arrears	Averages of Mortgages	Monthly
The Explanatory Variables			
Short Name	Detailed Explanation	Measure	Period
UNMPY	Unemployment rate in each country	Percentage	Monthly
ECBRATE	European Central Bank Rate	Percentage	Monthly
MTGRATE	15 Year Fixed Mtg. Rate	Percentage	Monthly
HOUINDEX	National - All Property Price Index	Index	Monthly
PERSAVING	Accounts Income, Savings	EURO Million	Monthly
CPIUCSL	Consumer Price Index –All Consumers	Index	Monthly

Figure 17 – Data set for Ireland

Mortgage Arrears (Number of Homes): This data refers to principal dwelling houses with mortgage payments that are 90 day and more overdue. Filing for bankruptcy and foreclosing on a home is almost impossible in Ireland. It takes about 12 years to discharge the debt and thus majority of mortgages “only” in arrears. The data was

calculated on data available in conference paper “Understanding Recent Trends in Irish Mortgage Arrears” by Lydon (2011) based on 323,388 primary dwellings multiplied by the mortgage in arrears rates.

Unemployment Rate (Percentage): In Ireland, the unemployment rate measures the number of people actively looking for a job as a percentage of the labor force. (www.tradingeconomics.com)

European Central Bank Rate (Percentage): Ireland is a member of the Euro Area, an economic and monetary union (EMU) of European Union (EU) member states that have adopted the euro. The Euro Area benchmark interest rate stands at 1.00 percent. In the Euro Area, interest rate decisions are taken by the Governing Council of the European Central Bank. The primary objective of the ECB’s monetary policy is to maintain price stability. The ECB’s Governing Council has defined price stability as "a year-on-year increase in the Harmonized Index of Consumer Prices (HICP) for The Euro Area of below 2%. The European Central Bank is the sole issuer of banknotes and bank reserves. That means it has the monopoly supplier of the monetary base. By virtue of this monopoly, it can set the conditions at which banks borrow from the Central Bank. Therefore it can also influence the conditions at which banks trade with each other in the money market. In the short run, a change in money market interest rates

induced by the Central Bank sets in motion a number of mechanisms and actions by economic agents.” (www.tradingeconomics.com)

Mortgage Rate – 15 Year Fixed (Percentage): Average 15 year fixed mortgage rate obtained from Central Statistics Office of Ireland.

Residential Property Price Index (Index): The Irish House Price Indices measure the average of prices paid for residential properties in Ireland. It is calculated using data on mortgage drawdowns and therefore excludes the prices of residential properties purchased with cash, index year 2005=100. (www.bloomberg.com)

Accounts Income, Consumption and Saving at Current Market Prices (EURO Million) – Seasonally Adjusted by Current Account, Institutional Sector and Quarter

Consumer Price Index (CPI – Index): “In Ireland, the Consumer Price Index or CPI measures changes in the prices paid by consumers for a basket of goods and services. Index set 2005=100.” (www.tradingeconomics.com)

Data Results:

In order to either accept or reject original hypothesis in this dissertation a multiple linear regression model has been run with one dependent and multiple independent variables. A SPSS statistical program has been used for this analysis. Detailed results of this analysis are located in Appendix VIII.

This analysis begins with the goodness of the fit for this data. Our r-squared has been at a respectable 0.975, thus the data in our regression that were chosen are a good fit for explaining the depended variable.

A Pearson product-moment correlation coefficient was computed to assess the relationship between our dependent Mortgage Arrears and independent variable. The correlation between the dependent variable Mortgage Arrears and independent variables are as follows: Unemployment has a strong positive and the only positive, $r = 0.869$, $n = 96$. European Central Bank a negative $r = -0.659$, $n=96$ and Mortgage rate a negative $r = -0.107$, $n=96$. Housing Index has a strong negative correlation $r = -0.888$, $n=96$; Personal saving rate correlation is small negative $r = -0.140$, $n= 96$. And CPI is significant with negative correlation $r = -0.575$, $n=96$. We can conclude that when unemployment increases so does the Mortgage arrears problem. If mortgage rates, European Central Bank, housing index, personal savings rate and CPI rates decrease, the mortgage arrears decrease.

The Durbin-Watson test has been performed for autocorrelation and with a value of 0.707 it is below the threshold of likely correlation. It is lower than ideal number 2. The F-value is 286.460 which is robust and it indicates that our independent variables do have validity in fitting and they are not purely randomly selected. The F-value does confirm that they are good explanatory variables for Mortgage Arrears in Ireland. Based on the t-statistics in this model, most of the absolute values are significantly large in order to confirm that none of the parameters are zero. One exception is CPI, which has absolute value of 0.057 and thus there is a significant likelihood that the parameter is zero and might not impact our dependent variable.

The Regression analysis from the statistical results based on unstandardized data, meaning percentages and dollar values data were analyzed together to determine the impact on Mortgage Arrears.

$$\text{Mortgage Arrears} = 6,001.38 - 241.546(\text{UNMPY}) - 5460.636(\text{ECBRATE}) + 9174.374(\text{MTGRATE}) - 317.047(\text{HOUINDEX}) + 1.37(\text{PERSAVING}) + 3.855(\text{CPIUCSL})$$

Based on our regression line, we statistically prove the impact of each of the independent variable on Mortgage in Arrears in Ireland. Unemployment has a negative

effect on the rise of arrears, where the unemployment rate decreases by 1%, the number of mortgages in arrears decreases by 242 per month. Also, an increase by a 1% in average mortgage rate charged by the financial institutions would result in a very substantial increase in the nonperforming category by 9,175 primary dwellings per month. On the other hand, decreasing the European Central lending rate by 1% would benefit the mortgage market performance and decrease the amount of mortgage arrears by 5,460 respectively per month. Price of homes is important in Ireland and a decrease in the housing index by 1 point would result in decrease in the mortgage arrear by 318 homes. Taking into account that the number of Mortgage Arrears in 2012 in the last four months of the year was 31,596 a decrease of 5,460 would be phenomenal. However, the economy of Ireland could not afford to see an additional increase in arrears and just by increasing a mortgage rate; this number would jump to 40,000 per month.

Two of our independent variables had less significant impact. The personal saving rate is actually not contributing to mortgage arrears as much as predicted and based on the data would have almost no impact. Consumer Price Index or increases in day to day prices in Ireland does not significantly impact the mortgage market.

Conclusion:

In conclusion, the Irish mortgage market is facing some issues and the mortgage arrears in increasing steadily. There are couple of areas that the government has control over and the mortgage market would benefit if these areas were looked into and addressed. Ireland over-borrowed from European Central Bank and allowed its own banking system to fall to pieces without proper controls. Ireland has to get control on their rate policies and keep mortgage rates low would help to keep the mortgages affordable and decrease monthly payments. European Central Bank announced that it would increase the lending rate by 0.5%-1% in the next year, thus keeping EU lending at low would in the long run result in less mortgage arrears.

Case Three – China



Figure 18 – google.com/maps

General Overview

“China is the world's most populous country, with a continuous culture stretching back nearly 4,000 years. China is one of the world's top exporters and is attracting record amounts of foreign investment. In turn, it is investing billions of dollars abroad. The collapse in international export markets that accompanied the global financial crisis of 2009 initially hit China hard, but its economy was among the first in the world to rebound, quickly returning to growth.

In February 2011 it formally overtook Japan to become the world's second-largest economy, though by early 2012 the debt crisis in the Euro zone - one of the biggest markets for Chinese goods - was beginning to act as a drag on China's growth. As a

member of the World Trade Organization, China benefits from access to foreign markets. But relations with trading partners have been strained over China's huge trade surplus and the piracy of goods.

- Full name: People's Republic of China
- Population: 1.35 billion (UN, 2011)
- Capital: Beijing
- Largest city: Shanghai
- Area: 9.6 million sq km (3.7 million sq miles)
- Major language: Mandarin Chinese
- Major religions: Buddhism, Christianity, Islam, Taoism
- Life expectancy: 72 years (men), 76 years (women) (UN)
- Monetary unit: 1 Renminbi (yuan) (Y) = 10 jiao = 100 fen;
- Main exports: Manufactured goods, including textiles, garments, electronics, arms
- GNI per capita: US \$4,940 (World Bank, 2011)

Politics: Under Communist rule since 1949, China has moved away from the Maoist radicalism that led to millions of deaths in the 1950s and 1960s, but the party has kept a tight grip on state and society, saying the suppression of dissent is justified by the need for stability.

Economics: Economic reform has replaced state socialism with a more capitalist system and generated rapid growth, turning China into one of the world's largest economies, but problems such as growing inequality, pollution, rural poverty, an inefficient state sector and low domestic consumption remain.

International: China's new-found strength has made it more assertive on the global stage, but it dismisses concerns about high defense spending and its "peaceful rise" as baseless. Accusations - denied by China - that it keeps its currency cheap to boost

exports have caused tension with the West, as has criticism of its human rights record.

Tensions have recently risen with Japan over a group of disputed islands.”

Source: www.bbc.com/countryprofiles

Current Mortgage Market Situation

Chinese real estate market has been very proactive in preventing the “bubble burst” that many of the developed countries have gone through. Based on data in www.globalpropertyguide.com “Housing sales and property prices began to rise in China in Q1 2009, boosted in November 2008 by a CNY4 trillion (US\$585 billion) post-financial crisis stimulus package. Buyers took advantage of looser lending conditions and lower interest rates.”

Property prices in China rose rapidly from 2000 to 2008, fuelled by low interest rates and cheap credit. The price index for second-hand homes in Shanghai soared 121% (85% inflation-adjusted) from Q1 2003 to Q2 2008. Residential property investment in China has tripled from 2% of GDP in 2000 to 6% of GDP in 2011. Real estate and property construction in the country currently accounts for around 11% of GDP. (GK Drakonomics)

Buying frenzy on the Chinese real estate market continued in 2012 where many investors simply wanted to “stash their money” instead of investing it or putting it in a bank. However, the market is in general slowdown and it is estimated that “there are

between 10 and 65 million vacant units held for investment and every city in China has a new development district with row upon row of condos that are sold, but empty (www.money.cnn.com)

“The Chinese economy, however, may feel more of the sting as the housing market slows. Around 10% of economic growth in China last year was directly related to real estate development, so it will be hard for the country to keep up its blistering pace if housing investment cools. By comparison, residential real estate construction in the United States peaked at 6.1% of the economy in 2005. And if housing development stumbles, other sectors of the Chinese economy will feel the pinch. Companies that provide building materials, including steel, cement and copper, will experience diminished demand.” (www.money.cnn.com)

Governmental Rules and Regulations Governing Mortgage Industry

Chinese government has learned from other real estate markets and early on enacted several policies and laws to help ease the tensions in the housing markets. Several of these policies included multiple changes that have impacted lenders, borrowers as well as investors into the real estate market.

2010 – “Market cooling measures:

- The down payment for first-time buyers’ mortgages was increased to 30% from 20%, while for second homes down payment rose to 60% from 50%.
- Mortgages for third home purchases were prohibited.

- There were limitations on home purchases in more areas, credit-quota limits and higher benchmark lending rates.
- New property taxes were introduced in Shanghai and Chongqing - between 0.4% and 0.6% in Shanghai, and between 0.5% and 1.2% on luxury homes and newly purchased high-end homes in Chongqing, plus a special tax on second home purchases by people with no business or employment interest in the city.
- In early-2011, Beijing also banned property purchase to those who have not lived in the province for five years, limited the number of homes a native Beijing family could own to two, and allowed only one home for non-native Beijing families.
- Mortgage discount for first-time homebuyers was eliminated.
- The benchmark interest rate was raised to 6.56% in July 2011, the third interest rate hike last year.” (www.globalpropertyguide.com)

2011 - started the construction of 10 million units. The government vowed to build 36 million affordable housing units until 2015 in order to help the population to cope with skyrocketing prices of in the housing market

2012 - the government allocated more than 200,000 hectares of land for low-income housing

2013 – “New cities aside from Beijing, Shanghai and Chongqing will be added to the list with experimental property tax reforms such as higher taxes on second homes and stricter qualifications on first-time home buyers.” (www.globalpropertyguide.com)

Lender Position in the Mortgage Industry

“As the real estate prices continue to increase, the Chinese government started to crack down on investment and speculations in the real estate market. Mortgage loans accounted for 20 percent of the total loan portfolio of China Construction Bank Corp.,

the nation's largest mortgage lender, at the end of June, while at Industrial & Commercial Bank of China Ltd., the second largest, the ratio was about 14 percent, according to their first-half earnings reports.” (www.reuters.com)

An IMF report from 2011 indicates that “The property sector occupies a central position in the Chinese economy, directly making up 12 percent of GDP and is highly connected to upstream industries (like steel and cement) and downstream producers of appliances and other consumer durables. Direct lending to banks’ credit portfolio; property is a sizable component of household and corporate balance sheets; and for local governments— which account for 82 percent of public spending—property-related revenues (including budgetary funds) are important. A property bubble, therefore, would pose serious macroeconomic and financial stability risks” (www.imf.org)

Another lender problem is with mortgage lending is lack of tightened controls among the banks themselves. Many local branches approved loans that were risky and the borrowers were speculators in the real estate market with no intention of repaying the loan. In order to combat this issue, first bank in China – Ping An – changed its policies and banned all local branches from approving mortgage loans. This is a recent development in February 2013. All mortgage loan requests have to be sent to the

headquarters for review and analysis. It is believed that other banks will follow suit and start and start similar procedures for their loan process.

Buyer Position in the Residential Mortgage Industry

Until the late 1990's owning a private house or a property in China was more prevalent in the Chinese country side. However, the Chinese government pushed several rules and regulation that made the home ownership much more affordable and also more prevalent.

There are several schemes that were designed to specifically support the dream of a new home. One of the major one is Housing Provident Funds (HPF) which was introduced in 1998 and was suppose to encourage workers to save a portion of their income for residential property purchases. "When an employee registers for an HPF, his employer opens a special account for him in a state-owned bank. The employee must contribute 5% of his monthly salary, which is matched by the employer. The employee cannot withdraw unless he retires, dies, or moves company, and can only use the funds to purchase residential property, for which he is entitled to below market-rate loans from state-owned banks.

An estimated 80 million workers were in the program by 2004, and had saved CNY630 billion (US\$76 billion). Government employees and employees of state-owned enterprises are required to take part, but HPFs are voluntary for private firms' employees" (www.reuters.com)

The housing boom brought a new problem, which the Chinese themselves describe as “fang-hu” or housing slaves. , a reference to the lifetime of work needed to pay off their debts. They’re taking on mortgages even as the government maintains property curbs to damp prices that have almost tripled since China embarked in 1998 on a drive to increase private home ownership. Chinese homebuyers typically use 30 percent to 50 percent of their monthly incomes to repay mortgages. ([www. bloomberg.com](http://www.bloomberg.com))

As the economy starting slowing down, the Chinese government enacted several rules that make it more challenging to obtain a mortgage and are suppose to dampen the mortgage defaults: (www.propertyguide.com)

- The property deed tax rate for first-time home buyers was reduced to 1% from 1.5% from January 2009 to December 2009, if the area of the residential property bought is less than 90 sq. m.
-
- Stamp duty and land value-added tax was waived for individuals purchasing residential properties from January 2009 to December 2009.
- If residential property is held for more than two years, the seller is exempted from the 5.5% business tax

Statistical Data Set and Data Results

Chinese real estate market is strong and it is still growing supported by favorable governmental policies. In term of data search, China is the most difficult country to obtain data from this case study. Chinese government does officially track foreclosures

or mortgage arrears. The only way to estimate trouble in the mortgage market is a rough estimate provided by Moody's in 2012 in which their research department estimated that in any given year, 8-10% of total personal mortgages are non-performing. They have estimated this number from official financial statements of the major banks operating in China. Chinese People's Bank is trying to ease the burden of non-performing loans on banks and "the People's Bank of China, China's central bank, has injected huge amounts of funds into China's banking system in recent months to bring down the interest rate at which banks lend to each other. The central bank has injected almost 1.3 trillion Yuan, or about \$208 billion, into the banking system since late June." (www.wsj.com)

Chinese mortgage holders became the new "slaves" of the housing market. The average mortgage holder pays 30-45% of their monthly salary on mortgage payments. The average house costs 35-45 yearly salaries, depending on the area. (www.globalpropertyguide.com)

The following data, which was collected for period of ten (10) years quarterly from January 2003 through December 2012, will help us analyze which of the following factors has the largest impact on the Non-performing loans. The results should provide a clearer picture of dependence between several key variables on the Chinese real estate market. Please note: Monthly data is not available for China. (Please see detailed numbers in Appendix VII)

The Dependent Variable			
Short Name	Detailed Explanation	Measure	Period
NPL	Non-Performing Loans	Yuan Billion	Quarterly
The Explanatory Variables			
Short Name	Detailed Explanation	Measure	Period
UNMPLY	Unemployment rate in China	Percentage	Quarterly
LENDRATE	China Bank Lending Rate	Percentage	Quarterly
HOUINDEX	Average price of house per sq. meter	Yuan/Sq. meter	Quarterly
PERSAVING	Personal Savings Rate	Percentage	Quarterly
CPI	Consumer Price Index, All Items	Index	Quarterly

Figure 19 – Data set for China

Non-Performing Loans (Yuan Billion) – by far the most difficult number to obtain. Year 2003 through 2008 are based on Moody’s 8% default estimate, years 2009 through 2012 on 10% default estimate. The total number of loans was obtained from Chinese Statistical Agency yearly press releases. The number is reported in Billion of Yuan per quarter.

Unemployment rate (UNMPLY) – “In China, the unemployment rate measures the number of people actively looking for a job as a percentage of the labor force.” (www.tradingeconomics.com)

Bank Lending Rate in China (LENDRATE) – “. In China, interest rates decisions are taken by The Peoples' Bank of China Monetary Policy Committee. The PBC

administers two different benchmark interest rates: one year lending and one year deposit rate” (www.tradingeconomics.com)

Housing Index (Yuan/Sq. meter) – this data was obtained from monthly statistical release from Global Property Guide. It represents the average price in Yuan per square meter of dwelling.

Personal Saving Rate (Percentage) – average percentage of saving from household income. Data obtained from Bloomberg.

CPI (Index) – “In China, the Consumer Price Index or CPI measures changes in the prices paid by consumers for a basket of goods and services.” (www.tradingeconomics.com)

Data Results:

In order to either accept or reject original hypothesis in this dissertation a multiple linear regression model has been run with one dependent and multiple independent variables. A SPSS statistical program has been used for this analysis. Detailed results of this analysis are located in Appendix VIII.

This analysis begins with the goodness of the fit for this data. Our r-squared has been at a respectable 0.983, thus the data in our regression that were chosen are a good fit for explaining the depended variable.

A Pearson product-moment correlation coefficient was computed to assess the relationship between our dependent Non Performing Loans (NPL) and independent variable. The correlation between the dependent variable Non Performing Loans (NPL) and independent variables are as follows: Housing Index has a strong positive correlation $r = 0.782$, $n=40$; Personal saving rate correlation is large and positive $r = 0.854$, $n = 40$ as well as CPI with positive correlation $r = 0.871$, $n=40$. Surprisingly, unemployment and Chinese Central Bank lending rate have insignificant negative correlations, $r = -0.030$, $n = 40$; and $r = -0.014$, $n=40$ respectively. We can conclude that when unemployment increases so does the NPL problem. China has the strongest personal saving rate out of all the case countries and also, as the only one requires the largest down payment in cash – 30% to 40% for each mortgage. This would explain why the personal saving rate as well as CPI plays a significant role.

The Durbin-Watson test has been performed for autocorrelation and with a value of 1.301 it is a good number well above the threshold of 0.80 and thus there is no significant correlation among the data. The F-value is 192.064 which is robust and it indicates that our independent variables do have validity in fitting and they are not

purely randomly selected. The F-value does confirm that they are good explanatory variables for Non Performing Loans in China. Based on the t-statistics in this model, most of the absolute values are significantly large in order to confirm that none of the parameters are zero.

The Regression analysis from the statistical results based on unstandardized data, meaning percentages and dollar values data were analyzed together to determine the impact on No Performing Loans.

$$\text{Mortgage Arrears} = 1.322 - 1.318(\text{UNMPLOY}) - 0.786(\text{LENDRATE}) - 8.415(\text{HOUINDEX}) - 0.023(\text{PERSAVING}) + 0.097(\text{CPI})$$

Based on our regression line, we statistically prove the impact of each of the independent variable on NPL in China. Unemployment has a negative effect on the rise of arrears, where the unemployment rate decreases by 1%, the number of NPL decreases by 1.3 million Yuan per quarter. Also, a decrease by a 1% in average rate charged by the People's Bank of China would results in a very substantial decrease in the nonperforming category by 786,000 primary dwellings per quarter. On the other hand, decreasing the home prices by 1,000Yuan/sq. meter would amount to the biggest effect on NPL by decreasing those by 8,415 million per quarter. Price of homes is important in China and a decrease in the house price would greatly benefit in term of

affordability. Personal saving rate and CPI had no significant impact on the Non Performing Loans.

Conclusion:

Chinese government is very proactive when it comes to the mortgage markets, but also very cautious in sharing data. The data and results are only based on what the governmental officials allow to be released and compared to other countries might be more skewed. China has one of the sticker rules when it come to down payment son anew house, where average down payment has to be 35%-45% in cash. However, that did not stop speculators in the housing market from taking advantage of governmental lending policies and less rigid rules when it comes to double checking credentials of the borrower. Chinese government regularly provides through the People's Bank of China "non-returnable" loans to banks to discharge their non performing loans. This clearly shows that there is a problem in the real estate mortgage market but also that Chinese government is not willing to admit it publicly.

Case Four– Spain



Figure 20 – google.com/maps

General Overview

“Located at the crossroads of the Atlantic and the Mediterranean, Europe and Africa, Spain's history and culture are made up of a rich mix of diverse elements. The constitution of 1978 enshrines respect for linguistic and cultural diversity within a united Spain. The country is divided into 17 regions which all have their own directly elected authorities. The level of autonomy afforded to each region is far from uniform.

One of Spain's most serious domestic issues has been tension in the northern Basque region. A violent campaign by the Basque separatist group Eta has led to nearly 850 deaths over the past four decades. Tentative moves to negotiate a lasting peace were

dealt a blow when Eta carried out a deadly bomb attack at Madrid's international airport in 2006, but, after several stalled cease-fires, in 2012 it announced that it was ready to disband.

Until 2008, the Spanish economy was regarded as one of the most dynamic within the EU. However, the mainstays of the economy were tourism and a booming housing market and construction industry, and so the global economic crisis of 2008-9 hit the country hard. The bursting of the housing bubble tipped Spain into a severe recession and by the end of 2011 the country had an unemployment rate of nearly 23% - the highest jobless rate in Europe. Austerity measures imposed by the government in an effort to reduce the level of public debt sparked a wave of protests.

- Full name: Kingdom of Spain
- Population: 46.4 million (UN 2011)
- Capital: Madrid
- Area: 505,988 sq km (195,363 sq miles)
- Major languages: Spanish (Castilian), Catalan and its variant Valencian, Gallego (Galician), Euskera (Basque)
- Major religion: Christianity
- Life expectancy: 79 years (men), 85 years (women) (UN)
- Monetary unit: 1 euro = 100 cents
- Main exports: Transport equipment, agricultural products
- GNI per capita: US \$30,990 (World Bank, 2011)

Politics: PM Mariano Rajoy from the conservative Popular Party took office in late 2011. The recession is spurring secessionist sentiment in Catalonia

Economy: Spain was hit hard in the 2008-9 global economic crisis and is deep in recession. Around 25% of Spaniards are unemployed

International: Spanish forces have taken part in multilateral missions and peacekeeping, including in Afghanistan. Spain claims sovereignty over the British overseas territory of Gibraltar”

Source: www.bbc.com/countryprofiles

Current Housing Market Situation

Spanish house prices continue to slide, as the economy slumps deeper into recession mainly due to weak demand and stringent austerity measures. “The property prices in the country fell by 8.3% year-on-year in Q2 2012. Property demand is currently very weak, as consumer and investor confidence fell amidst the struggling economy. The total number of properties sold dropped 29% to 349,118 units in 2011 from the previous year. In the first quarter of 2012, the total number of property sales was 70,228, according to the Ministry of Public Works. Of these about 91.2% were in the free market housing sector and the remaining 8.8% were subsidized housing.

Likewise, the total number of land transactions dropped 19.2% to 3,598 in the first quarter of 2012 from the same period last year. Over the same period, the total area of land transactions plunged by 15.2% to 4.63 million sq. m. while the total value fell by 32.9% to €582.86 million.

The average amount of mortgage contracts in the country fell from about €151,000 during the peak levels of late 2007 to slightly above €105,000 in the first quarter of

2012. Spanish house prices are expected to fall by another 10% before reaching bottom, according to local property market experts. Transaction costs on second-hand properties are moderate in Spain and there are no restrictions on foreigners buying property in the country. Transaction costs on second-hand properties are moderate in Spain and there are no restrictions on foreigners buying property in the country.

In 2011, the Spanish economy recorded a meagre GDP growth of 0.7%, after experiencing annual declines of 3.7% in 2009 and 0.07% in 2010, according to the IMF. The economy is expected to shrink by 1.5% in 2012 and by another 0.5% in 2013, according to the Spanish government.” (www.globalpropertyguide.com)

Governmental Rules and Regulations Governing Mortgage Industry

2012 (EU) – Spain as a member of EU is facing the same rules as Ireland instituted by the EU commission. Caps of 40% loan-to-value indicator and if buyer asks for a higher amount, they will have to ask to pay more in interest. Member states have interpreted current rules with a large degree of discretion. The current 'substantial margin' loan-to-value level is 80% Spain, according to data collected by the Committee of European Banking Supervisors (CEBS) in 2008. According to figures published by the European Mortgage Federation, in 2004 the 'average' loan-to-value applied by Spanish banks was 80%. (NY Times Dealbook)

2013 – “The government announced to stop banks using mortgages of more than 30 years as collateral in covered bonds that package the loans. With the longer-maturity debt making up 10 percent of the mortgage market, the rules will restrict home financing and hurt existing covered bonds. Economy minister announced reforms for the mortgage market this week after loan delinquencies rose to 3.5 percent at the end of September, the highest in at least six years according to the Spanish Mortgage Association. They allow borrowers to cancel debt if they pay 65 percent of an outstanding mortgage over five years after a home is sold at auction, or 80 percent in a 10-year period.” (www.bloomberg.com)

2012 – “Royal Decree-Law 18/2012 - impose new “cover” on “problematic assets” warehoused in the balance sheets of Spanish banks (property loans, even normal ones, and repossessed assets). This “cover” translates into three different mechanisms that Spanish banks will need to apply onto their legacy “problematic assets” (i) additional specific provisions, (ii) a new generic provision on “normal” property loans and (iii) extra capital add-ons. Problematic assets are Healthy normal Loans, Sub-performing/sub-standard loans; Non-performing loans and reposed assets.” (Salans, 2012).

Lender Position in the Mortgage Industry

“Spain’s lenders are pledging some of their best assets to raise record levels of secured funding, including from the European Central Bank, eroding creditor safeguards at the same time the government is planning the country’s largest bank bailout.

Spanish lenders are increasingly depending on the central bank and secured debt sales to lower funding costs after their return on equity in 2011 was the lowest in more than four decades following the country’s real-estate crash. The ECB provides loans at rates of 1 percent against collateral such as covered bonds and mortgage-backed securities, which would be used to repay the debt in an event of a default, leaving fewer assets available to unsecured creditors, including depositors.

The seven major banks, including Banco Santander SA (SAN), Banco Bilbao Vizcaya Argentaria SA (BBVA) and Bankia Group, which was formed in 2010 from a merger of seven savings banks to become the country’s third-largest lender, will need 68 billion euros of additional capital as a buffer against bad loans and to comply with increasing regulatory requirements. Santander and BBVA, the country’s two largest banks, have increased issuance of covered bonds to 80 percent of their eligible mortgages, the maximum allowed under the Spanish law.

Banco Santander has 27.81 billion euros of outstanding Spanish covered bonds, according to the prospectus of its 2 billion euros of 3.25 percent 2015 bonds due sold in February. That's up from 23.5 billion euros of the outstanding debt at the end of 2010, according to an Oct. 18 prospectus filed with the Spanish market regulator.

Bankia Group's ability to increase mortgage covered bond issuance declined almost 40 percent to 6.5 billion euros at the end of 2011 down from 10.6 billion euros, a year earlier, according to a May 4 report from the company. That compares with 20.3 billion euros of maturing debt this year, including 9 billion euros of bonds that have the backing of the Spanish government.

The ECB applies a discount on top of the market valuation of as low as one percentage point on a covered bond, compared with at least 6.5 percentage points for an unsecured bank bond, or 16 percent for asset-backed securities, according to the central bank.”
(www.bloomberg.com)

Buyer Position in the Residential Mortgage Industry

“An estimated 1.4 million Spaniards are facing potential foreclosure proceedings. In 2007, there were just 26,000 foreclosures. Last year, there were more than 93,000. Early indications suggest that they will be higher again in 2010.

A recent Standard & Poor's report found that 8 percent of Spain's housing is now worth less than the value of the mortgage, and with prices continuing to fall, that figure could rise to 20 percent. Banks have the right to auction houses in foreclosure. If no buyers appear, as is often the case these days, the bank can take ownership of the house for 50 percent of its value, according to the estimate either at the time of purchase, or at the current time, depending on what the mortgage specifies. The banks then have 15 years to go after the homeowner. The banks usually charge 5 or 6 percent, but sometimes the charge is 15 to 18 percent.” (www.nytimes.com)

“With the average Spanish household owning €140,000 on their home, annual mortgage payments would rise by €1,300 if the benchmark Euribor rate climbs to around 5 percent, the Spanish Association of Mortgage Holders said, warning that many heavily indebted families may find it ‘impossible’ to meet the extra cost. Appraisers are predicting that property prices will rise by 10 percent this year, the lowest pace in six years.” (barcelonereporter.com)

Statistical Data Set and Data Results

Data Set:

Spain real estate market is currently in peculiar situation where there is clear disconnect between the governmental agencies and private lending banking sector. Spanish government and especially the Prime minister are aiming “to fast track reforms to halt

evictions related to mortgage non-payments” after recent suicides. (www.ap.org)

However, Banco Santander SA (SAN) Chief Executive Officer Alfredo Saenz said April 27 that anyone saying that mortgage defaults were a problem for Spanish banks was “saying something stupid.” (Bloomberg.com)

Currently, the average price of a home is worth about 9-times the average yearly salary and the mortgage defaults are predicting to rise since the unemployment rate has not been stabilized and the economic situation is not improving. (NYtimes.com)

The following data, which was collected for period of ten (10) years Quarterly from January 2003 through December 2012, will help us analyze which of the following factors has the largest impact on the Mortgages Arrears. The results should provide a clearer picture of dependence between several key variables on the Spanish real estate market. Please note: Monthly data is not available for Spain. (Please see detailed numbers in Appendix VII)

The Dependent Variable			
Short Name	Detailed Explanation	Measure	Period 01/2003 – 12/2012
MORTARR	Number of Mortgages in Arrears	Averages of Mortgages	Quarterly
The Explanatory Variables			
Short Name	Detailed Explanation	Measure	Period
UNMPY	Unemployment rate in Spain	Percentage	Quarterly

INTGOV	Interest Rate on Governmental Securities	Percentage	Quarterly
ECBRATE	European Central Bank Rate	Percentage	Quarterly
MTGRATE	Mortgage Market Reference Rate	Percentage	Quarterly
HOUINDEX	Spain Housing Index	EURO/Sq. m	Quarterly
PERSAVING	Personal Saving Rate	EURO Million	Quarterly
CPIUCSL	Consumer Price Index –All Consumers	Index	Quarterly

Figure 21 – Data set for Spain

Mortgage Arrears (Average Number of Mortgages): Spanish real estate market does not track foreclosures. It is rare to have a home foreclosed on, since there are a lot of governmental loan to draw from. Also, it is a deep cultural believe that property is very important and it is almost socially unacceptable to lose a home. However, Spain real Estate market is plagued with Non Performing Loans (NPL) or Mortgage Arrears. This number represents mortgages that are behind with payment more than 90 days. The number is derived from total amount of mortgages on the Spanish market (obtained from Spanish Statistical Office) multiplied by the percentage of Mortgages in Arrears each year listed by Bank of Spain, CSO (MacCollie, Lyons, Lang , 2012)

Unemployment Rate (Percentage): “In Spain, the unemployment rate measures the number of people actively looking for a job as a percentage of the labor force.” (www.tradingeconomics.com)

Interest Rate on Governmental Securities (Percentage): Most of the mortgage in arrears were rescued and provided additional funding by the government that needed to

raise capital. Thus using this rate would be beneficial to prove mortgages in arrears are benefitting from governmental securities. (www.stluis.org)

European Central Bank Benchmark Rate (Percentage): “Spain is a member of the Euro Area, an economic and monetary union (EMU) of European Union (EU) member states that have adopted the euro. The Euro Area benchmark interest rate stands at 1.00 percent. In the Euro Area, interest rate decisions are taken by the Governing Council of the European Central Bank. The primary objective of the ECB’s monetary policy is to maintain price stability. The ECB’s Governing Council has defined price stability as "a year-on-year increase in the Harmonized Index of Consumer Prices (HICP) for The Euro Area of below 2%. The European Central Bank is the sole issuer of banknotes and bank reserves. That means it has the monopoly supplier of the monetary base. By virtue of this monopoly, it can set the conditions at which banks borrow from the Central Bank. Therefore it can also influence the conditions at which banks trade with each other in the money market. In the short run, a change in money market interest rates induced by the Central Bank sets in motion a number of mechanisms and actions by economic agents. Ultimately the change will influence developments in economic variables such as output or prices. (www.tradingeconomics.com)

Spain Housing Index (EURO/Square meter): “In Spain, Housing Index is measured by the house prices per square meter.” (www.tradingeconomics.com)

Personal Savings (Percentage): “In Spain, Personal Savings correspond to the income saved by persons during a certain period of time.” (www.tradingeconomics.com)

Consumer Price Index (CPI – Index): “In Spain, the Consumer Price Index or CPI measures changes in the prices paid by consumers for a basket of goods and services. Index set 2005=100.” (www.tradingeconomics.com)

Data Results:

In order to either accept or reject original hypothesis in this dissertation a multiple linear regression model has been run with one dependent and multiple independent variables. A SPSS statistical program has been used for this analysis. Detailed results of this analysis are located in Appendix VIII.

This analysis begins with the goodness of the fit for this data. Our r-squared has been at a respectable 0.832, thus the data in our regression that were chosen are a good fit for explaining the depended variable.

A Pearson product-moment correlation coefficient was computed to assess the relationship between our dependent Mortgage Arrears and independent variable. The correlation between the dependent variable Mortgage Arrears and independent variables are as follows: Unemployment has a strong positive, $r = 0.788$, $n = 40$,

Governmental 10-yr. Bond rate positive correlation, $r = 0.585$, $n=40$; CPI a strong positive at $r = 0.756$, $n=40$; European Central Bank a negative $r = -0.546$, $n = 40$ and Mortgage rate a negative $r = -0.256$, $n=40$. Housing Index and Personal saving rate correlation were insignificant. We can conclude that when unemployment, bond rate increase, so does the Mortgage arrears problem. If mortgage rates and European Central Bank rates decrease, the mortgage arrears decrease.

The Durbin-Watson test has been performed for autocorrelation and with a value of 0.852 it is above the threshold of likely correlation. It is lower than ideal number, which should be closer to 2. The F-value is 10.296 which is not robust that we would like to see, however it indicates that our independent variable do have validity in fitting and they not purely randomly selected and does confirm that they are a good explanatory variables for Mortgage Arrears in Spain. Based on the t-statistics in this model, most of the absolute values are significantly large in order to confirm that none of the parameters are zero. One exception is Housing Index, which has absolute value of 0.11 and thus there is a significant likelihood that the parameter is zero and might not impact our dependent variable.

The Regression analysis from the statistical results based on unstandardized data, meaning percentages and dollar values data were analyzed together to determine the impact on Mortgage Arrears.

$$\text{Mortgage Arrears} = -5398.61 + 184.135(\text{UNMPLY}) - 314.61(\text{INTGOV}) - 652.476(\text{ECBRATE}) + 586.235(\text{MTGRATE}) + 0.031(\text{HOUINDEX}) + 0.029(\text{PERSAVING}) + 49.82(\text{CPIUCSL})$$

Based on our regression line, we statistically prove the impact of each of the independent variable on Mortgage in Arrears in Spain. Unemployment has a positive effect on the rise of arrears, where if the unemployment rate is increases by 1%, the number of mortgages in arrears increases by 184 per quarter. Also, an increase by a 1% in average mortgage rate charged by the financial institutions would results in 587 mortgages dropping into the nonperforming category per quarter. On the other hand, decreasing the long term bond rates and the European Central lending rate by 1% would benefit the mortgage market performance and decrease the amount of mortgage arrears by 314 and 652 respectively per quarter. Taking into account that the number of Mortgage Arrears in 2012 in every quarter was 7,319 a decrease of even 184 would be beneficial. But decrease by 652 would be significant.

Two of our independent variables had less significant impact. The Housing Index and Personal savings are actually not contributing to mortgage arrears as much as predicted and based on the data would have no impact. Consumer Price Index or increases in day to day prices in Spain would contribute to the mortgage problem. Higher prices coupled with higher unemployment limit the purchasing power of citizens and create household

budget issues where many homeowners might not be able to afford the monthly mortgage payments. A point increase in CPI would effectively lead to 49 extra mortgage in arrears per quarter.

Conclusion:

In conclusion, the Spanish mortgage market is facing some issues and the mortgage arrears in increasing steadily. There are couple of areas that the government has control over and the mortgage market would benefit if these areas were looked into and addressed. Firstly, decreasing unemployment should be a priority, especially for the younger generation 20-35 years old. Many of them lost their first homes and since the banks required a co-signer for most loan, their parents if they co-signed lost their homes concurrently. Keeping mortgage rates and long term bond rate low would help to keep the mortgages affordable and decrease monthly payments. European Central Bank announced that it would increase the lending rate by 0.5%-1% in the next year, thus keeping EU lending at low would in the long run result in less mortgage arrears.

Overall Case Conclusions

This dissertation analyzed the non performing mortgages in four different and very diverse markets. The cases span from largest mortgage market in North America, than to Ireland, Spain in Europe and finally included China as one of the most unpredictable, yet fastest growing real estate market. Based on the case study detail overview and the data analysis we can conclude several important findings.

The lack of accurate and complete data on mortgage defaults across the mortgage markets. Each of countries is treating mortgages differently and provides data that are inconsistent not only to other markets, but also within their country. Governments were clearly unprepared for the housing meltdowns and really on providing statistical data relevant to mortgage defaults on private corporation or don't track them at all.

Unwillingness to share the data – data that is tracked is not readily available and many private lender, institutions and even governments are not willing to share it.

Disconnect between the governments and the private sector on how to deal with the mortgage meltdowns. Governments were trying to find out guilty party yet at the same time protect the citizens (mortgage holders) and were slow in acting. Private businesses – the lenders - were trying to recover from severe losses in their revenues and obtain governmental support.

After an in depth case analysis, this dissertation would revisit the original hypotheses originally proposed at the beginning of this research.

Hypothesis 1: Fees charged by mortgage broker played a major role in the mortgage defaults in all three countries. INCONCLUSIVE

I was unable to test this Hypothesis for the lack of available data. Broker fees are considered privileged information and are only provided to the mortgage holder at the time of the contract signing.

Hypothesis 2: Rating agencies revenues mortgage securities were responsible for faulty mortgage ratings and subsequent defaults in all three countries. ACCEPT

I had accepted this Hypothesis. On the US market, the rating agencies did have an impact on the number of foreclosures. In Ireland and Spain this was reflected on the ECB lending, since the private bank needed additional capital to support all the mortgage obligations.

Hypothesis 3: The unemployment rate has the largest impact on the number of foreclosures in all three countries. ACCEPT

In United States, Ireland and Spain unemployment played a major role in non performing (foreclosures, mortgage arrears) loans. It significantly contributed to the

amount homes foreclosed on the US market and mortgages in arrears in both Ireland and Spain. However, it had not a significant impact on Chinese real estate market.

Hypothesis 4: Price of the real estate has a very important impact on the number of foreclosures in all three countries. ACCEPT

Price of real estate was important, however in neither of the countries it was the main determinant. It does have an impact, but it is not a very important one.

Hypothesis 5: Interest rates and ease of lending have a large impact on the number of foreclosures in all three countries. ACCEPT

In all cases, this was the most important aspect of nonperforming loans. In all four case countries mortgage policies were the largest contributor to increases or decreases in the non performing mortgage loan numbers.

Hypothesis 6: Nations personal savings rate has an impact on foreclosures in all three countries. REJECT

Both China and Ireland have large amounts of personal savings, however, the personal savings rate had no impact on their non performing loans. On the other hand United States with its low saving rate showed some impact, but it was not significant.

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Appendix

Appendix I – Mortgage Payment Example

Amount Of	
Loan	100,000
Annual Interest	5.000%
Monthly Interest	0.417%
# Periods	360
Payment	\$536.82
Annual	
Payment	\$6,441.86
Lifetime	
Payments	\$193,255.78

		Scheduled	Pre	Beginning	Interest	Principal	Ending	Percent
	Month	Payment	Pay	Balance	Paid	Paid	Balance	Paid
1	12/1/2007	\$536.82		100,000.00	416.67	120.15	99,879.85	0.12%
2	1/1/2008	\$536.82		99,879.85	416.17	120.66	99,759.19	0.12%
3	2/1/2008	\$536.82		99,759.19	415.66	121.16	99,638.03	0.12%
4	3/1/2008	\$536.82		99,638.03	415.16	121.66	99,516.37	0.12%
5	4/1/2008	\$536.82		99,516.37	414.65	122.17	99,394.20	0.12%
6	5/1/2008	\$536.82		99,394.20	414.14	122.68	99,271.52	0.12%
7	6/1/2008	\$536.82		99,271.52	413.63	123.19	99,148.33	0.12%
8	7/1/2008	\$536.82		99,148.33	413.12	123.70	99,024.62	0.12%
9	8/1/2008	\$536.82		99,024.62	412.60	124.22	98,900.41	0.12%
10	9/1/2008	\$536.82		98,900.41	412.09	124.74	98,775.67	0.12%
11	10/1/2008	\$536.82		98,775.67	411.57	125.26	98,650.41	0.13%
12	11/1/2008	\$536.82		98,650.41	411.04	125.78	98,524.63	0.13%
TOTAL after YR					4,966.49	1,475.37		1.48%

Source: my private budget spreadsheet

Appendix II – Homebuyer Defaults - US

Table 1194. Mortgage Originations and Delinquency and Foreclosure Rates: 1990 to 2010

[In percent, except as indicated (459 represents \$459,000,000,000). Covers one- to four-family residential nonfarm mortgage loans. Mortgage origination is the making of a new mortgage, including all steps taken by a lender to attract and qualify a borrower, process the mortgage loan, and place it on the lender's books. Based on the National Delinquency Survey which covers 45 million loans on one- to four-unit properties, representing between 80 to 85 percent of all 'first-lien' residential mortgage loans outstanding. Loans surveyed were reported by approximately 120 lenders, including mortgage bankers, commercial banks, and thrifts]

Item	1990	2000	2004	2005	2006	2007	2008	2009	2010
MORTGAGE ORIGINATIONS									
Total (bil. dol.)	459	1,139	2,773	2,908	2,726	2,306	1,509	1,995	1,572
Purchase (bil. dol.)	389	905	1,309	1,512	1,399	1,140	731	664	473
Refinance (bil. dol.)	70	234	1,463	1,397	1,326	1,166	777	1,331	1,099
DELINQUENCY RATES ¹									
Total	4.7	4.4	4.5	4.5	4.6	5.4	6.9	9.4	9.3
Prime conventional loans	(NA)	2.3	2.3	2.3	2.4	2.9	4.3	6.5	6.5
Subprime conventional loans	(NA)	11.9	10.8	10.8	12.3	15.6	19.9	25.5	25.9
Federal Housing Administration loans	6.7	9.1	12.2	12.5	12.7	12.7	13.0	14.0	12.8
Veterans Administration loans	6.3	6.8	7.3	7.0	6.7	6.4	7.2	7.9	7.5
FORECLOSURE RATES									
Total loans in foreclosure process ² ...	0.9	1.2	1.2	1.0	1.2	2.0	3.3	4.3	4.6
Prime conventional loans	(NA)	0.4	0.5	0.4	0.5	1.0	1.9	3.0	3.5
Subprime conventional loans	(NA)	9.4	3.8	3.3	4.5	8.7	13.7	15.1	14.5
Federal Housing Administration loans	1.3	1.7	2.7	2.3	1.9	2.3	2.4	3.2	3.5
Veterans Administration loans	1.2	1.2	1.5	1.1	1.0	1.1	1.7	2.2	2.4
Loans entering foreclosure process ³ ...	1.2	1.5	1.7	1.6	1.9	2.8	4.2	5.4	5.0
Prime conventional loans	(NA)	0.6	0.8	0.7	0.8	1.3	2.4	4.0	4.0
Subprime conventional loans	(NA)	9.2	5.9	5.6	7.3	11.7	16.5	16.2	12.9
Federal Housing Administration loans	1.7	2.3	3.9	3.4	3.3	3.6	3.8	4.8	4.7
Veterans Administration loans	1.6	1.5	2.0	1.5	1.4	1.6	2.3	3.1	3.3

NA Not available. ¹ Number of loans delinquent 30 days or more as percentage of mortgage loans serviced in survey. Annual average of quarterly figures. Delinquency rate does not include loans in the process of foreclosure. ² Percentage of loans in the foreclosure process at year-end, not seasonally adjusted. ³ Percentage of loans entering foreclosure process at year-end, not seasonally adjusted.

Source: Mortgage Bankers Association of America, Washington, DC, "MBA Mortgage Originations Estimates," National Delinquency Survey, quarterly, <<http://www.mortgagebankers.org/>>; and unpublished data.

Source: <http://www.census.gov/compendia/statab/2011/tables/11s1193.pdf>

Appendix III – Personal Savings Rate - US

FRED Graph Observations
Federal Reserve Economic Data
Link: <http://research.stlouisfed.org/fred2>
Help: <http://research.stlouisfed.org/fred2/help-faq>
Economic Research Division
Federal Reserve Bank of St. Louis

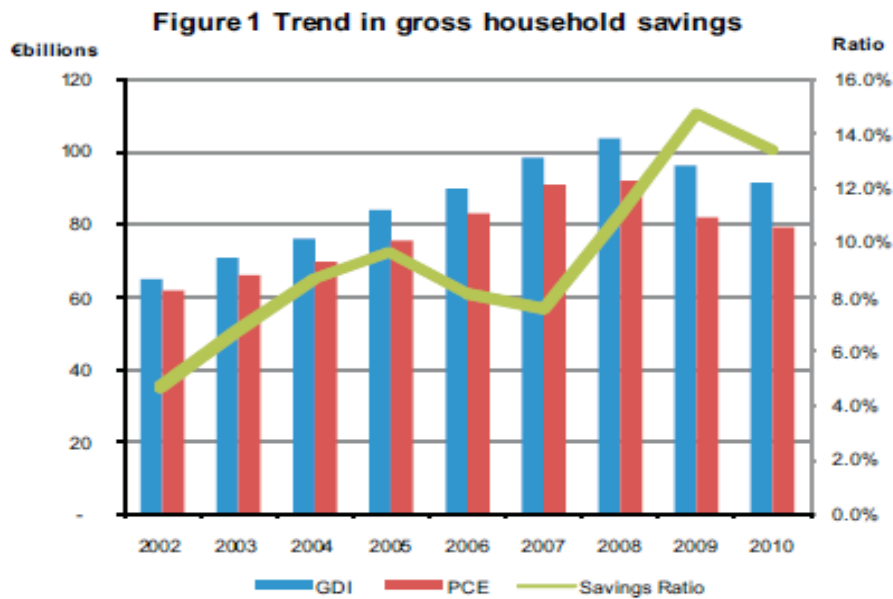
PSAVERT Personal Saving Rate (PSAVERT), Percent, Annual, Seasonally Adjusted Annual Rate

Frequency: Annual

observation_date	PSAVERT
1980-01-01	9.8
1981-01-01	10.6
1982-01-01	10.9
1983-01-01	8.7
1984-01-01	10.2
1985-01-01	8.2
1986-01-01	7.6
1987-01-01	6.5
1988-01-01	6.9
1989-01-01	6.6
1990-01-01	6.5
1991-01-01	7.0
1992-01-01	7.3
1993-01-01	5.8
1994-01-01	5.2
1995-01-01	5.2
1996-01-01	4.9
1997-01-01	4.6
1998-01-01	5.3
1999-01-01	3.1
2000-01-01	2.9
2001-01-01	2.7
2002-01-01	3.5
2003-01-01	3.5
2004-01-01	3.6
2005-01-01	1.6
2006-01-01	2.6
2007-01-01	2.4
2008-01-01	5.4

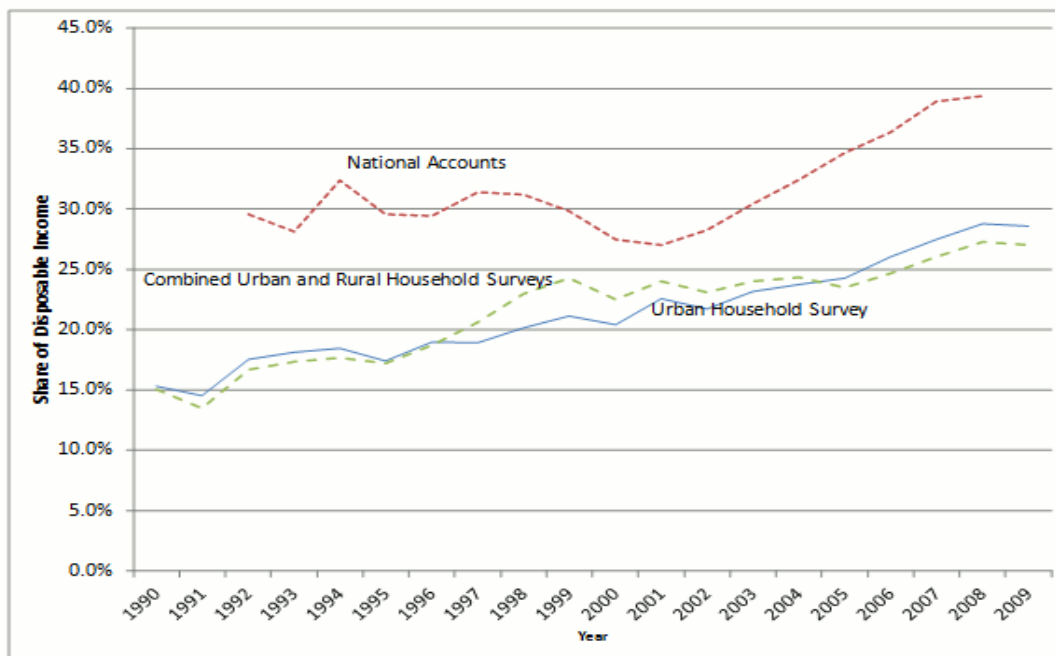
2009-01-01	5.1
2010-01-01	5.3
2011-01-01	4.7

Appendix III – Personal Savings Rate - Ireland



Source: www.globalpropertyguide.com

Appendix III – Personal Savings Rate – China



Source: Chamon, Liu, Prasad – China's Rising Household Saving Rate, 2011

Appendix IV – Valuation and Assessment Process Chart for Real Estate Appraisals

Figure 1 Valuation in the Assessment Process

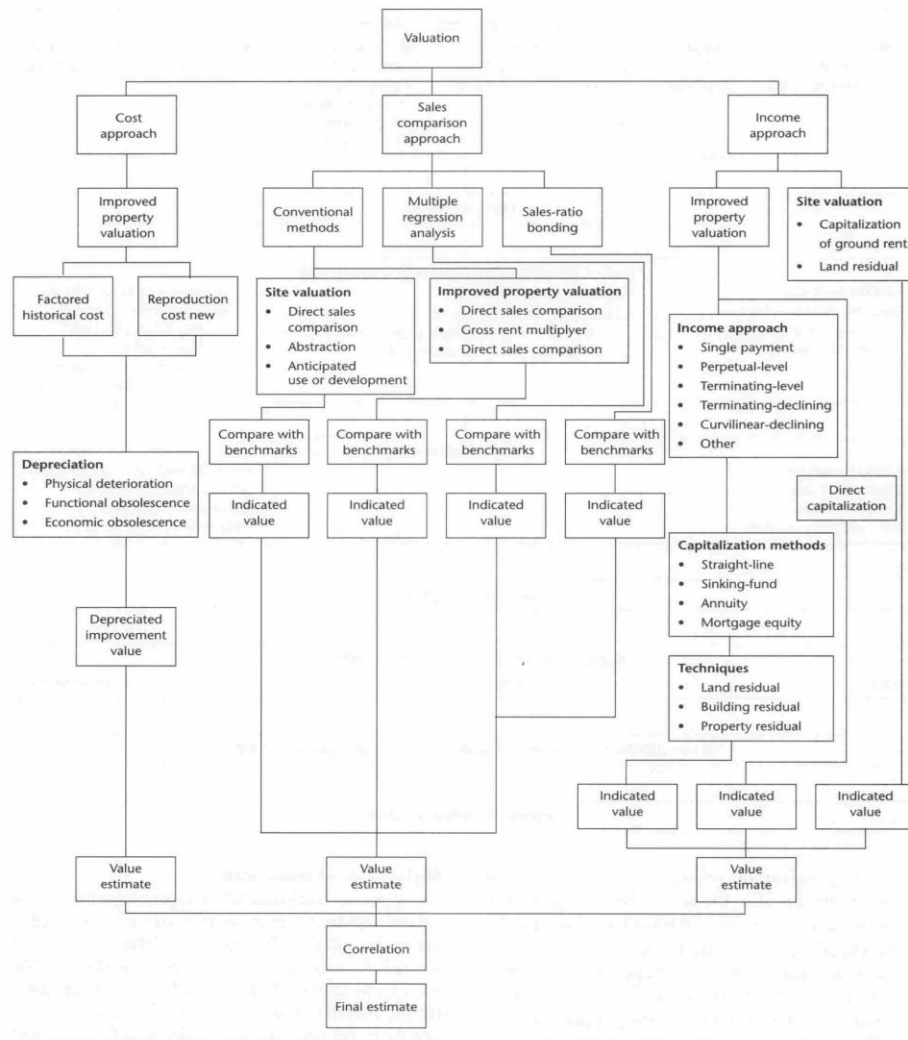
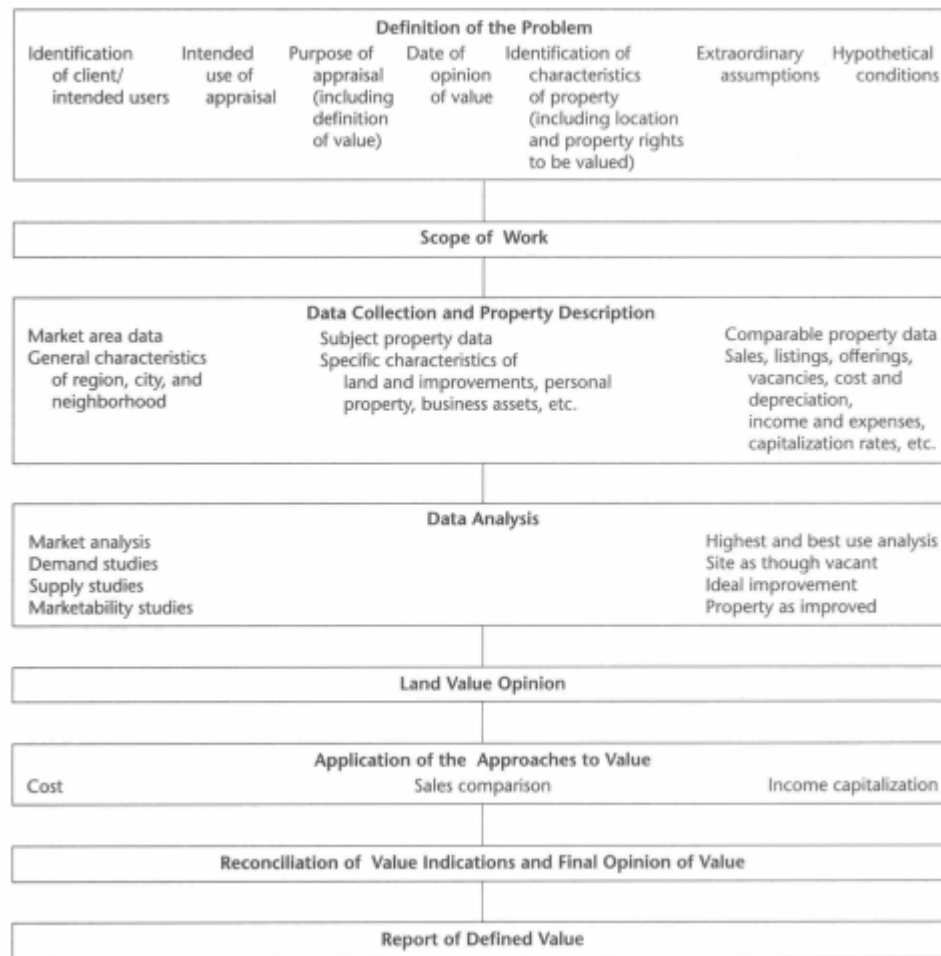


Figure 2 The Valuation Process



Source: The Role of the Real Estate Appraisal and Assessor in Valuing Real Property for Ad Valorem Assessment Purposes, Cannon, 2002

Appendix V – Mortgage Industry Statistics

UNITED STATES

SIZE OF FIRM INDUSTRY ESTIMATES

Year	Establishments by Size of Firm									Total
	1-4 Emps.	5-9 Emps.	10-19 Emps.	20-49 Emps.	50-99 Emps.	100-249 Emps.	250-499 Emps.	500+ Emps.	Unknown Emps.	
2007	16,574	3,549	1,908	981	222	115	25	13	566	23,955
2008	18,647	3,993	2,147	1,103	250	130	28	15	637	26,951
2009	21,416	4,585	2,466	1,267	287	149	32	17	731	30,954
Year	Sales (\$Millions) by Size of Firm									Total
	1-4 Emps.	5-9 Emps.	10-19 Emps.	20-49 Emps.	50-99 Emps.	100-249 Emps.	250-499 Emps.	500+ Emps.	Unknown Emps.	
2007	6,537	4,052	4,557	6,921	3,114	4,342	3,076	3,163	3,531	39,312
2008	7,428	4,604	5,178	7,864	3,539	4,934	3,495	3,616	4,013	44,671
2009	8,624	5,345	6,011	9,131	4,109	5,728	4,058	4,199	4,667	51,872
Year	Employment by Size of Firm									Total
	1-4 Emps.	5-9 Emps.	10-19 Emps.	20-49 Emps.	50-99 Emps.	100-249 Emps.	250-499 Emps.	500+ Emps.	Unknown Emps.	
2007	49,723	21,293	26,722	31,379	13,557	15,327	7,532	10,238	36,288	212,060
2008	55,941	23,956	30,064	35,303	15,253	17,244	8,474	11,520	40,832	238,586
2009	64,247	27,513	34,527	40,545	17,518	19,804	9,732	13,230	46,976	274,091

Source: Worldwide Mortgage & Non-Mortgage Brokers (NAICS, 52231), 2009

IRELAND

INDUSTRY ESTABLISHMENTS, SALES & EMPLOYMENT TRENDS

	Year					Percent Change Year-to-Year			
	2005	2006	2007	2008	2009	05-06	06-07	07-08	08-09
Establishments	347	378	379	433	505	8.9%	0.3%	14.3%	16.7%
Sales (\$Millions)	805	878	938	1,048	1,235	9.1%	6.8%	11.7%	17.8%
Employment	3,525	3,842	3,852	4,405	5,142	9.0%	0.3%	14.3%	16.7%
Sales (EurosM)	568	620	662	739	871	9.1%	6.8%	11.7%	17.8%

INDUSTRY RATIOS

(Industry Averages)	Year					Percent Change Year-to-Year			
	2005	2006	2007	2008	2009	05-06	06-07	07-08	08-09
Sales (\$M)/Estab.	2.32	2.33	2.48	2.42	2.44	0.2%	6.5%	-2.3%	0.9%
Sales (\$) per Emp.	228,416	228,619	243,573	237,952	240,083	0.1%	6.5%	-2.3%	0.9%
Emps. per Estab.	10.2	10.2	10.2	10.2	10.2	0.1%	0.0%	0.0%	0.0%
Euros(M)/Estab.	1.64	1.64	1.75	1.71	1.72	0.2%	6.5%	-2.3%	0.9%
Euros per Emp.	161,129	161,272	171,821	167,856	169,359	0.1%	6.5%	-2.3%	0.9%

Source: Worldwide Mortgage & Non-Mortgage Brokers (NAICS, 52231), 2009

CHINA

SIZE OF FIRM INDUSTRY ESTIMATES

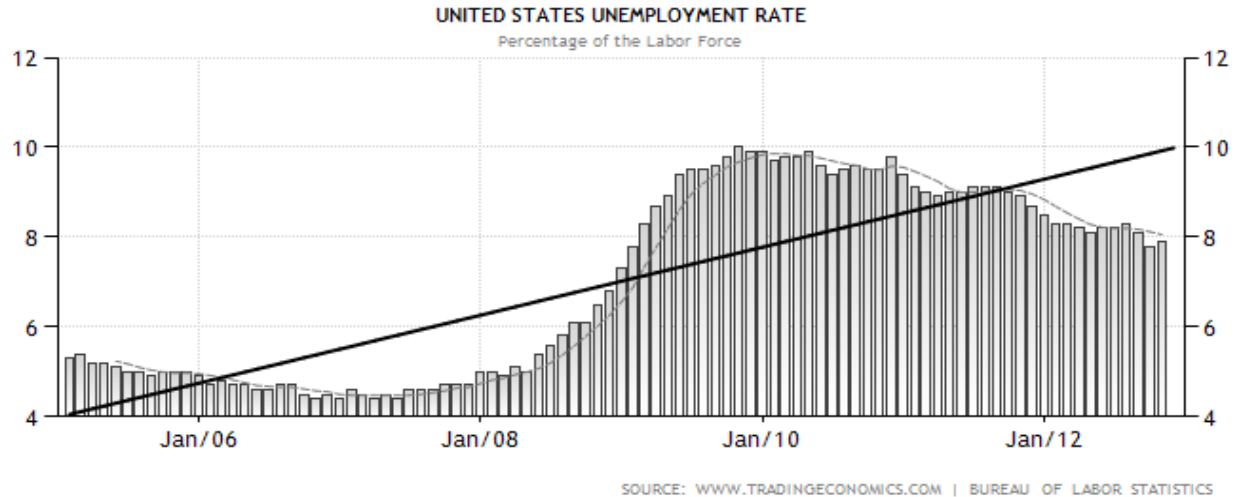
Year	Establishments by Size of Firm									Total
	1-4 Emps.	5-9 Emps.	10-19 Emps.	20-49 Emps.	50-99 Emps.	100-249 Emps.	250-499 Emps.	500+ Emps.	Unknown Emps.	
2007	69,776	14,940	8,035	4,128	936	485	104	56	2,382	100,847
2008	78,072	16,717	8,991	4,619	1,047	543	116	63	2,666	112,839
2009	89,170	19,093	10,269	5,276	1,196	620	133	72	3,045	128,884
Year	Sales (\$Millions) by Size of Firm									Total
	1-4 Emps.	5-9 Emps.	10-19 Emps.	20-49 Emps.	50-99 Emps.	100-249 Emps.	250-499 Emps.	500+ Emps.	Unknown Emps.	
2007	1,993	1,235	1,389	2,110	949	1,324	938	970	1,076	11,984
2008	2,312	1,433	1,611	2,447	1,101	1,535	1,088	1,125	1,249	13,902
2009	2,899	1,797	2,021	3,070	1,381	1,926	1,364	1,412	1,569	17,439
Year	Employment by Size of Firm									Total
	1-4 Emps.	5-9 Emps.	10-19 Emps.	20-49 Emps.	50-99 Emps.	100-249 Emps.	250-499 Emps.	500+ Emps.	Unknown Emps.	
2007	240,581	103,025	129,292	151,824	65,597	74,160	36,443	49,541	175,578	1,026,040
2008	269,188	115,276	144,665	169,877	73,397	82,978	40,776	55,432	196,483	1,148,071
2009	307,463	131,666	165,235	194,032	83,833	94,776	46,574	63,314	224,810	1,311,703

Source: Worldwide Mortgage & Non-Mortgage Brokers (NAICS, 52231), 2009

Appendix VI – Unemployment Rate Charts

Note: Data sourcing ran from January 2005 through December 2012

United States Unemployment Rate:



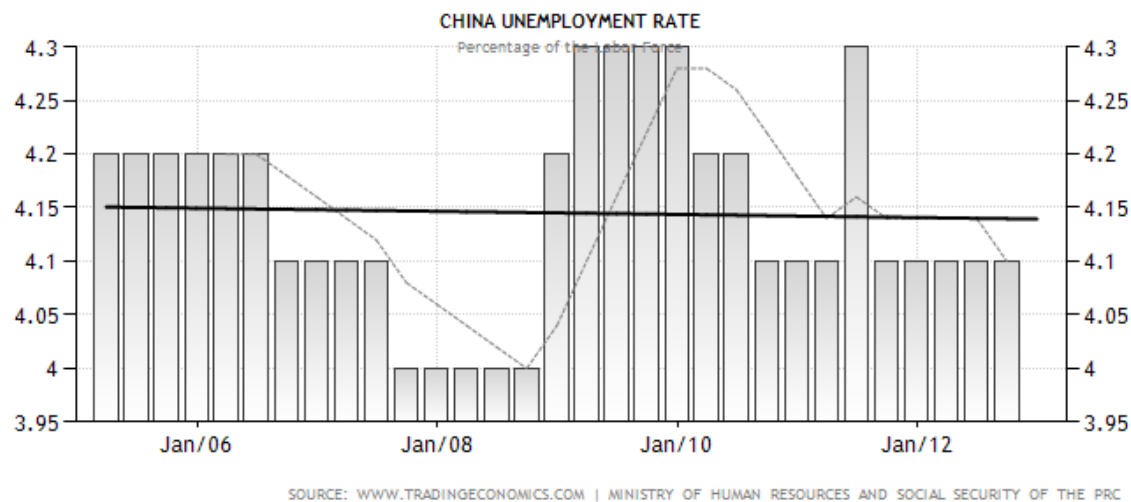
Source: <http://trendingeconomics.com/unitedstates>

Ireland's Unemployment Rate:



Source: <http://trendingeconomics.com/ireland>

China’s Unemployment Rate:



Source: <http://trendingeconomics.com/china>

Appendix VII – Complete Data for Statistical Analysis

UNITED STATES

Date	FORECL	REVRAT	UNMPY	HOPRICE	INTRATE30	INTRATE15	PERSAVING	CPIUCSL	DISPERINC
1/31/2005	56,351	44.70%	5.3	5.71	5.17	223,100.00	2.1	191.6	9,050.40
2/28/2005	38,660	44.70%	5.4	5.63	5.15	237,300.00	1.8	192.4	9,075.20
3/31/2005	52,830	44.70%	5.2	5.93	5.46	229,300.00	1.4	193.1	9,097.30
4/30/2005	61,995	44.70%	5.2	5.86	5.41	236,300.00	1.0	193.7	9,147.90
5/31/2005	68,633	44.70%	5.1	5.72	5.28	228,300.00	1.9	193.6	9,192.00
6/30/2005	73,202	44.70%	5	5.58	5.17	226,100.00	1.4	193.7	9,243.30
7/31/2005	76,132	44.70%	5	5.7	5.28	229,200.00	1.1	194.9	9,306.40
8/31/2005	75,597	44.70%	4.9	5.82	5.4	240,100.00	1.5	196.1	9,354.30
9/30/2005	68,632	44.70%	5	5.77	5.36	240,400.00	1.4	198.8	9,399.70
10/31/2005	81,351	44.70%	5	6.07	5.63	243,900.00	1.5	199.1	9,444.10
11/30/2005	71,573	44.70%	5	6.33	5.86	237,900.00	1.7	198.1	9,486.20
12/31/2005	81,290	44.70%	4.9	6.27	5.82	238,600.00	1.8	198.1	9,530.90
1/31/2006	104,354	46.40%	4.7	6.15	5.71	244,900.00	2.2	199.3	9,651.80
2/28/2006	117,150	46.40%	4.8	6.25	5.86	250,800.00	2.5	199.4	9,708.50
3/31/2006	101,597	46.40%	4.7	6.32	5.97	238,800.00	2.6	199.7	9,755.30
4/30/2006	91,168	46.40%	4.7	6.51	6.16	257,000.00	2.5	200.7	9,821.70
5/31/2006	92,746	46.40%	4.6	6.6	6.21	238,200.00	2.6	201.3	9,853.20
6/30/2006	88,195	46.40%	4.6	6.68	6.31	243,200.00	2.9	201.8	9,916.40
7/31/2006	92,845	46.40%	4.7	6.76	6.39	238,100.00	2.3	202.9	9,939.30
8/31/2006	113,300	46.40%	4.7	6.52	6.2	243,900.00	2.5	203.8	9,985.80
9/30/2006	112,210	46.40%	4.5	6.4	6.08	226,700.00	2.6	202.8	10,022.50
10/31/2006	115,568	46.40%	4.4	6.36	6.05	250,400.00	2.8	201.9	10,061.10
11/30/2006	120,334	46.40%	4.5	6.24	5.96	240,100.00	2.9	202	10,097.40
12/31/2006	109,652	46.40%	4.4	6.14	5.88	244,700.00	2.7	203.1	10,175.20
1/31/2007	148,425	49.06%	4.6	6.22	5.97	254,400.00	2.5	203.437	10,198.20
2/28/2007	139,922	49.06%	4.5	6.29	6.02	250,800.00	2.6	204.226	10,252.90
3/31/2007	149,150	49.06%	4.4	6.16	5.88	262,600.00	2.8	205.288	10,315.30
4/30/2007	147,708	49.06%	4.5	6.18	5.88	242,500.00	2.5	205.904	10,340.20
5/31/2007	176,137	49.06%	4.4	6.26	5.97	245,000.00	2.2	206.755	10,363.90
6/30/2007	164,644	49.06%	4.6	6.66	6.34	235,500.00	2.1	207.234	10,371.70
7/31/2007	122,477	49.06%	4.6	6.7	6.36	246,200.00	2.1	207.603	10,413.60
8/31/2007	243,947	49.06%	4.6	6.57	6.23	236,500.00	2.0	207.667	10,436.90

9/30/2007	219,850	49.06%	4.7	6.38	6.05	240,300.00	2.3	208.547	10,520.20
10/31/2007	224,451	49.06%	4.7	6.38	6.04	234,300.00	2.5	209.19	10,558.50
11/30/2007	201,950	49.06%	4.7	6.21	5.85	249,100.00	2.3	210.834	10,614.70
12/31/2007	215,749	49.06%	5	6.1	5.75	227,700.00	2.6	211.445	10,697.00
1/31/2008	232,597	34.13%	5	5.76	5.29	232,400.00	3.7	212.199	10,822.30
2/29/2008	223,651	34.13%	4.9	5.92	5.44	245,300.00	4.4	212.623	10,880.70
3/31/2008	233,089	34.13%	5.1	5.97	5.42	229,300.00	4.5	213.441	10,935.70
4/30/2008	258,627	34.13%	5	5.92	5.47	246,400.00	3.9	213.971	10,913.20
5/31/2008	273,001	34.13%	5.4	6.04	5.6	229,300.00	8.3	215.206	11,482.60
6/30/2008	252,363	34.13%	5.6	6.32	5.91	234,300.00	6.1	217.47	11,264.10
7/31/2008	272,171	34.13%	5.8	6.43	5.97	237,300.00	5.1	219.09	11,147.50
8/31/2008	303,879	34.13%	6.1	6.48	6.03	221,000.00	4.5	218.749	11,047.40
9/30/2008	265,968	34.13%	6.1	6.04	5.64	225,200.00	5.0	218.872	11,048.70
10/31/2008	279,561	34.13%	6.5	6.2	5.89	213,200.00	5.7	216.966	11,006.60
11/30/2008	259,085	34.13%	6.8	6.09	5.79	221,600.00	6.5	213.074	10,929.80
12/31/2008	303,410	34.13%	7.3	5.29	5.04	229,600.00	6.5	211.401	10,815.40
1/31/2009	274,399	25.03%	7.8	5.05	4.72	208,600.00	6.1	211.962	10,822.20
2/28/2009	290,631	25.03%	8.3	5.13	4.77	209,700.00	5.2	212.823	10,706.30
3/31/2009	341,180	25.03%	8.7	5	4.64	205,100.00	5.2	212.561	10,655.00
4/30/2009	342,038	25.03%	8.9	4.81	4.5	219,200.00	5.6	212.705	10,698.50
5/31/2009	321,480	25.03%	9.4	4.86	4.52	222,300.00	6.7	212.977	10,856.60
6/30/2009	336,173	25.03%	9.5	5.42	4.9	214,700.00	5.0	214.744	10,719.20
7/31/2009	325,229	25.03%	9.5	5.22	4.69	214,200.00	4.3	214.726	10,669.40
8/31/2009	320,148	25.03%	9.6	5.19	4.61	207,100.00	3.1	215.479	10,665.50
9/30/2009	343,638	25.03%	9.8	5.06	4.49	216,600.00	4.0	215.883	10,672.90
10/31/2009	332,172	25.03%	10	4.95	4.39	215,100.00	3.5	216.476	10,671.80
11/30/2009	262,339	25.03%	9.9	4.88	4.34	218,800.00	3.9	217.113	10,729.00
12/31/2009	347,288	25.03%	9.9	4.93	4.39	222,600.00	4.0	217.33	10,802.90
1/31/2010	315,716	20.69%	9.7	5.03	4.44	218,200.00	4.7	217.469	10,892.70
2/28/2010	285,287	20.69%	9.8	4.99	4.37	221,900.00	4.6	217.397	10,922.20
3/31/2010	367,056	20.69%	9.8	4.97	4.33	224,800.00	4.6	217.44	10,983.90
4/30/2010	333,837	20.69%	9.9	5.1	4.42	208,300.00	5.3	217.373	11,068.30
5/31/2010	285,853	20.69%	9.6	4.89	4.28	230,500.00	5.7	217.182	11,134.60
6/30/2010	312,220	20.69%	9.4	4.74	4.18	219,500.00	5.8	217.206	11,149.70
7/31/2010	325,229	20.69%	9.5	4.56	4.04	212,100.00	5.6	217.649	11,158.50
8/30/2010	336,998	20.69%	9.6	4.43	3.91	226,600.00	5.4	218.062	11,204.80
9/30/2010	347,420	20.69%	9.5	4.35	3.81	228,000.00	5.2	218.364	11,192.80

10/30/2010	302,188	20.69%	9.5	4.23	3.66	204,200.00	4.9	219.02	11,230.40
11/30/2010	262,339	20.69%	9.8	4.3	3.68	219,600.00	4.6	219.441	11,256.10
12/30/2010	246,030	20.69%	9.4	4.71	4.06	241,200.00	4.9	220.414	11,330.60
1/31/2011	251,020	21.90%	9.1	4.76	4.09	240,100.00	5.5	221.036	11,453.40
2/28/2011	225,101	21.90%	9	4.95	4.22	220,100.00	5.2	222.008	11,496.20
3/31/2011	239,795	21.90%	8.9	4.84	4.08	220,500.00	4.6	223.193	11,502.50
4/30/2011	219,258	21.90%	9	4.84	4.06	224,700.00	4.5	224.03	11,535.70
5/31/2011	214,927	21.90%	9	4.64	3.82	222,000.00	4.4	224.634	11,535.70
6/30/2011	221,765	21.90%	9.1	4.51	3.69	240,200.00	4.7	224.837	11,555.50
7/31/2011	212,764	21.90%	9.1	4.55	3.68	229,900.00	4.2	225.515	11,574.20
8/31/2011	228,098	21.90%	9.1	4.27	3.46	219,600.00	4.0	226.266	11,568.90
9/30/2011	214,855	21.90%	9	4.11	3.32	217,000.00	3.5	226.87	11,574.60
10/31/2011	230,678	21.90%	8.9	4.07	3.35	224,800.00	3.6	226.804	11,607.80
11/30/2011	223,477	21.90%	8.7	3.99	3.31	214,300.00	3.2	227.014	11,577.90
12/31/2011	205,024	21.90%	8.5	3.96	3.25	218,600.00	3.4	227.033	11,609.10
1/31/2012	210,941	20.10%	8.3	3.92	3.2	221,700.00	3.7	227.505	11,708.80
2/29/2012	206,900	20.10%	8.3	3.89	3.16	239,900.00	3.5	228.433	11,782.70
3/31/2012	198,853	20.10%	8.2	3.95	3.2	239,800.00	3.7	229.098	11,837.70
4/30/2012	188,780	20.10%	8.1	3.91	3.14	236,400.00	3.5	229.177	11,841.30
5/31/2012	205,990	20.10%	8.2	3.8	3.03	239,200.00	3.9	228.527	11,858.20
6/30/2012	197,834	20.10%	8.2	3.68	2.95	232,600.00	4.1	228.618	11,885.90
7/31/2012	191,925	20.10%	8.3	3.55	2.85	237,400.00	3.9	228.723	11,902.20
8/31/2012	193,508	20.10%	8.1	3.6	2.86	253,200.00	3.7	230.102	11,912.00
9/30/2012	180,427	20.10%	7.8	3.47	2.78	254,600.00	3.3	231.414	11,959.30
10/31/2012	186,455	20.10%	7.9	3.38	2.69	247,200.00	3.4	231.751	11,965.70
11/30/2012	180,817	20.10%	7.8	3.35	2.66	244,600.00	4.0	231.025	12,091.10
12/31/2012	162,511	20.10%	7.8	3.35	2.66	249,800.00	6.4	231.137	12,414.60

IRELAND

Date	MORTARR	UNMPY	ECBRATE	MTGRATE	HOUINDEX	PERSAVING	CPIUCSL
1/31/2005	323	4.3	2	3.47	100	6,675.00	108.9
2/28/2005	323	4.1	2	3.47	100.4	6,675.00	109.8
3/31/2005	323	4.3	2	3.47	100.6	6,675.00	110.1
4/30/2005	970	4.4	2	3.47	101.3	6,956.00	110.6
5/31/2005	970	4.5	2	3.47	102	6,956.00	111
6/30/2005	970	4.5	2	3.47	102.9	6,956.00	111.3
7/31/2005	1,617	4.5	2	3.47	104.3	6,932.00	111.3
8/31/2005	1,617	4.5	2	3.47	105.9	6,932.00	111.8
9/30/2005	1,617	4.4	2	3.47	107.2	6,932.00	112.7
10/31/2005	1,940	4.4	2	3.53	109	7,070.00	112.8
11/30/2005	1,940	4.3	2	3.53	110	7,070.00	112.6
12/31/2005	1,940	4.3	2.25	3.53	111.5	7,070.00	112.5
1/31/2006	2,264	4.4	2.25	3.74	111.8	7,309.00	112.2
2/28/2006	2,264	4.4	2.25	3.74	112.6	7,309.00	113.4
3/31/2006	2,264	4.4	2.5	3.74	113.1	7,309.00	113.9
4/30/2006	2,264	4.4	2.5	4.00	114.6	7,493.00	114.8
5/31/2006	2,264	4.4	2.5	4.00	116.8	7,493.00	115.3
6/30/2006	2,587	4.5	2.75	4.00	119	7,493.00	115.6
7/31/2006	2,587	4.5	2.75	4.34	121.3	7,595.00	116
8/31/2006	2,587	4.5	3	4.34	123.5	7,595.00	116.8
9/30/2006	2,587	4.5	3	4.34	125.1	7,595.00	117.2
10/31/2006	2,910	4.4	3.25	4.73	126	7,255.00	117.2
11/30/2006	2,910	4.3	3.25	4.73	126.1	7,255.00	117.6
12/31/2006	2,910	4.4	3.5	4.73	127.3	7,255.00	118
1/31/2007	2,910	4.4	3.5	5.00	128.4	7,760.00	99.9
2/28/2007	2,910	4.4	3.5	5.00	129.6	7,760.00	100.7
3/31/2007	2,910	4.4	3.75	5.00	129.9	7,760.00	101.4
4/30/2007	3,234	4.5	3.75	5.21	130.3	7,879.00	102.2
5/31/2007	3,234	4.5	3.75	5.21	130.2	7,879.00	102.6
6/30/2007	3,234	4.5	4	5.21	130.2	7,879.00	102.8
7/31/2007	3,234	4.5	4	5.39	130.2	8,069.00	103.1
8/31/2007	3,881	4.5	4	5.39	130.4	8,069.00	103.6
9/30/2007	3,881	4.6	4	5.39	130.5	8,069.00	103.9
10/31/2007	3,881	4.6	4	5.39	130.1	8,010.00	104

11/30/2007	3,881	4.8	4	5.39	130.1	8,010.00	104.6
12/31/2007	3,881	4.7	4	5.39	129.5	8,010.00	104.7
1/31/2008	4,204	4.8	4	5.43	128.7	8,282.00	104.2
2/29/2008	4,204	4.8	4	5.43	127.6	8,282.00	105.5
3/31/2008	4,204	5.2	4	5.43	126.6	8,282.00	106.5
4/30/2008	4,204	5.3	4	5.51	125.7	8,283.00	106.6
5/31/2008	4,527	5.6	4	5.51	124.6	8,283.00	107.4
6/30/2008	4,527	6	4	5.51	123.4	8,283.00	107.9
7/31/2008	4,527	6.4	4.25	5.85	122.5	8,097.00	107.6
8/31/2008	4,527	6.9	4.25	5.85	121.5	8,097.00	108.1
9/30/2008	5,498	7.1	4.25	5.85	120.1	8,097.00	108.4
10/31/2008	5,498	7.6	3.75	5.26	117.7	8,542.00	108.2
11/30/2008	5,498	8	3.25	5.26	115.7	8,542.00	107.2
12/31/2008	5,498	8.5	2.5	5.26	113.5	8,542.00	105.9
1/31/2009	6,144	9.3	2	3.89	111.3	8,111.00	104.1
2/28/2009	6,144	10.1	2	3.89	108.5	8,111.00	103.7
3/31/2009	6,144	10.8	1.5	3.89	105.6	8,111.00	103.7
4/30/2009	7,115	11.3	1.25	3.31	103.3	7,803.00	102.9
5/31/2009	7,115	11.9	1	3.31	101.1	7,803.00	102.4
6/30/2009	7,115	12.1	1	3.31	99.2	7,803.00	102.1
7/31/2009	8,757	12.3	1	3.32	97.5	7,526.00	101.3
8/31/2009	8,757	12.5	1	3.32	96.2	7,526.00	101.7
9/30/2009	8,757	12.7	1	3.32	95.5	7,526.00	101.3
10/31/2009	9,534	12.7	1	3.32	94.4	7,641.00	101.1
11/30/2009	9,534	12.8	1	3.32	93.9	7,641.00	101.1
12/31/2009	9,534	12.8	1	3.32	92.4	7,641.00	100.6
1/31/2010	10,774	12.9	1	3.37	91.6	7,494.00	100
2/28/2010	10,774	12.9	1	3.37	90.1	7,494.00	100.4
3/31/2010	10,774	13	1	3.37	89.7	7,494.00	100.5
4/30/2010	12,146	13.3	1	3.59	89.1	7,478.00	100.7
5/31/2010	12,146	13.6	1	3.59	88	7,478.00	101.3
6/30/2010	12,146	13.5	1	3.59	86.9	7,478.00	101.2
7/31/2010	13,490	13.6	1	3.78	85.8	7,366.00	101.2
8/30/2010	13,490	13.6	1	3.78	85.8	7,366.00	101.9
9/30/2010	13,490	14	1	3.78	84.9	7,366.00	101.8
10/30/2010	14,836	14.2	1	3.91	83.9	7,248.00	101.8
11/30/2010	14,836	14.4	1	3.91	83.1	7,248.00	101.7
12/30/2010	14,836	14.4	1	3.91	82.7	7,248.00	101.9

1/31/2011	16,536	14.2	1	3.91	81.8	7,152.00	101.7
2/28/2011	16,536	14.1	1	3.91	80.4	7,152.00	102.6
3/31/2011	16,536	14.2	1	3.91	79	7,152.00	103.5
4/30/2011	18,588	14.2	1.25	4.13	78.2	7,231.00	103.9
5/31/2011	18,588	14.3	1.25	4.13	77.3	7,231.00	104
6/30/2011	18,588	14.4	1.25	4.13	75.7	7,231.00	103.9
7/31/2011	20,990	14.5	1.5	4.33	75.1	7,281.00	103.9
8/31/2011	20,990	14.6	1.5	4.33	73.9	7,281.00	104.1
9/30/2011	20,990	14.4	1.5	4.33	72.8	7,281.00	104.4
10/31/2011	23118	14.5	1.5	4.34	71.2	7,260.00	104.7
11/30/2011	23118	14.5	1.25	4.34	70.1	7,260.00	104.7
12/31/2011	23118	14.6	1	4.34	68.9	7,260.00	104.4
1/31/2012	25226	14.9	1	4.24	67.6	7,377.00	99.5
2/29/2012	25226	15	1	4.24	66.1	7,377.00	100.4
3/31/2012	25226	14.9	1	4.24	66.1	7,377.00	101.4
4/30/2012	27011	14.9	1	4.20	65.4	7,506.00	101.4
5/31/2012	27011	14.9	1	4.20	65.5	7,506.00	101.4
6/30/2012	27011	14.9	1	4.20	64.8	7,506.00	101.2
7/31/2012	30453	14.8	0.75	4.20	64.9	7,505.00	101.1
8/31/2012	30453	14.8	0.75	4.20	65.2	7,505.00	101.7
9/30/2012	30453	14.8	0.75	4.20	65.8	7,505.00	101.6
10/31/2012	31596	14.7	0.75	4.4	65.4	7,667.00	101.5
11/30/2012	31596	14.6	0.75	4.4	66.1	7,667.00	101.1
12/31/2012	31596	14.6	0.75	4.4	65.8	7,667.00	101.2

CHINA

Date	NPL	UNMPLOY	LENDRATE	HOUINDEX	PERSAVING	CPI
2/15/2003	0.480	4.1	5.31	5,995.60	22.63	95.0081618321802
5/15/2003	0.480	4.1	5.31	5,995.60	22.63	93.9020465987338
8/15/2003	0.480	4.2	5.31	5,995.60	22.63	93.2678744424093
11/15/2003	0.480	4.3	5.31	6,045.27	22.63	95.9024682694857
2/15/2004	0.500	4.3	5.31	6,132.34	23.15	97.6333874024120
5/15/2004	0.500	4.3	5.31	6,151.00	23.15	97.9575074634692
8/15/2004	0.500	4.2	5.31	5,902.30	23.15	98.0848670206799
11/15/2004	0.500	4.2	5.58	923.00	23.15	98.8650049947324

2/15/2005	0.560	4.2	5.58	5,740.51	23.77	100.3142416718150
5/15/2005	0.560	4.2	5.58	6,259.52	23.77	99.6031160661561
8/15/2005	0.560	4.2	5.58	6,219.36	23.77	99.3676445065770
11/15/2005	0.560	4.2	5.58	6,088.75	23.77	100.2289121333380
2/15/2006	0.600	4.2	5.58	5,939.49	24.30	101.7327828490070
5/15/2006	0.600	4.2	5.58	5,951.92	24.30	101.2549634218460
8/15/2006	0.600	4.1	6.12	5,983.01	24.30	100.9498148287640
11/15/2006	0.600	4.1	6.12	5,989.23	24.30	102.1660637932380
2/15/2007	0.682	4.1	6.12	6,020.29	26.04	104.5280935097280
5/15/2007	0.682	4.1	6.39	6,219.31	26.04	104.9088883462680
8/15/2007	0.682	4	6.57	7,152.20	26.04	107.1981906744700
11/15/2007	0.682	4	6.84	8,197.04	26.04	109.0295172411620
2/15/2008	0.560	4	7.47	8,657.27	27.48	112.9912840078640
5/15/2008	0.560	4	7.47	8,993.11	27.48	113.1583592529280
8/15/2008	0.560	4	7.2	9,061.46	27.48	112.8937443251550
11/15/2008	0.560	4.2	6.66	8,850.00	27.48	111.8430150463320
2/15/2009	1.540	4.3	5.58	8,769.15	27.14	112.2842953426610
5/15/2009	1.540	4.3	5.31	9,042.80	27.14	111.4258792632120
8/15/2009	1.540	4.3	5.31	9,316.44	27.14	111.4608443872930
11/15/2009	1.540	4.3	5.31	9,509.23	27.14	112.4321697744510
2/15/2010	2.303	4.2	5.31	9,714.47	28.70	114.6103268840750
5/15/2010	2.303	4.2	5.31	9,820.13	28.70	114.4545216544880
8/15/2010	2.303	4.1	5.31	9,720.62	28.70	115.0995553049780
11/15/2010	2.303	4.1	5.31	9,764.08	28.70	117.6516449656100
2/15/2011	2.090	4.1	6.06	9,844.93	28.59	120.5309256083750
5/15/2011	2.090	4.3	6.31	9,894.68	28.59	121.1697270496810
8/15/2011	2.090	4.1	6.56	9,913.33	28.59	122.5096520241280
11/15/2011	2.090	4.1	6.56	9,888.45	28.59	123.1235246287000
2/15/2012	2.600	4.1	6.56	9,888.45	29.50	125.1334120903700
5/15/2012	2.600	4.1	6.31	9,876.01	29.50	124.6379514602840
8/15/2012	2.600	4.1	6	9,900.82	29.50	124.7556467307140
11/15/2012	2.600	4.1	6	9,950.57	29.50	125.5478540010710

SPAIN

Date	MORTARR	UNMPY	INTGOV	ECBRATE	MTGRATE	HOUINDEX	PERSAVING	CPIUCSL
2/15/2003	1,237.00	11.96	4.10	2.75	2.25	1,230.30	39,890.00	92.769
5/15/2003	1,237.00	11.28	3.92	2.5	2.25	1,309.60	50,764.00	93.985
8/15/2003	1,237.00	11.31	4.14	2	2.25	1,344.90	43,208.00	93.787
11/15/2003	1,237.00	11.37	4.34	2	2.25	1,380.30	49,187.00	95.011
2/15/2004	1,385.00	11.5	4.12	2	2.25	1,456.20	41,636.00	94.804
5/15/2004	1,385.00	11.08	4.31	2	2.25	1,538.80	52,204.00	96.994
8/15/2004	1,385.00	10.74	4.17	2	2.25	1,570.80	44,762.00	96.890
11/15/2004	1,385.00	10.56	3.82	2	2.25	1,618.00	50,024.00	98.278
2/15/2005	1,573.00	10.19	3.64	2	2.25	1,685.40	44,166.00	97.893
5/15/2005	1,573.00	9.33	3.36	2	2.25	1,752.80	56,552.00	100.117
8/15/2005	1,573.00	8.42	3.18	2	2.25	1,781.50	48,981.00	100.219
11/15/2005	1,573.00	8.7	3.38	2	2.5	1,824.30	51,104.00	101.771
2/15/2006	2,349.00	9.07	3.49	2.25	2.75	1,887.60	49,069.00	101.826
5/15/2006	2,349.00	8.53	3.97	2.5	3.25	1,942.30	62,889.00	104.067
8/15/2006	2,349.00	8.15	3.89	2.75	3.5	1,956.70	50,389.00	103.760
11/15/2006	2,349.00	8.3	3.79	3.25	3.75	1,990.50	53,721.00	104.410
2/15/2007	2,478.00	8.47	4.06	3.5	4	2,024.20	52,975.00	104.293
5/15/2007	2,478.00	7.95	4.39	3.75	4.25	2,054.50	64,635.00	106.550
8/15/2007	2,478.00	8.03	4.45	4	4.5	2,061.20	48,947.00	106.215
11/15/2007	2,478.00	8.6	4.33	4	4.5	2,085.50	54,469.00	108.543
2/15/2008	2,091.00	9.63	4.15	4	4.5	2,101.40	48,533.00	108.863
5/15/2008	2,091.00	10.44	4.51	4	4.75	2,095.70	61,079.00	111.454
8/15/2008	2,091.00	11.33	4.64	4.25	5.25	2,068.70	52,359.00	111.425
11/15/2008	2,091.00	13.91	4.16	3.75	5	2,018.50	50,459.00	111.207
2/15/2009	4,719.00	17.36	4.15	2	2.5	1,958.10	44,601.00	109.371
5/15/2009	4,719.00	17.92	4.11	1.25	2.25	1,920.90	58,900.00	110.701
8/15/2009	4,719.00	17.93	3.87	1	1.75	1,896.80	49,154.00	110.234
11/15/2009	4,719.00	18.83	3.79	1	1.75	1,892.30	49,064.00	111.366
2/15/2010	4,100.00	20.05	3.93	1	1.5	1,865.70	43,628.00	110.567
5/15/2010	4,100.00	20.09	4.18	1	1.5	1,848.90	53,422.00	112.461
8/15/2010	4,100.00	19.79	4.19	1	1.75	1,832.00	45,806.00	112.387
11/15/2010	4,100.00	20.33	4.70	1	1.75	1,825.50	50,380.00	114.207
2/15/2011	2,553.00	21.29	5.30	1	2	1,777.60	39,826.00	114.420
5/15/2011	2,553.00	20.89	5.38	1.25	2.5	1,752.10	56,102.00	116.389
8/15/2011	2,553.00	21.52	5.42	1.25	2.5	1,729.30	46,042.00	115.832

11/15/2011	2,553.00	22.85	5.66	1.5	2.75	1,701.80	47,726.00	117.351
2/15/2012	7,319	24.44	5.23	1	2.75	1,649.30	37,140.00	116.659
5/15/2012	7,319	24.63	6.17	1	2.25	1,606.40	54,651.00	118.677
8/15/2012	7,319	25.02	6.43	0.75	2.25	1,565.60	49,644.00	119.028
11/15/2012	7,319	26.02	5.56	0.75	2.25	1,531.20	55,216.00	120.977

Appendix VIII – Complete Statistical Analysis

UNITED STATES

Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.940 ^a	.884	.874	31521.93267	.884	83.089	8	87	.000	.989

a. Predictors: (Constant), DISCPERINC, HOUPRICE, PERSAVING, INTERATE30, UNMPLY, REVRAT, CPI, INTERATE15

b. Dependent Variable: FORECL

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	6.605E+11	8	82559547579	83.089	.000 ^b
	Residual	86446004794	87	993632239.0		
	Total	7.469E+11	95			

a. Dependent Variable: FORECL

b. Predictors: (Constant), DISCPERINC, HOUPRICE, PERSAVING, INTERATE30, UNMPLY, REVRAT, CPI, INTERATE15

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B		Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	-522617.519	315370.559		-1.657	.101	-1149450.654	104215.616					
	REVRAT	-3348.424	1913.950	-.445	-1.749	.084	-7152.607	455.760	-.672	-.184	-.064	.021	48.575
	UNMPLY	32824.773	5353.131	.776	6.132	.000	22184.845	43464.701	.734	.549	.224	.083	12.031
	INTERATE30	-241664.702	44945.346	-2.662	-5.377	.000	-330998.444	-152330.961	-.373	-.499	-.196	.005	184.212
	INTERATE15	297937.496	45897.561	3.755	6.491	.000	206711.124	389163.868	-.362	.571	.237	.004	251.534
	HOUPRICE	-.863	.374	-.128	-2.306	.023	-1.607	-.119	-.608	-.240	-.084	.431	2.322
	PERSAVING	-4743.956	7187.633	-.080	-.660	.511	-19030.155	9542.243	.773	-.071	-.024	.090	11.139
	CPI	-333.637	3182.545	-.041	-.105	.917	-6659.290	5992.016	.601	-.011	-.004	.009	117.455
	DISCPERINC	69.870	41.842	.650	1.670	.099	-13.295	153.036	.604	.176	.061	.009	113.723

a. Dependent Variable: FORECL

Correlations										
		FORECL	REVRAT	UNMPLY	INTERATE30	INTERATE15	HOUPRICE	PERSAVING	CPI	DISCPERINC
Pearson Correlation	FORECL	1.000	-.672	.734	-.373	-.362	-.608	.773	.601	.604
	REVRAT	-.672	1.000	-.931	.878	.888	.491	-.672	-.857	-.813
	UNMPLY	.734	-.931	1.000	-.783	-.790	-.614	.611	.717	.654
	INTERATE30	-.373	.878	-.783	1.000	.996	.254	-.387	-.796	-.746
	INTERATE15	-.362	.888	-.790	.996	1.000	.255	-.375	-.808	-.754
	HOUPRICE	-.608	.491	-.614	.254	.255	1.000	-.439	-.223	-.173
	PERSAVING	.773	-.672	.611	-.387	-.375	-.439	1.000	.595	.661
	CPI	.601	-.857	.717	-.796	-.808	-.223	.595	1.000	.984
	DISCPERINC	.604	-.813	.654	-.746	-.754	-.173	.661	.984	1.000
Sig. (1-tailed)	FORECL	.	.000	.000	.000	.000	.000	.000	.000	.000
	REVRAT	.000	.	.000	.000	.000	.000	.000	.000	.000
	UNMPLY	.000	.000	.	.000	.000	.000	.000	.000	.000
	INTERATE30	.000	.000	.000	.	.000	.006	.000	.000	.000
	INTERATE15	.000	.000	.000	.000	.	.006	.000	.000	.000
	HOUPRICE	.000	.000	.000	.006	.006	.	.000	.014	.046
	PERSAVING	.000	.000	.000	.000	.000	.000	.	.000	.000
	CPI	.000	.000	.000	.000	.000	.014	.000	.	.000
	DISCPERINC	.000	.000	.000	.000	.000	.046	.000	.000	.
N	FORECL	96	96	96	96	96	96	96	96	96
	REVRAT	96	96	96	96	96	96	96	96	96
	UNMPLY	96	96	96	96	96	96	96	96	96
	INTERATE30	96	96	96	96	96	96	96	96	96
	INTERATE15	96	96	96	96	96	96	96	96	96
	HOUPRICE	96	96	96	96	96	96	96	96	96
	PERSAVING	96	96	96	96	96	96	96	96	96

IRELAND

Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.975 ^a	.951	.947	2116.621167	.951	286.460	6	89	.000	.707

a. Predictors: (Constant), CPIUCSL, MTGRATE, HOUINDEX, PERSAVING, UNMPLY, ECBRATE

b. Dependent Variable: MORTARR

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	7700192575	6	1283365429	286.460	.000 ^b
	Residual	398727579.8	89	4480085.167		
	Total	8098920155	95			

a. Dependent Variable: MORTARR

b. Predictors: (Constant), CPIUCSL, MTGRATE, HOUINDEX, PERSAVING, UNMPLY, ECBRATE

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B		Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	6001.380	10931.087		.549	.584	-15718.456	27721.216					
	UNMPLY	-.241.546	192.947	-.119	-1.252	.214	-624.928	141.836	.869	-.132	-.029	.061	16.298
	ECBRATE	-.5460.636	1406.354	-.711	-3.883	.000	-8255.031	-2666.241	-.659	-.381	-.091	.016	60.692
	MTGRATE	9174.374	1290.732	.749	7.108	.000	6609.718	11739.031	-.107	.602	.167	.050	20.092
	HOUINDEX	-.317.047	46.573	-.761	-6.808	.000	-409.586	-224.507	-.888	-.585	-.160	.044	22.574
	PERSAVING	1.370	1.022	.064	1.341	.183	-.660	3.401	-.140	.141	.032	.244	4.093
	CPIUCSL	3.855	67.149	.002	.057	.954	-129.569	137.279	-.575	.006	.001	.397	2.519

a. Dependent Variable: MORTARR

Correlations

		MORTARR	UNMPLY	ECBRATE	MTGRATE	HOUINDEX	PERSAVING	CPIUCSL
Pearson Correlation	MORTARR	1.000	.869	-.659	-.107	-.888	-.140	-.575
	UNMPLY	.869	1.000	-.814	-.348	-.894	-.148	-.698
	ECBRATE	-.659	-.814	1.000	.797	.891	.550	.416
	MTGRATE	-.107	-.348	.797	1.000	.493	.697	.029
	HOUINDEX	-.888	-.894	.891	.493	1.000	.463	.489
	PERSAVING	-.140	-.148	.550	.697	.463	1.000	-.223
	CPIUCSL	-.575	-.698	.416	.029	.489	-.223	1.000
Sig. (1-tailed)	MORTARR	.	.000	.000	.149	.000	.087	.000
	UNMPLY	.000	.	.000	.000	.000	.075	.000
	ECBRATE	.000	.000	.	.000	.000	.000	.000
	MTGRATE	.149	.000	.000	.	.000	.000	.388
	HOUINDEX	.000	.000	.000	.000	.	.000	.000
	PERSAVING	.087	.075	.000	.000	.000	.	.015
	CPIUCSL	.000	.000	.000	.388	.000	.015	.
N	MORTARR	96	96	96	96	96	96	96
	UNMPLY	96	96	96	96	96	96	96
	ECBRATE	96	96	96	96	96	96	96
	MTGRATE	96	96	96	96	96	96	96
	HOUINDEX	96	96	96	96	96	96	96
	PERSAVING	96	96	96	96	96	96	96
	CPIUCSL	96	96	96	96	96	96	96

CHINA

Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.983 ^a	.966	.961	.162196	.966	192.064	5	34	.000	1.301

a. Predictors: (Constant), CPI, UNMPLY, LENDRATE, HOUINDEX, PERSAVING

b. Dependent Variable: NPL

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	25.264	5	5.053	192.064	.000 ^b
	Residual	.894	34	.026		
	Total	26.158	39			

a. Dependent Variable: NPL

b. Predictors: (Constant), CPI, UNMPLY, LENDRATE, HOUINDEX, PERSAVING

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B		Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	1.322	1.943		.680	.501	-2.628	5.271					
	UNMPLY	-1.318	.390	-.154	-3.380	.002	-2.111	-.526	-.030	-.502	-.107	.484	2.068
	LENDRATE	-.768	.061	-.606	-12.518	.000	-.892	-.643	-.014	-.906	-.397	.429	2.330
	HOUINDEX	-.8415E-.006	.000	-.021	-.299	.767	.000	.000	.782	-.051	-.009	.202	4.942
	PERSAVING	-.023	.054	-.067	-.425	.673	-.132	.086	.854	-.073	-.013	.040	24.938
	CPI	.097	.012	1.179	8.062	.000	.073	.121	.871	.810	.256	.047	21.270

a. Dependent Variable: NPL

Correlations

		NPL	UNMPY	LENDRATE	HOUINDEX	PERSAVING	CPI
Pearson Correlation	NPL	1.000	-.030	-.014	.782	.854	.871
	UNMPY	-.030	1.000	-.703	-.167	-.287	-.275
	LENDRATE	-.014	-.703	1.000	.302	.418	.440
	HOUINDEX	.782	-.167	.302	1.000	.888	.865
	PERSAVING	.854	-.287	.418	.888	1.000	.975
	CPI	.871	-.275	.440	.865	.975	1.000
Sig. (1-tailed)	NPL	.	.428	.467	.000	.000	.000
	UNMPY	.428	.	.000	.152	.037	.043
	LENDRATE	.467	.000	.	.029	.004	.002
	HOUINDEX	.000	.152	.029	.	.000	.000
	PERSAVING	.000	.037	.004	.000	.	.000
	CPI	.000	.043	.002	.000	.000	.
N	NPL	40	40	40	40	40	40
	UNMPY	40	40	40	40	40	40
	LENDRATE	40	40	40	40	40	40
	HOUINDEX	40	40	40	40	40	40
	PERSAVING	40	40	40	40	40	40
	CPI	40	40	40	40	40	40

SPAIN

Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.832 ^a	.693	.625	1114.039	.693	10.296	7	32	.000	.852

a. Predictors: (Constant), CPIUCSL, MTGRATE, PERSAVING, INTGOV, HOUINDEX, ECBRATE, UNMPY

b. Dependent Variable: MORTARR

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	89445259.70	7	12777894.24	10.296	.000 ^b
	Residual	39714653.90	32	1241082.934		
	Total	129159913.6	39			

a. Dependent Variable: MORTARR

b. Predictors: (Constant), CPIUCSL, MTGRATE, PERSAVING, INTGOV, HOUINDEX, ECBRATE, UNMPY

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B		Correlations			Collinearity Statistics	
	B	Std. Error	Beta			Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
1 (Constant)	-5398.610	8242.753		-.655	.517	-22188.548	11391.327					
UNMPLOY	184.135	186.517	.602	.987	.331	-195.787	564.057	.788	.172	.097	.026	38.641
INTGOV	-314.610	628.784	-.129	-.500	.620	-1595.401	966.181	.585	-.088	-.049	.144	6.954
ECBRATE	-652.476	870.373	-.390	-.750	.459	-2425.367	1120.415	-.546	-.131	-.073	.036	28.154
MTGRATE	586.235	893.751	.333	.656	.517	-1234.277	2406.747	-.256	.115	.064	.037	26.886
HOUINDEX	.031	2.864	.004	.011	.992	-5.803	5.864	.048	.002	.001	.071	14.146
PERSAVING	.029	.039	.098	.745	.461	-.051	.109	.000	.131	.073	.557	1.794
CPIUCSL	49.820	159.860	.220	.312	.757	-275.805	375.445	.756	.055	.031	.019	51.780

a. Dependent Variable: MORTARR

Correlations

		MORTARR	UNMPLOY	INTGOV	ECBRATE	MTGRATE	HOUINDEX	PERSAVING	CPIUCSL
Pearson Correlation	MORTARR	1.000	.788	.585	-.546	-.256	.048	.000	.756
	UNMPLOY	.788	1.000	.738	-.764	-.484	-.218	-.234	.769
	INTGOV	.585	.738	1.000	-.322	-.013	-.184	-.029	.697
	ECBRATE	-.546	-.764	-.322	1.000	.902	.465	.308	-.325
	MTGRATE	-.256	-.484	-.013	.902	1.000	.610	.371	.062
	HOUINDEX	.048	-.218	-.184	.465	.610	1.000	.434	.395
	PERSAVING	.000	-.234	-.029	.308	.371	.434	1.000	.155
	CPIUCSL	.756	.769	.697	-.325	.062	.395	.155	1.000
Sig. (1-tailed)	MORTARR	.	.000	.000	.000	.056	.384	.499	.000
	UNMPLOY	.000	.	.000	.000	.001	.089	.073	.000
	INTGOV	.000	.000	.	.021	.468	.127	.429	.000
	ECBRATE	.000	.000	.021	.	.000	.001	.027	.020
	MTGRATE	.056	.001	.468	.000	.	.000	.009	.351
	HOUINDEX	.384	.089	.127	.001	.000	.	.003	.006
	PERSAVING	.499	.073	.429	.027	.009	.003	.	.170
	CPIUCSL	.000	.000	.000	.020	.351	.006	.170	.
N	MORTARR	40	40	40	40	40	40	40	40
	UNMPLOY	40	40	40	40	40	40	40	40
	INTGOV	40	40	40	40	40	40	40	40
	ECBRATE	40	40	40	40	40	40	40	40
	MTGRATE	40	40	40	40	40	40	40	40
	HOUINDEX	40	40	40	40	40	40	40	40
	PERSAVING	40	40	40	40	40	40	40	40
	CPIUCSL	40	40	40	40	40	40	40	40