

The Financial Crisis of 2007-201? *

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The financial crisis that began in 2007 is still with us five years later. Unfortunately, we are living through more than just after effects; we are in the midst of an ongoing crisis. It might seem there is no end in sight, but I am willing to go out on a limb and suggest it will end before 2020 by putting “201?” in my title. It seems unlikely the crisis will continue into the 2020s. That is not a very happy beginning for a paper or talk, but it is realistic.

The crisis can be summarized as a serious financial crisis followed by an ongoing sovereign debt crisis. The sovereign debt crisis followed almost immediately after the financial crisis itself. It is infelicitous to call the combination of the two events a “financial crisis” and then call the first part a “financial crisis” as well, but that is what I will do.

Figure 1 shows the best indicator of general financial distress among banks: the London Interbank Borrowing Rate less the Overnight Index Swap Rate.¹ This spread abstracts from the level of interest rates. Both of the rates are dollar interest rates. The London Interbank Borrowing Rate (LIBOR) is the average interest rate at which banks indicate they can borrow from other banks. The Overnight Index Swap Rate (OIS) is the interest rate for swapping fixed-rate interest payments for floating-rate payments. OIS is close to completely collateralized and risk free. The spread can be interpreted in at least two different ways. From the viewpoint of a lender, it is a measure of perceived credit risk associated with lending to banks. From the viewpoint of a bank borrower, it is a measure of liquidity. The interpretation in terms of credit risk is immediate. The interpretation as liquidity relies on a different perception of credit risk by the bank borrower than others’ perception. The bank perceives itself as having a liquidity problem because lenders will not lend to it at rates that reflect the lender’s perception of its own credit risk.

¹ Dungey, Dwyer and Flavin (2011) examine three spreads, LIBOR less OIS, the TED spread and a commercial rate less Treasury bill rate. We find that LIBOR less OIS dominates the other two spreads in terms of its relationship to subprime-mortgage backed securities, a measure of general financial distress and of difficulties in the market for these problematic securities.

The spread of LIBOR over OIS clearly reflects major events in the financial crisis. While the spread has not returned to its pre-crisis level even by early 2012, it has been relatively low with low volatility since early 2009.

Figure 2 shows the spread of credit default swap rates for selected European countries relative to the credit default swap rate for Germany. Credit default swap rates are a measure of perceived credit risk associated with each government's debt. Germany is relatively risk free and a spread over Germany's rate abstracts from the level of rates itself. I use credit default swap rates in this figure but government bond rates are broadly similar.

The sovereign debt crisis immediately followed the general financial crisis. Credit default swap rates started increasing just as LIBOR less OIS was falling. While it is possible to consider these as two separate crises – and the events certainly are very different – there really is only one crisis. Without the financial crisis from 2007 to 2008, it strikes me as implausible that the sovereign debt crisis would have occurred in anything like the way it has happened.

But this gets ahead of the story. Let's start with the Financial Crisis of 2007-2008. The United States is a good place to start.

The Financial Crisis of 2007-2008

In the United States, the Financial Crisis of 2007-2008 revolved around housing and subprime mortgages.

Housing in the United States

Figure 3 shows two commonly referenced indices of housing prices in the United States. The two indices have different incomplete coverage and a fair conclusion in this case is that housing prices in general in the United States are somewhere in between these two indices.² Figure 4 shows delinquency rates on

² Both indices are repeat-purchase indices that adjust for a particular house's characteristics. The FHFA index covers the entire United States and the Case-Shiller index covers the twenty largest metropolitan areas. The FHFA index includes only mortgages which can be purchased by the U.S. housing GSEs and the Case-Shiller index

single-family mortgages in the United States. The two lower lines are for prime mortgages and the two upper lines are for subprime mortgages. There is no standard definition of subprime mortgages but subprime mortgages basically are riskier mortgages in which the borrower likely has a lower credit rating, may have defaulted on another mortgage or may have filed for bankruptcy a few years before obtaining the mortgage. Prime loans are loans to people with the opposite characteristics and the mortgages are eligible to be purchased by the two housing Government Sponsored Enterprises (GSEs) popularly known as Fannie Mae and Freddie Mac.³

Housing prices peaked around the last half of 2006 or the first half of 2007, depending on the index. Delinquencies on subprime mortgages were rising before then but it was 2007 before delinquencies rose above the delinquency rates in the early part of the decade.⁴ The delinquency rate on subprime mortgages is extraordinary. By 2010, the delinquency rate on subprime adjustable-rate mortgages was almost 30 percent. Almost one out of three owners of houses financed by subprime mortgages was 90 days or more past due on their mortgage.

Mortgage originations actually peaked before 2007 though. Figure 5 shows that mortgage originations peaked in 2003 and then were roughly constant from 2004 to 2006.⁵ The red part of each bar indicates subprime mortgages, which became more important from 2004 to 2006 than in earlier years – substantially more important. By 2008, subprime mortgages were smaller and hard to even see by 2009, the last year with data available to me.

includes all houses. The major difference due to this feature is the exclusion of higher valued homes from the FHFA index. The FHFA index excludes many high-valued houses in California for example, which probably had bigger price increases than average. The Case-Shiller index excludes houses in rural areas and smaller metropolitan areas, for example Omaha Nebraska, which probably had smaller price increases than average. Absent additional information to determine a comprehensive index, I find it plausible to suggest that a comprehensive index housing prices probably would be roughly in the middle of these two indices.

³ Besides having good credit, the payment to income ratio must be no more than 28 percent and the loan value must not exceed a threshold, currently \$417,000 in most of the United States and \$625,500 in some areas with higher home prices. There is an implicit subsidy built into the securitization process through the GSEs and the subsidy is thought to be less or non-existent for households buying more expensive homes.

⁴ In these data, a mortgage is delinquent if it is 90 days or more past due.

⁵ Mortgage originations include refinanced mortgages in addition to mortgages associated with home purchases.

How important are subprime mortgages? Paula Tkac and I (Dwyer and Tkac 2009) estimated the size of total holdings of subprime mortgages in the world relative to global financial markets. We estimated that total financial assets including stock, bonds and bank deposits were on the order of \$138 trillion in late 2006 and subprime mortgages account for about \$1 trillion of that. This is small relative to the size of financial markets worldwide, to the point of seeming inconsequential. One way to see this is to compare these mortgages to losses on equity markets. Global equities were about \$50 trillion in late 2006. A typical standard deviation of stock prices in financial markets is one percent per day. The loss of the entire value of subprime mortgages is the same as a two standard deviation loss on stock prices. About once a other month, the loss on stock prices is on the order of a loss of the entire value of all subprime mortgages.⁶

How Difficulties Spread

The question becomes: How did a tiny part of the world's securities markets create turmoil around the world?

The key to how problems in subprime loans became widespread problems in financial markets is a financial instrument called a "collateralized debt obligation" (CDO). (Brunnermeier 2009, Dwyer and Tkac 2009, Dwyer and Tkac 2010). Figure 6 shows the levels of indices of the value of CDOS backed by subprime mortgages.⁷ These indices were created in January and July 2006 and January and July 2007. No new indices have been created since. This is not surprising given the dramatic decrease in subprime mortgage origination. Financial difficulties in funding markets and decreases in housing prices in the United States led to both transitory and longer lasting decreases in the values of these securities (Dungey, Dwyer and Flavin 2011).

⁶ The correlations across markets are less than one, which might change the figure from once every two months to once every few months. The point would remain.

⁷ CDOs can be backed by other assets and generally have been.

The path from a homely mortgage loan to a CDO is convoluted, but it is worth grasping the essentials.⁸

Contrary to practice fifty years ago, mortgages in the United States typically are sold rather than held to maturity by the lender. Mortgages are securitized by pooling many mortgages together to form a Residential Mortgage Backed Security (RMBS), shares of which are sold to investors wishing to include real estate in their portfolio. While the actual financial and legal arrangements are complicated, a basic feature of RBMS is that payments on mortgages by households flow through to the investors who own the securitized pools.

There is one wrinkle which is important for the subsequent story. In a typical security – say an issue of AT&T corporate bonds – if AT&T fails to pay, all holders of the bonds suffer the same proportionate loss. All the holders of the bonds have the same risk. This is not so for many RMBSs. Some holders of RMBSs bear more risk than others and some bear less. This is accomplished by “tranching” the RMBS security and constructing what is called a “waterfall” of payments.

You can view the mortgage payments as coming in at the top of the waterfall. First, the mortgage payments go to the highest-rated tranche, the AAA tranche. If there are remaining funds – water in the waterfall – the remaining payments go to the next tranche, the AA tranche. And so on. Any remaining payments go to the lowest tranche, the equity tranche. In financial economics, equity holders are often called “residual claimants” and that holds here. The equity tranche gets whatever is left over. Tranches generally cover the entire range from the AAA to the equity tranche with each intermediate grade included (AAA, AA, A, BBB, BBB-, equity).

The collateralized debt obligations (CDOs) at the center of the financial crisis are created from tranches of RMBSs. The underlying portfolio of a CDO is a portfolio of, say, BBB tranches of different RMBS. The allocation of risk is similar, with the waterfall of payments being similar. The AAA tranche often was roughly 85 percent of the value of these CDOs (Griffin and Tang 2012). The lower rated tranches account

⁸ Dwyer and Tkac (2010) provide details of this discussion.

for the remaining 15 percent and represent the degree of subordination in the CDO. The higher the subordination, the less risk that a AAA tranche will experience a loss.

CDOs are even more complicated than this summary suggests. CDOs backed by subprime mortgages were idiosyncratic. The underlying securities are held by a trust. The terms of the trust agreements underlying CDO deals vary across deals, and not always in unimportant ways (Goodman et al. 2008, Smithson 2009). For example, CDOs can be actively or passively managed, they can have a reserve fund to pay the higher tranches if the payments on the underlying securities are inadequate, and the reserve can depend on delinquencies and prior losses. The priority order of principal payments can change over time. As a result of these differences, CDOs trade over the counter and not on organized exchanges. Two different CDOs need not trade at the same price, even if they are broadly similar. It is not enough to simply look up the price of a subprime-mortgage backed CDO in the most recent trade and determine the likely price of another CDO.

The indices of CDOs in Figure 6 are based on securities created through this complicated process. When initiated, the indices of CDOs in Figure 6 generally traded at 100. The index beginning in January 2006 is based on CDOs created in the prior six months, as are the subsequent vintages of the index.⁹

The values of CDOs fell substantially. There are similarities in the price falls across the vintages. The lowest rated tranches fall more. This is consistent with the waterfall of payments into these tranches in a period of heightened default. The lowest rated tranches, the BBB and BBB- tranches are essentially worthless by the end of 2008.

The AAA tranches of both vintages fall by amounts that are hard to square with a low-risk security. The AAA tranche of the 2006 vintage falls close to 40 percent, from 100 to about 60 by early 2009. The AAA

⁹ The AAA part of the index for January 2006 includes tranches rated AAA at inception. If the underlying AAA tranche of a CDO was downgraded to a lower credit rating after the creation of the index, the tranche remains in the AAA index.

tranche of the 2007 falls quite a bit more, from 100 to about 25 by early 2009, a 75 percent decline in value.

There are two possible, though not mutually exclusive, explanations for the greater losses in the 2007 vintage. It is possible that the loans made in the last half of 2006 were riskier *ex ante*, less well documented and more fraudulent. In addition though, the people who obtained mortgages in the last half of 2006 were doing so at the end of the increases in house prices. Since prices have subsequently fallen dramatically, these people are more likely to owe more than the house is worth. Consequently, they are more likely to default.¹⁰ Demyanyk and Van Hemert (2011) analyze subprime loans from 2001 to 2007 and find a gradual and persistent deterioration of prospective loan quality. Mian and Sufi (2009) provide evidence that an increase in securitization of mortgages and an increased supply of subprime mortgages resulted in less stringent lending criteria and contributed to subprime mortgages' growth. This lower *ex ante* credit quality does not imply lower house prices did not increase delinquencies even more.

These CDOs were purchased by entities all over the world. Four townships in northern Norway bought AAA tranches of CDOs based on advice from brokers. Government-owned banks in Germany bought tranches to diversify their portfolios. (Dwyer and Tkac 2009.) While probably atypical, these purchases indicate that the difficulties were indeed spread around the world.

As these difficulties became apparent, the rate of creation of these securities was affected. Figure 7 shows origination of CDOs from the first quarter of 2005 to the first quarter of 2012. Origination of these securities – “tranches” in the figure – are essentially zero by 2009 and have yet to recover if they ever will.

The crisis proper can be dated as starting August 9, 2007. There is a substantial spike in LIBOR less OIS on that date. On that date, BNP Paribas halted redemptions on three investment funds and the

¹⁰ Most states in the United States allow a lender to sue the borrower for the difference between the loan amount and the market value of the house. For more detail, see Ghent and Kudlyak (2011).

European Central Bank (ECB) increased loans to banks by €95 billion. This was followed by a dramatic series of events, some represented in Figure 1 and more summarized in the Appendix to Dwyer and Tkac (2009).

The climax of the financial crisis came the week of September 16, 2008. In the prior week on September 7, 2008, the GSEs Fannie Mae and Freddie Mac were put into conservatorship. On September 15, Bank of America announced the purchase of Merrill Lynch in distressed conditions and Lehman Brothers filed for bankruptcy. On September 16, the insurance company AIG received an \$85 billion “bridge loan” from the Federal Reserve. The money market fund Reserve Primary Fund broke the buck on the same day, announcing that its net asset value was \$0.97.¹¹ The decrease in value was due to Primary Reserve Fund’s holdings of commercial paper issued by Lehman Brothers and a run on it by institutional investors. A general run on prime money market funds followed.¹² This run on prime money market funds occurred for essentially the same reasons as runs on banking systems (Dwyer and Samartín 2009). This turmoil clearly is reflected in LIBOR less OIS. A substantial increase in banks’ borrowing costs for funding their assets follows immediately. As indicated earlier, this can be interpreted as an increase in credit risk or a liquidity premium. Either way, it spelled trouble for banks which borrowed overnight in “wholesale markets” to fund positions.

These uncertainty created by these developments were followed by numerous policy responses. These responses included creative programs to provide funds to banks and other organizations affected by the financial crisis as well as increases in government spending rationalized as attempts to increase employment and output in a serious recession.

Global Financial Crisis?

¹¹ Money market funds in the U.S. do not guarantee a net asset value of \$1 but they have provided it in practice since their inception in the 1970s

¹² Prime money market funds hold commercial paper in addition to Treasury securities.

Was this a global financial crisis caused by CDOs? Banks in Iceland were an early casualty of the financial crisis. These banks' financial difficulties were due to loans on Icelandic stock and had nothing to do with subprime mortgages in the United States or in Iceland (Special Investigation Commission 2010, Chapter 21; Flannery 2009). Similarly, Ireland's financial difficulties were due to domestic credit expansion associated with increasing housing prices in Ireland. These loans were financed by borrowing abroad but were not even especially low-credit-quality Irish loans, let alone were they loans on U.S. properties (Honohan 2010; Connor, Flavin and O'Kelly 2012). These are small countries and therefore might be small, isolated observations but they are not. The U.K. bank Northern Rock was an early casualty of the crisis in September 2007, and Northern Rock's difficulties were associated with concerns about the bank's ability to securitize mortgages it had made in the United Kingdom (Congdon 2009, Milne and Wood 2009, Shin 2009). Northern Rock's problems were not related to holding or transacting in U.S. subprime mortgages or claims to them such as CDOs. Spain's difficulties after the financial crisis have little or no connection with U.S. subprime mortgages and are associated with increases in Spanish housing prices and a subsequent fall in those prices (Carbó Valverde 2009).

The financial crisis was not a global one though. For example, neither Australia nor Canada experienced serious problems and have yet to do so. This is ironic since I have heard economists in both countries talk about the "GFC", the Global Financial Crisis, which somehow missed their countries.

The United States is not the only country that experienced substantial increases and decreases in housing prices. Figure 8 shows housing prices since 2000 for the United States, Ireland, Spain and the United Kingdom. All of these countries have substantial price increases from 2000 to 2006 or 2007 and size of the increase in the United States does not stand out.

Not all countries experienced substantial increases and decreases. Figure 9 shows housing prices in Canada and Australia, neither of which had a financial crisis, along with those in the United States.

House prices in Canada show a slow and steady increase with a relatively small drop in 2009. Housing prices have risen substantially more in Australia than in the United States, let alone Canada.¹³

Problems in countries other than the United States arose for various reasons, at least partly idiosyncratic.

If there was a global financial crisis, it was not solely due to housing problems in the United States or CDOs.

An Hypothesis

I suggest that common elements in the crisis across countries are increases in leverage and increases in maturity transformation which made the financial system particularly vulnerable to difficulties. Another way of saying it is that the common factor was the so-called Great Moderation and a related inference that the world was less risky than it had been before. This suggestion does not imply factors such as Fannie Mae and Freddie Mac or CDOs played no role. This “Great Moderation factor” affected people in governments as well as people in their private lives. This suggestion is that the common factor across countries in making such activities more attractive was a reduction in the perception of risk.

The Financial Crisis of 2007-2008 has done away with any talk of an ongoing Great Moderation. Instead, many countries are in a state of financial turmoil that is apparent in a different way than in 2007 and 2008 but the turmoil has not gone away as of mid-2012. Figures 1 and 2 make this point clearly.

A reduction in leverage is a reasonable response to greater perceived risk and the continuing turmoil. Households in many countries have been decreasing their leverage. Interestingly, this reduction in private leverage has occurred at the same that many governments have been increasing their leverage. Some governments have increased their borrowing because of private obligations assumed during the Financial Crisis of 2007-2008; some governments have increased their borrowing to fund increases in

¹³ Why not Australia?

government spending with the hope of reducing the effects of recessions which followed the financial crisis.

The Sovereign-Debt Crisis of 2008-2011?

Figure 2 shows the dramatic increases in spreads on 5-year credit default swaps (CDSs) for European countries. These increases are similar in broad outline to the increases in spreads on 10-year government bonds, shown in Figure 10. Despite government officials' complaints about the effects of CDSs on cash markets, recent research has shown the two are tied together, mutually reinforcing each other in terms of both information aggregation and pricing (Arce, Mayordomo and Peña 2011, Aizenman, Hutchison and Jinjarak 2011).

Deficits and Debt

The concerns about government debt reflected in these spreads are warranted. Figure 11 shows ratios of debt to GDP for 2003 to 2011. A high level of Greek debt has been ongoing for some time, only dipping below 100 percent of GDP from 2006 to 2008. The financial crisis caught Greece with a relatively high level of debt that has risen substantially since 2008 (Gibson, Hall and Tavlas 2012). While not a member of the eurozone, Iceland is an interesting country to include for comparison. Iceland and Ireland had the lowest level of debt relative to GDP before the financial crisis. For different reasons, both countries have seen substantial increases in the ratio of debt to GDP. Iceland's debt has increased because the debt is denominated in foreign currency and indexed plus the government has run large government deficits. Ireland's debt has increased because the government has run large government deficits due to additional expenditures associated with the government's guarantee of all bank liabilities and substantially lower revenue due to the decline of housing sales and construction. Italy and Portugal have relatively high debt, but that is a feature of the whole period and is not news. Spain and the United States have the lowest ratios of debt to GDP in 2011.

Figure 12 shows the state of governments' finances in terms of debt relative to GDP as of December 31, 2011 and in terms of the governments' deficits relative to GDP for 2011. The ratio of debt to GDP for Greece easily is the highest. Other things stand out too though. The so-called PIIGS – Portugal, Italy, Ireland, Greece and Spain – have among the highest ratios of debt to GDP in the figure, although Iceland actually has the second-highest ratio of debt to GDP.

As in Figure 11, Spain stands out as having a relatively low ratio of debt to GDP, in fact lower than France or Germany. A difference between Spain and France and Germany is the higher Spanish deficit. Furthermore, Spain has substantial liabilities associated with the failure of the regional savings banks – *cajas* – and falling real estate values. The *cajas* made substantial development loans and, as in Ireland, construction has fallen from a double-digit percentage of GDP to very low levels. The Spanish situation looks similar to the United States, both in terms of debt relative to GDP and in terms of its deficit. This is more a cause for concern about the United States than a reason to be sanguine about Spain.

Another way of looking at the debt problem is to look at debt relative to government revenue rather than GDP. The comparison to GDP is evocative of general comments that governments cannot go bankrupt because the economy is there to back the debt. Fortunately governments in most countries do not own everything produced in the country. Instead, a government's claim on private resources is more nearly represented by the government's revenue – the government's typical part of GDP. The sizes of governments differ dramatically across these countries and this is reflected in the differences between Figure 12 and Figure 13. The ratios of government debt to government revenue are higher than the ratios of debt to the larger GDP. The ratio of government debt to revenue has a nice interpretation: the number of years of government revenue that would be necessary to pay off the debt. The smallest ratio is France's, which indicates it would take 1.37 years of revenue to pay off its debt. The highest ratio is for the United States, which would take 4.61 years to pay off its debt. Greece is the second highest, which would take 4.10 years to pay off its debt.

Table 1 shows the alternative rankings of countries on these three measures of fiscal difficulties. The rankings change substantially. Relative to revenue, the United States' debt is the highest, followed by Greece's. France and Germany are at the bottom. As I indicated earlier, unrecognized and uncertain liabilities associated with banks and large government deficits are the problems confronting the third country from the bottom: Spain.

Only one country in these figures and tables can guarantee to pay what is promised by its debt. U.S. government debt promises to pay dollars, and the government can print dollars for next to nothing. As a result, U.S. government debt is nominally risk free.¹⁴ The Greek government cannot print the euros in terms of which its debt is denominated, nor can any of the other countries in the figure.

Greece, Ireland and Portugal encountered difficulties and interest rates in the market which were deemed less desirable than arrangements with the European Commission (EC), the European Central Bank (ECB) and the International Monetary Fund (IMF).

Responses to Problems in the Eurozone

The current arrangement in the eurozone is the European Financial Stability Facility (EFSF). The EFSF can issue securities up to €440 billion. Lending is limited to about €220 billion. The difference between the amount of debt borrowed and what can be lent is due to a reserve fund necessary to receive AAA or close to AAA ratings. The securities issued by EFSF are backed by guarantees provided by governments in the eurozone. Not all of these countries have AAA credit ratings and a reserve fund is created with some of the funds from securities issuance, thereby obtaining a Aaa credit rating from Moody's, AAA credit rating from Fitch and a AA+ rating from Standard and Poor's.

This arrangement will be followed by the European Stabilization Mechanism (ESM). The eurozone governments are to be members and the ESM is expected to be able to lend up to €500 billion based on

¹⁴ It is not risk free in real terms of course. I do not say this to indicate approval of the U.S. government printing money to pay on its debt; I merely say it to highlight the difference between the United States and Eurozone countries, and Iceland for that matter.

pledged funds of €700 billion. There will be €80 billion of funds paid in with €620 billion pledged and callable. The language of the agreement is interpreted as indicating bondholders will take losses:

In accordance with IMF practice, in exceptional cases an adequate and proportionate form of private sector involvement shall be considered in cases where stability support is provided accompanied by conditionality in the form of a macro-economic adjustment programme.

There also is a fiscal agreement amongst the Eurozone countries. This compact was signed in January 2012 and may come into force as soon as January 2013. Participation in this scheme will affect eligibility for funds from the ESM. The agreement requires signatories to put restrictions on government deficits in place at the constitutional level. The basic restriction is to run a structural deficit no larger than 0.5 percent of GDP with a restriction to 1.0 percent of GDP for some countries. If a country's ratio of debt to GDP exceeds 60 percent, it will reduce its debt by one-twentieth of its level each year until its debt falls to 60 percent of GDP. This latter provision affects all of the countries in Figure 12. A fine of 0.5 percent of GDP is levied for breaching the agreement. It is not obvious this fine is credible.

The difficulties confronting some countries are compounded by capital flight. This is reflected in TARGET2 balances owed by individual countries' central banks to the ECB. TARGET2 balances arise as clearing transactions when funds are sent from a bank in one country to a bank in another country and the transfer from the domestic bank is financed through the domestic central bank, the ECB, the foreign central bank and the bank receiving the funds.¹⁵ These loans are collateralized, although the collateral can fall in value. Figure 14 shows a rough estimate of TARGET2 balances at the end of 2011. Capital flight is reflected in a negative TARGET2 balance for Greece, for example. These figures are amounts in euros and not relative to the sizes of the economies. For comparison, Greece's TARGET2 balance at the end of November 2011 is about €110 and its outstanding marketable debt is about €510 at the end of 2011.

Conclusion

¹⁵ It would be a substantial digression to explain these balances in detail. I summarize them and provide references elsewhere (Dwyer 2012).

This lays out the problem; it does not suggest how to resolve it.

I start with what I think is the simplest thing first. Some governments have responded to the financial crisis by deliberately leveraging up. This is occurring at the same time that households want to do the reverse. It is not necessary to give full credence to Ricardian equivalence to think that households are likely to respond to large government deficits by saving more. The Tea Party in the United States is clear evidence that some people have noticed large government deficits and their implications for future government spending and taxes. Multipliers for government purchases that are less than one are frequently mentioned in macroeconomics in the last few years. An at least partially offsetting private response to deficits due to Ricardian equivalence is consistent with such multipliers, although it is not the only explanation.

This does not mean that increasing taxes by increasing tax rates has no effect. Strictly speaking, Ricardian equivalence holds for changes in lump-sum transfers financed by debt. On the contrary, changes in tax rates can have substantial effects. Lower tax rates are the most important part of any growth strategy. This is likely to be inconsistent with reducing a deficit in the short term unless spending is reduced at the same time.

Beyond this, what can a government in serious financial difficulties do short of default? I think there are lessons to be learned from Eastern Europe countries after the collapse of the Soviet empire. Some may be positive about what to do, such as distributing shares in enterprises to taxpayers in some circumstances to unload government enterprises and their obligations. Some may be negative about what can be done, such as the importance of prior experience with a market economy.

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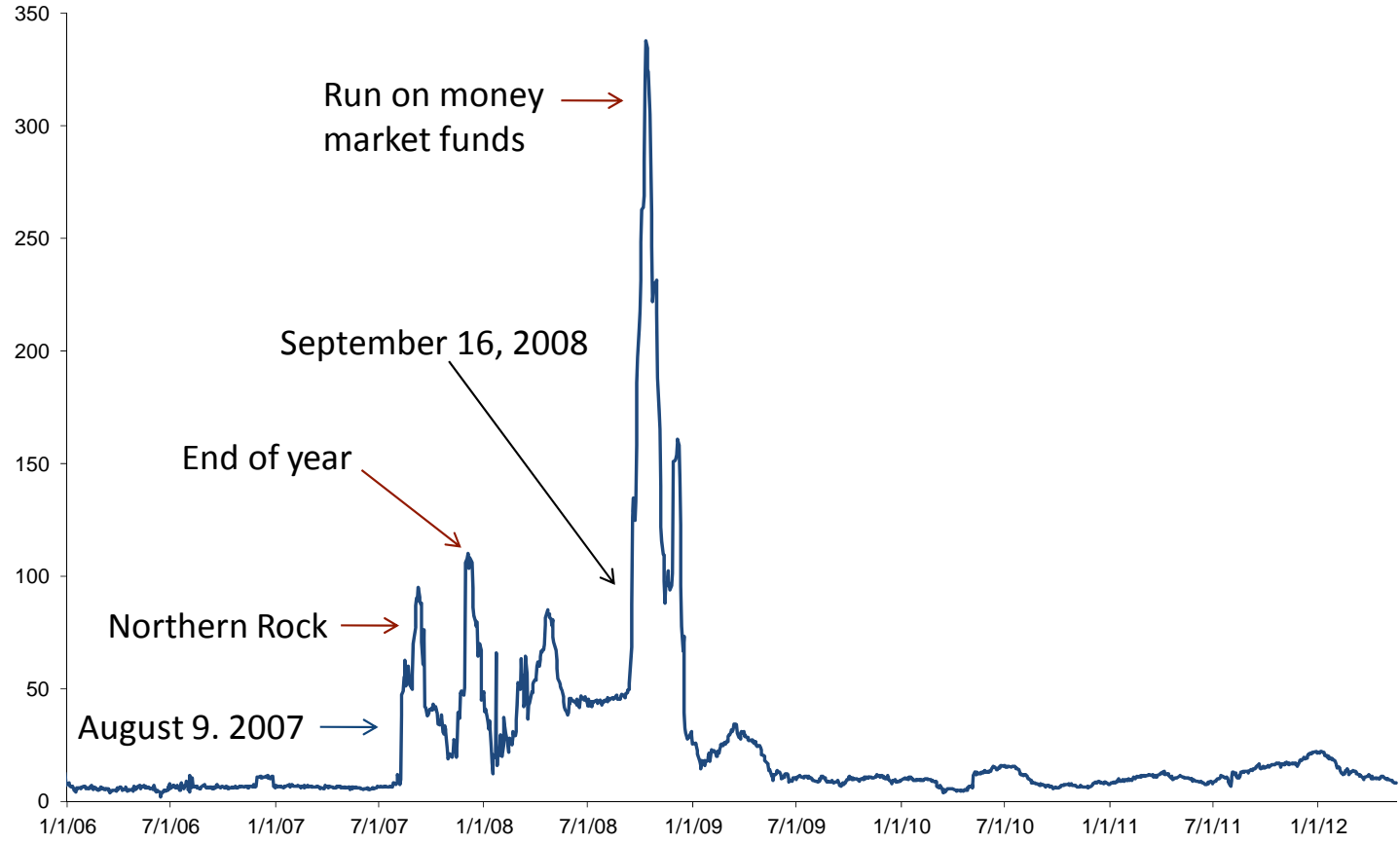
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Table 1
 Rankings of Governments' Fiscal Positions on These Measures

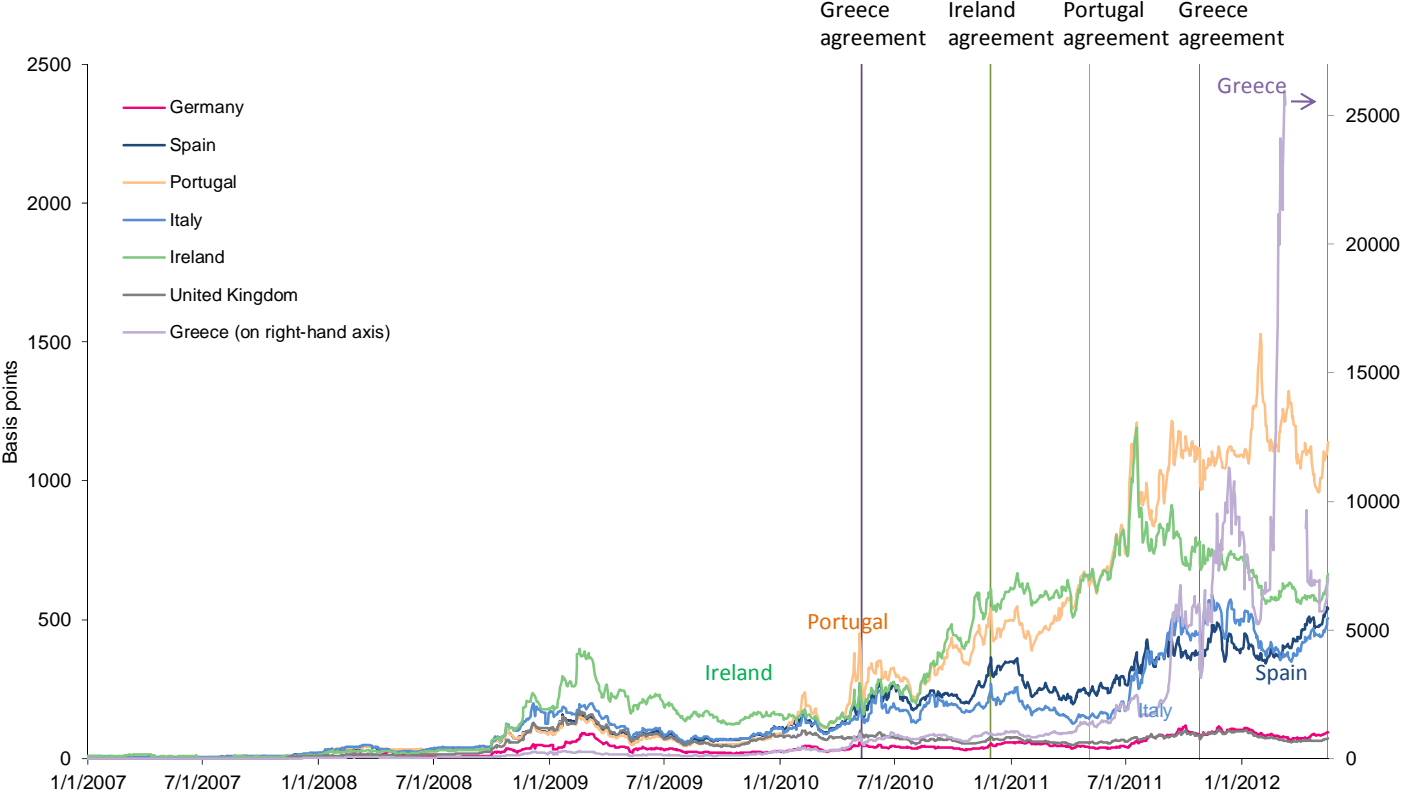
Debt Relative to GDP	Deficit Relative to GDP	Debt Relative to Revenue
Greece	Ireland	United States
Iceland	Spain	Greece
Italy	France	Iceland
Ireland	United States	Ireland
France	Greece	Italy
Portugal	Iceland	Portugal
Germany	Portugal	Spain
Spain	Italy	Germany
United States	Germany	France

Figure 1
LIBOR less OIS - 30 days
January 1, 2006 to May 16, 2012



Sources: Financial Times, Bloomberg, Haver Analytics

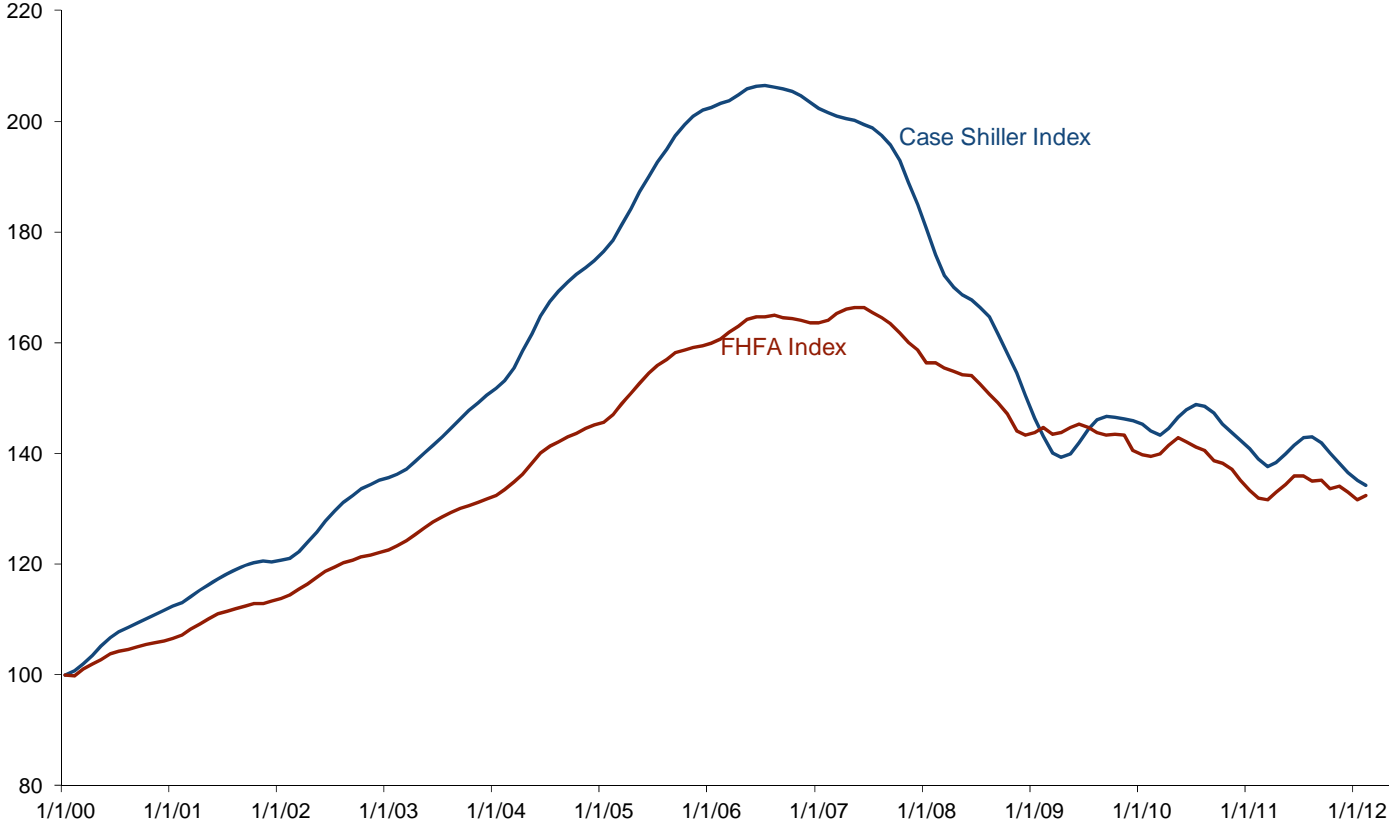
Figure 2
European CDS Spreads - January 2, 2007 to May 16, 2012



Source: Datastream, Bloomberg

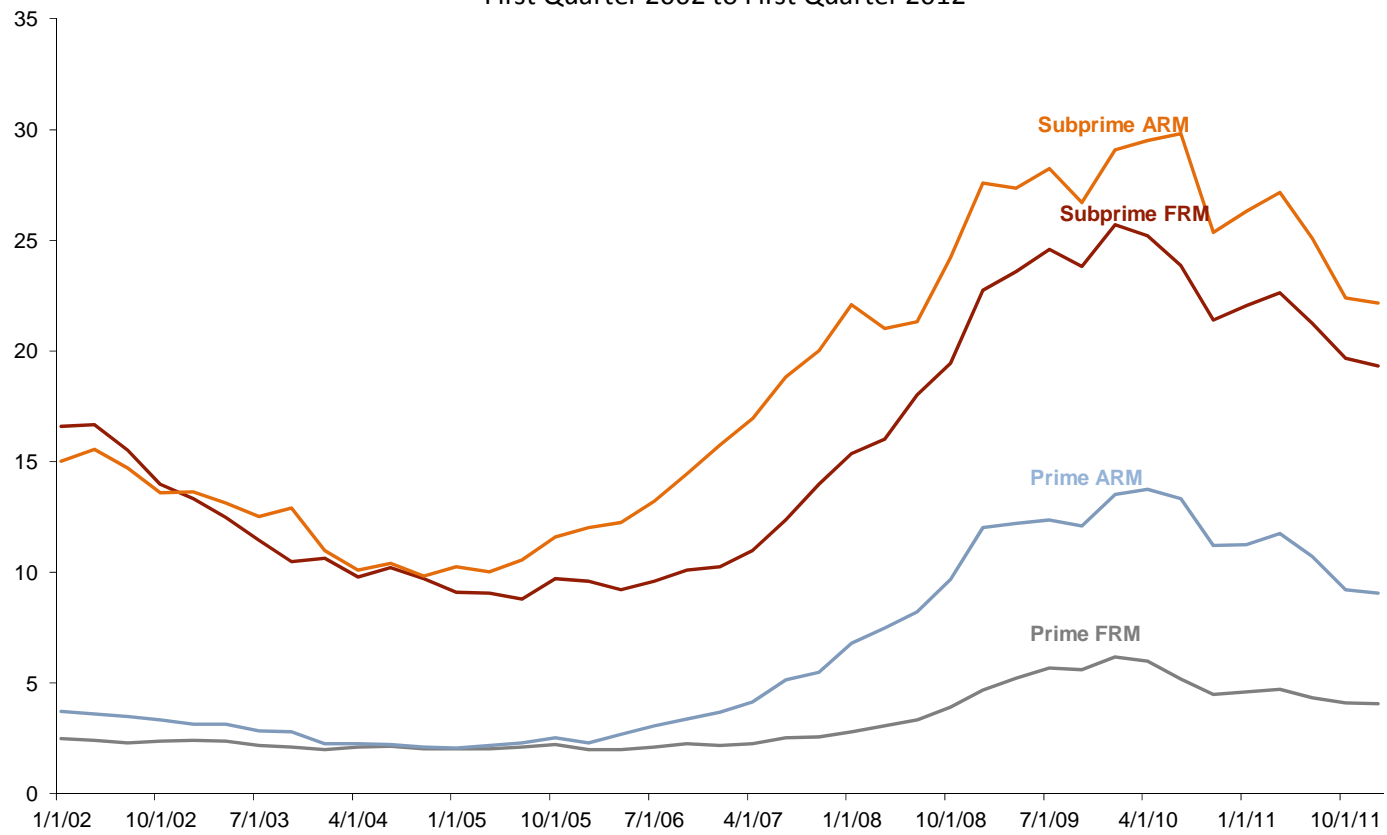
Figure 3
U.S. Housing Price Indices

January 2000 to February 2012



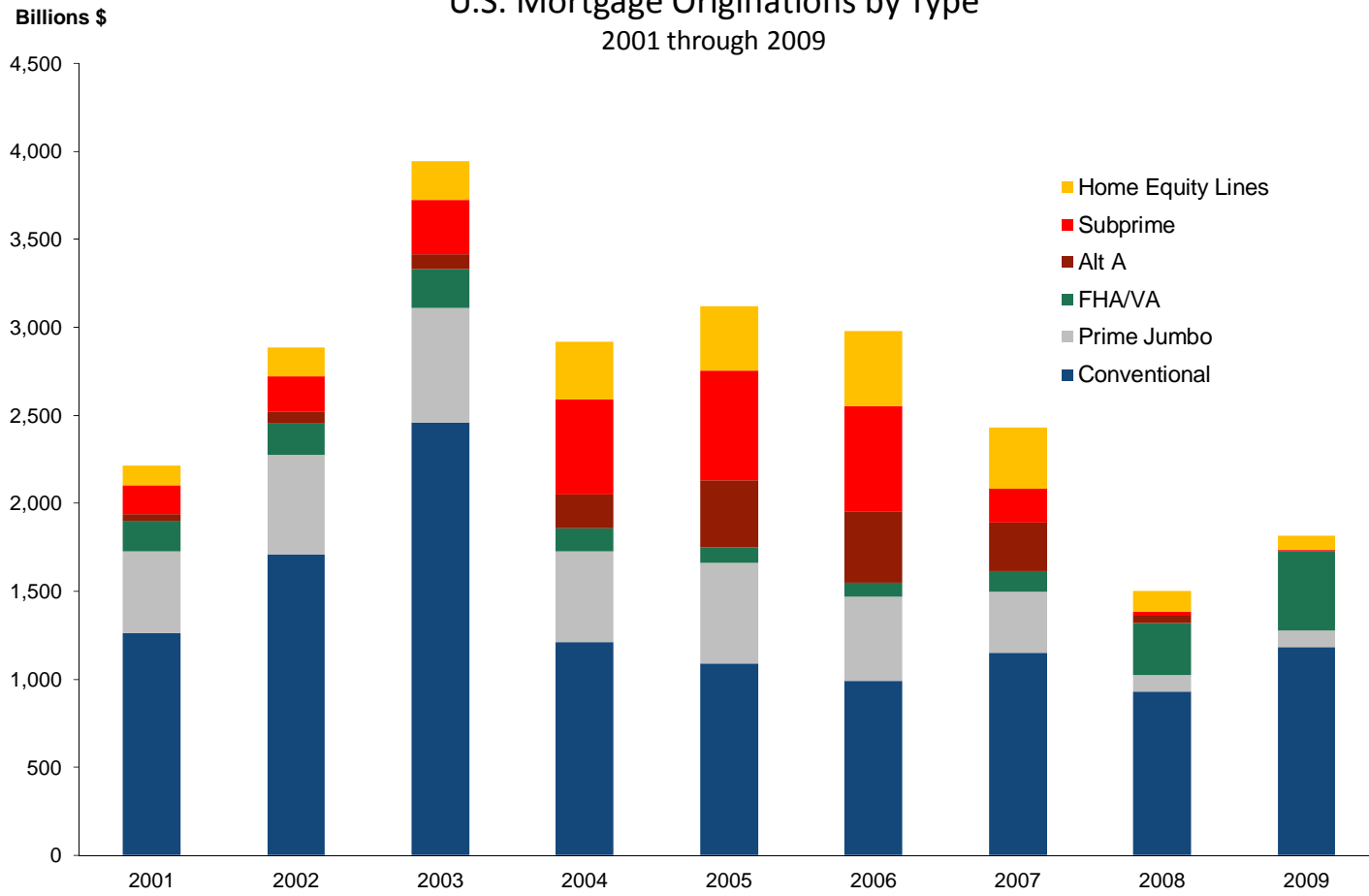
Sources: S&P, FHFA, Haver Analytics

Figure 4
U.S. Delinquencies by Loan Type
First Quarter 2002 to First Quarter 2012



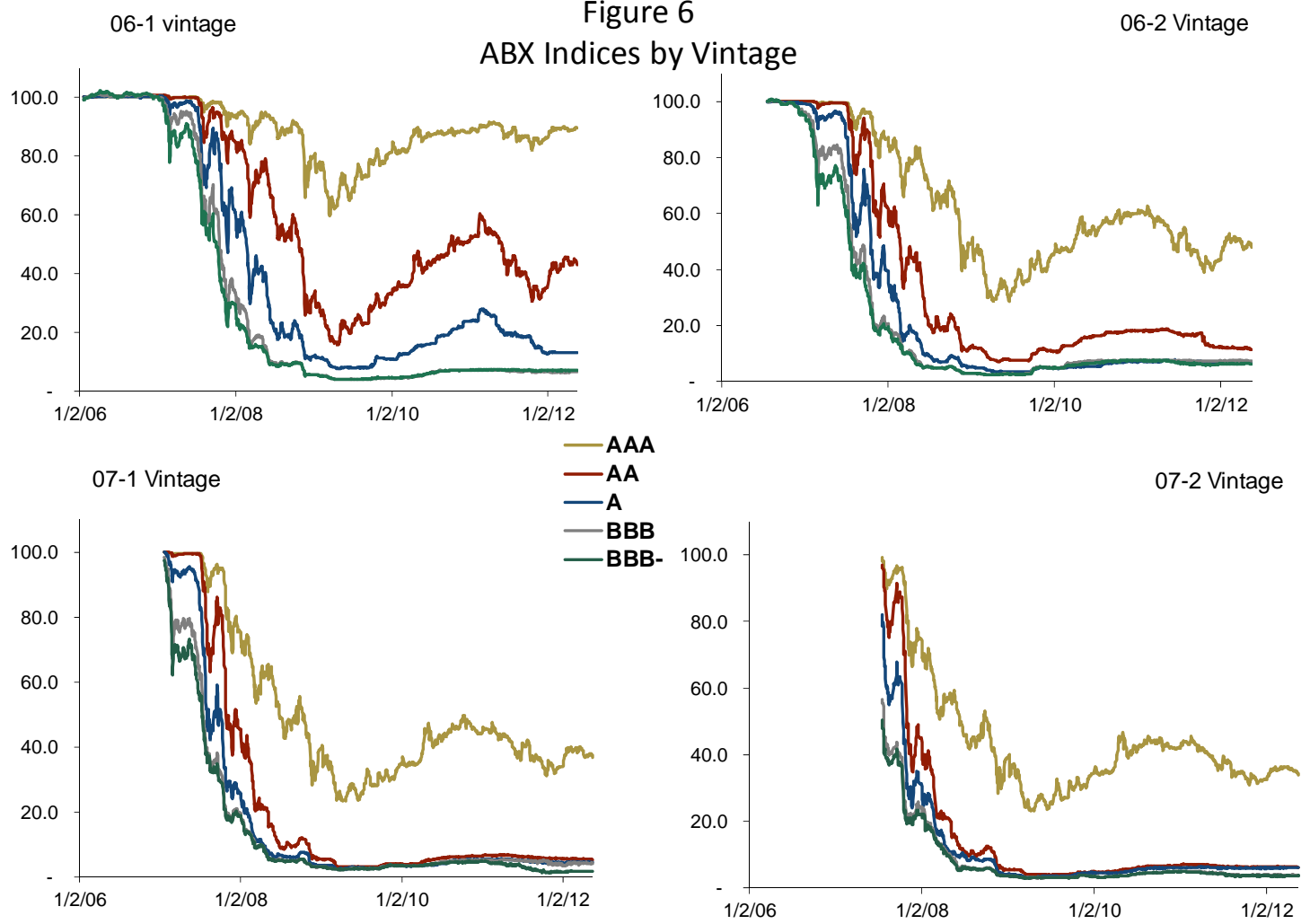
Sources: Mortgage Bankers Association, Haver

Figure 5
 U.S. Mortgage Originations by Type
 2001 through 2009



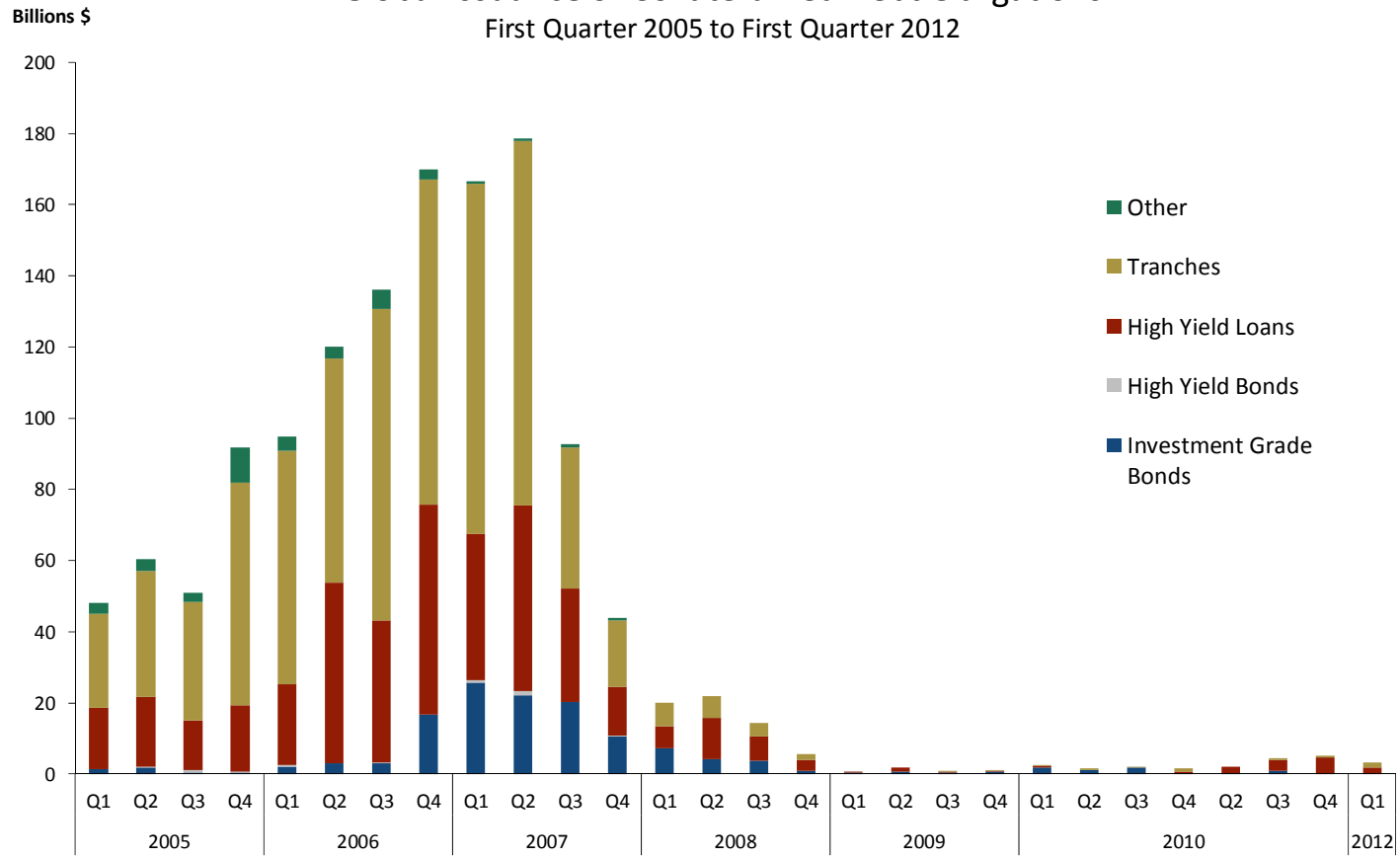
Source: Inside Mortgage Finance

Figure 6
ABX Indices by Vintage



Sources: Markit Group Limited/Haver Analytics

Figure 7
Global Issuance of Collateralized Debt Obligations
 First Quarter 2005 to First Quarter 2012



Source: SIFMA

Figure 8
Housing Prices

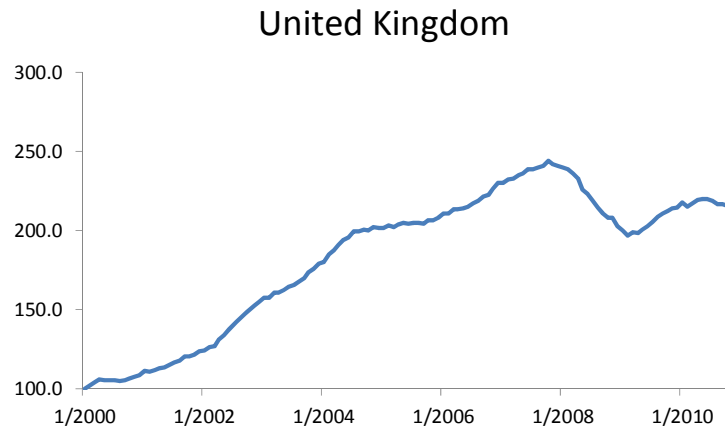
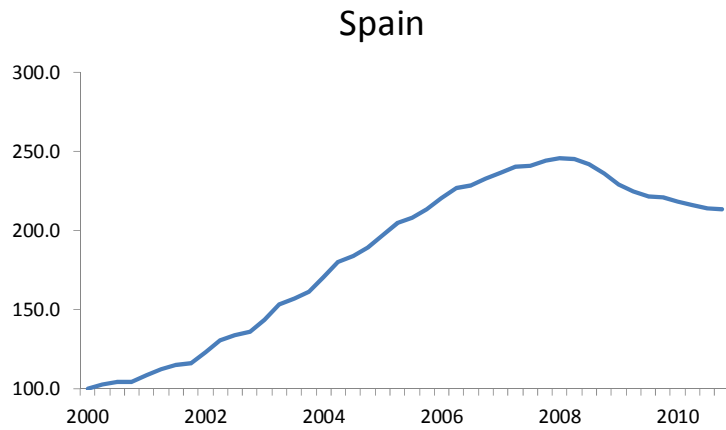
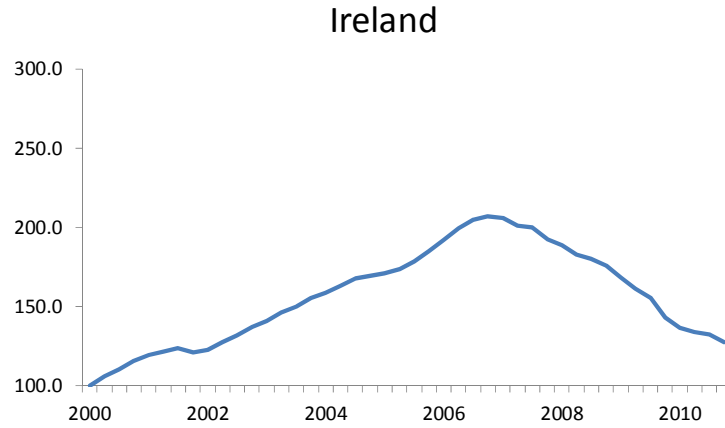
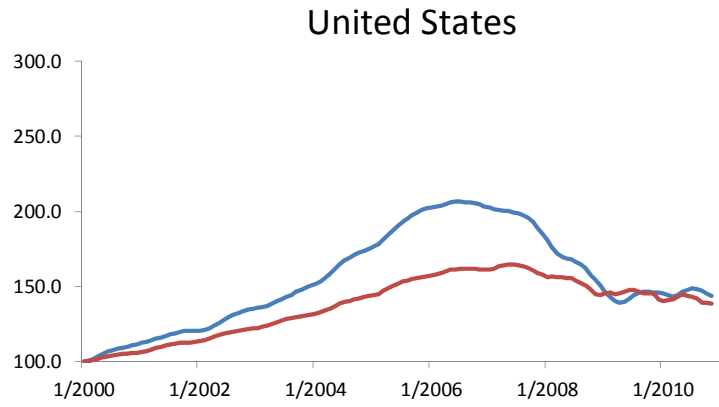


Figure 9
Housing Prices

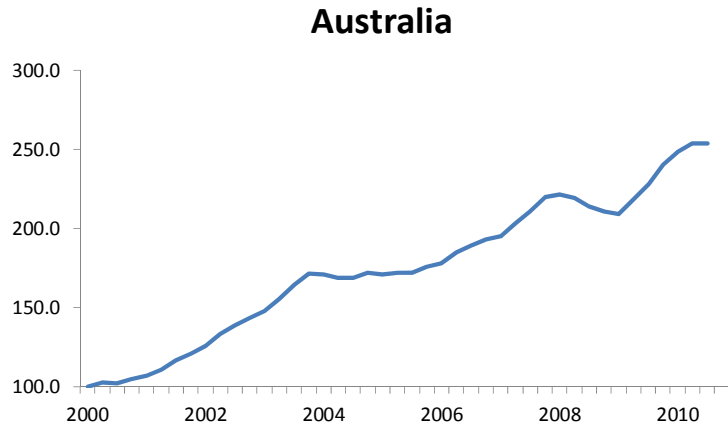
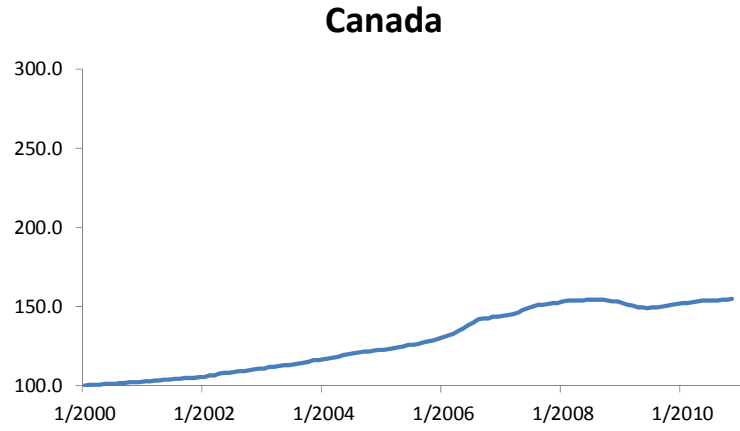
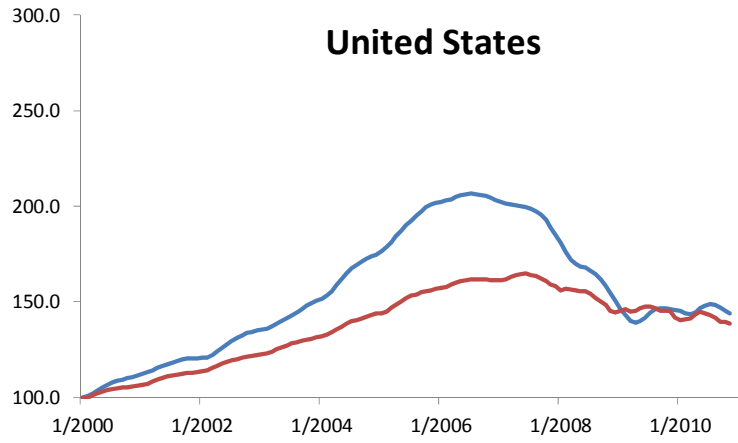
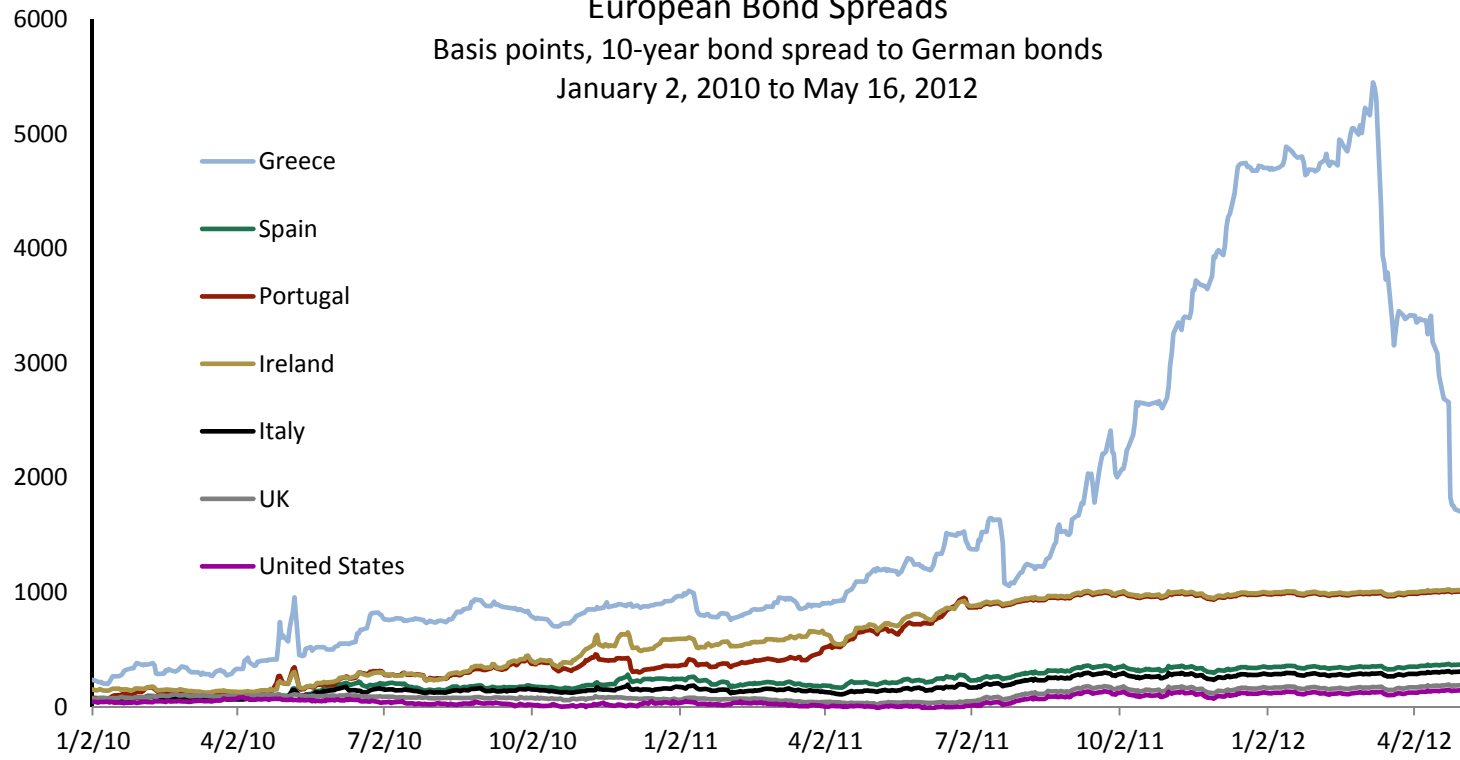
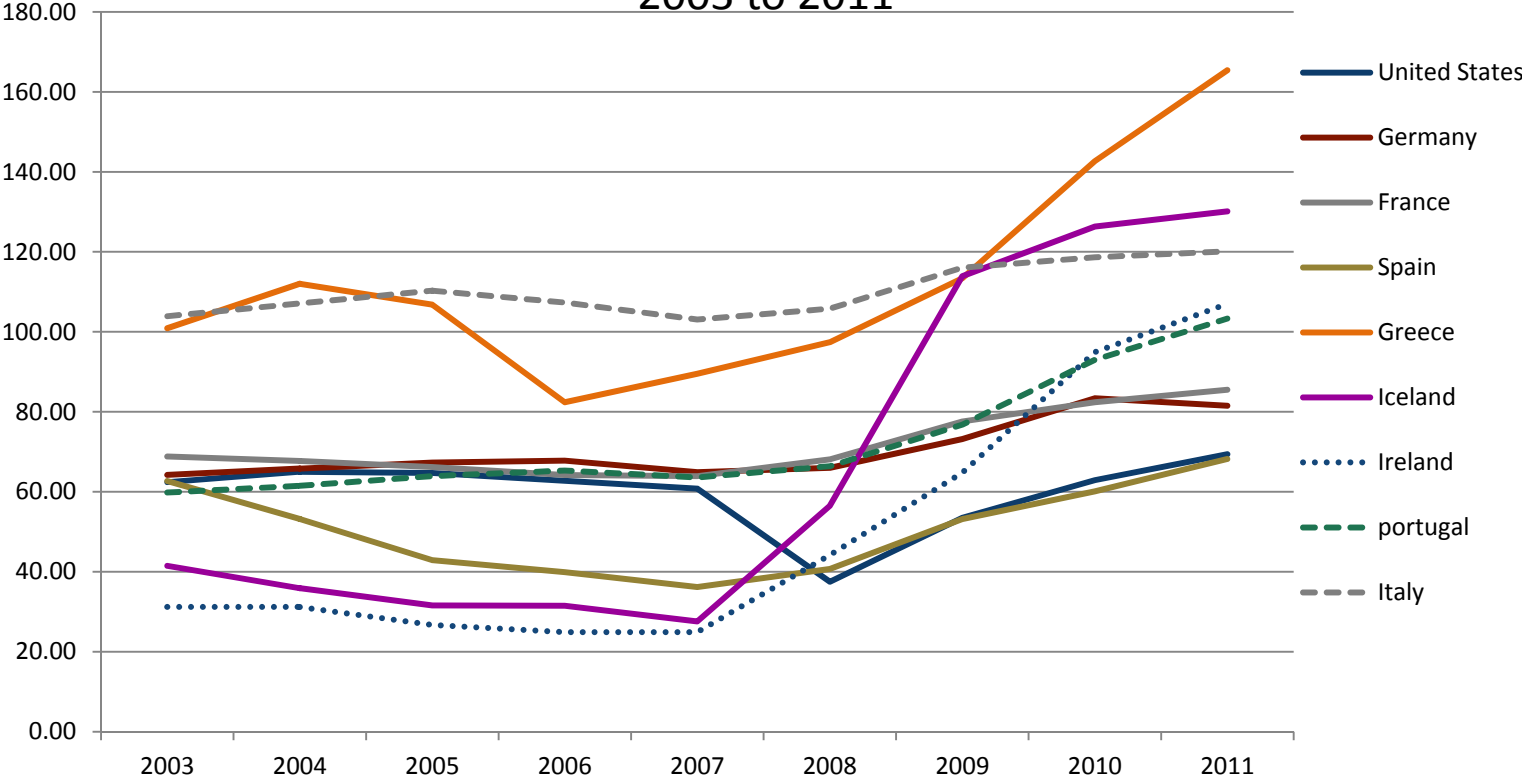


Figure 10
European Bond Spreads
Basis points, 10-year bond spread to German bonds
January 2, 2010 to May 16, 2012



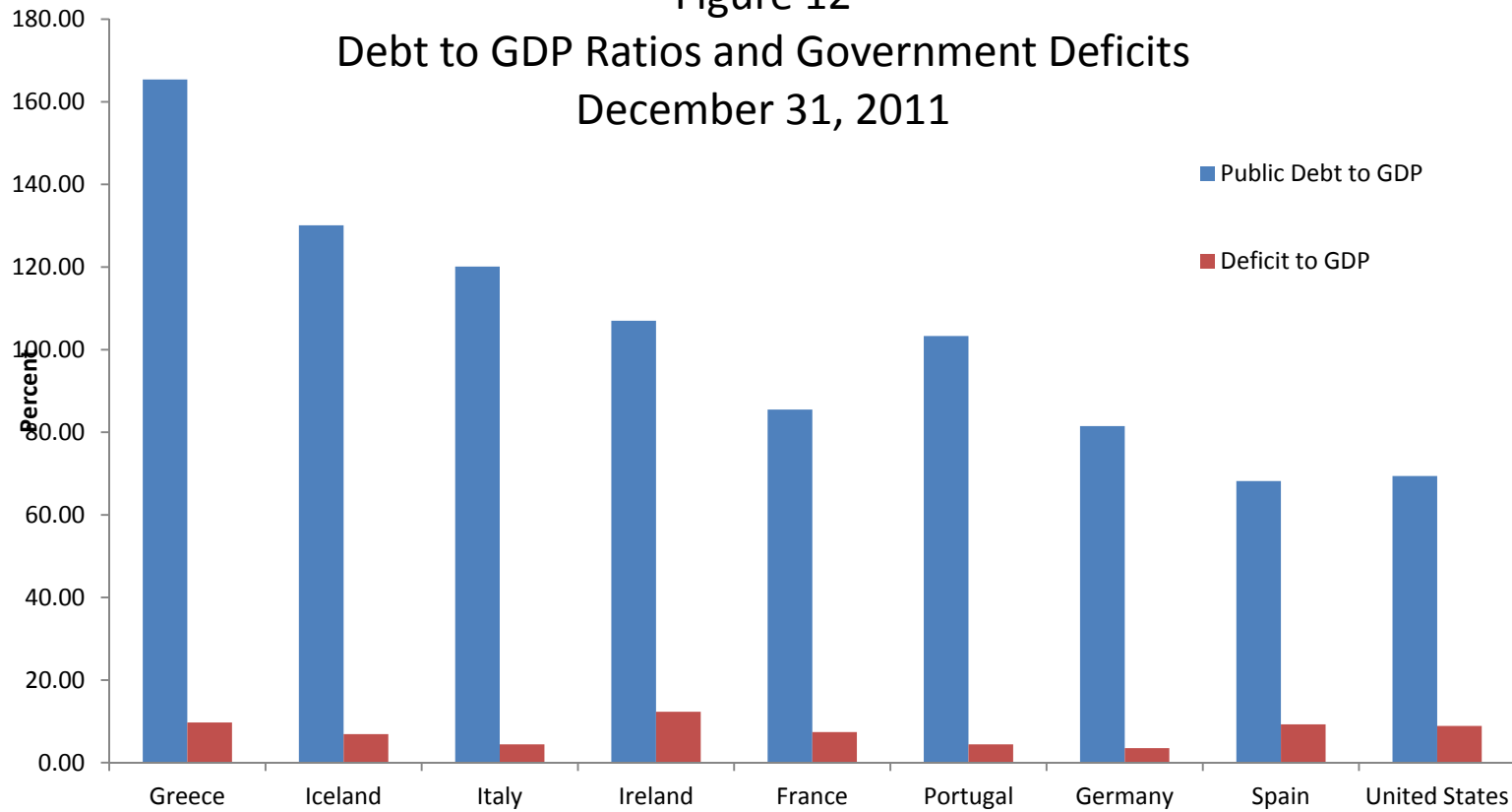
Source: Bloomberg

Figure 11
 Ratio of Debt to Gross Domestic Product
 2003 to 2011



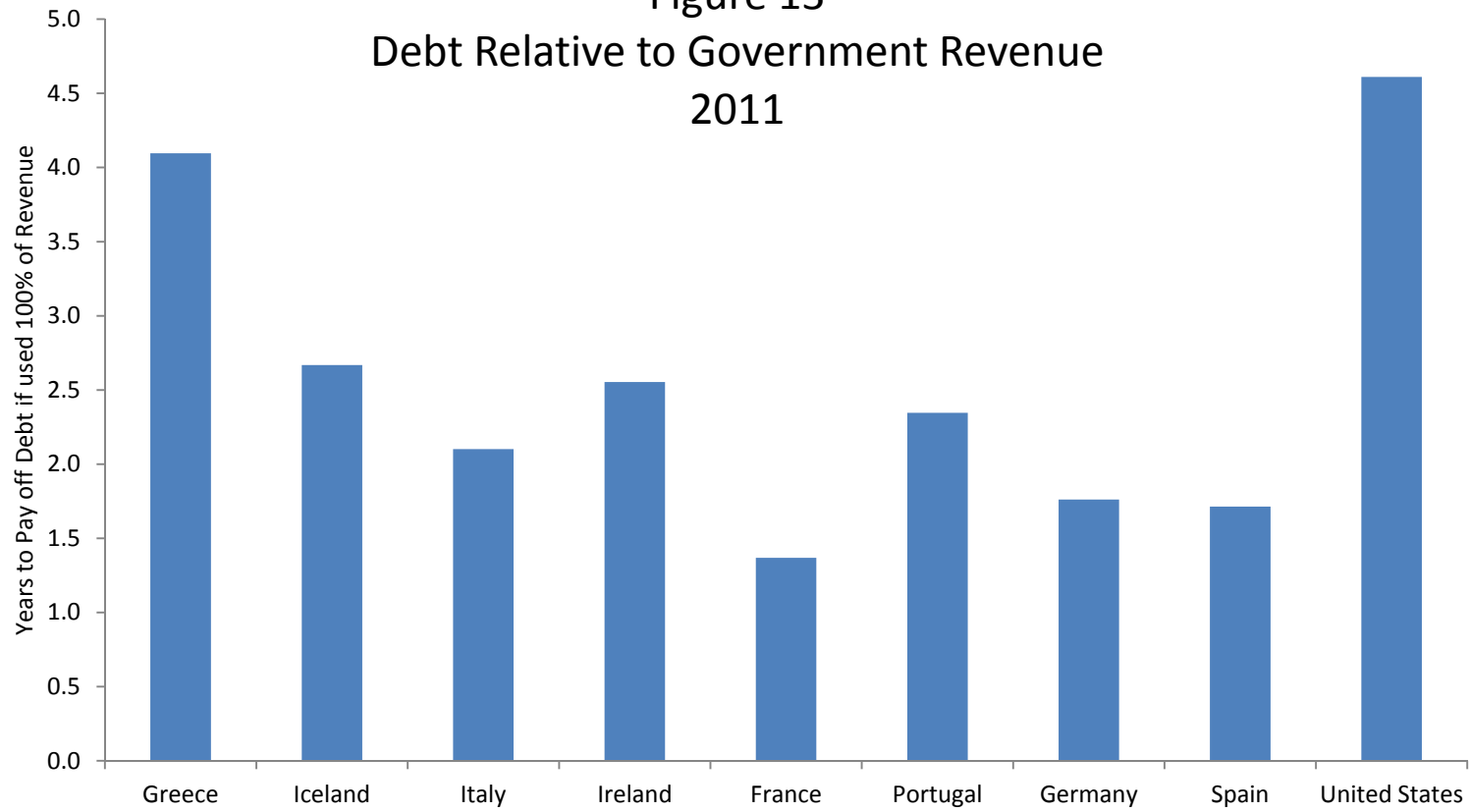
Source: CIA World Factbook, estimates

Figure 12
Debt to GDP Ratios and Government Deficits
December 31, 2011



Source: CIA World Factbook, estimates

Figure 13
Debt Relative to Government Revenue
2011



Source: CIA World Factbook, estimates

Figure 14
Estimate of TARGET2 Balances
December 31, 2011

