From Hubris to Nemesis: Irish Banks, Behavioral Biases, and the Crisis

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Abstract

The collapse of the Irish economy, still ongoing after five years, has its roots firmly in the banking sector. Lax risk management, aided by poor board oversight and behavioral biases among senior executives, is now viewed as one of the primary causes of the over-lending during the ‘Celtic Tiger’ years which fueled the excessive growth in credit and subsequent banking implosion, eventually resulting in all Irish banks ending in state ownership. We approach the causes of the Irish banking sector collapse from a behavioural perspective of the role of Boards of Directors in bank risk management, and then proceed to explore the likely presence of behavioral biases among senior executives in Irish banks. The Irish context provides a pertinent case study of what can happen when hubris and associated behavioural biases take control of a bank’s risk management strategy.

**JEL**: G01; G02; G21; G32

**Keywords**: behavioral finance; risk management; banking; Ireland; Board of Directors; financial crisis
From Hubris to Nemesis: Irish Banks, Behavioral Biases, and the Crisis

The collapse of the Irish economy, still ongoing after five years, has its roots firmly in the banking sector. Although that is not to say that the banking sector alone caused the collapse. It is clear that there were major problems elsewhere in the economy, but a credit fuelled boom led by the banks allowed these problems to be masked and ignored. It is arguable that there were at least three ongoing problems – productivity, banking and economic structure which all fed off each other\(^1\). Prior then to a discussion of the banks it is worth examining the extent and nature of the Irish banking and economic collapse.

1. The Irish Banking Collapse

Ireland had experienced a significant catch-up over the decades since it joined the EU (then EC) in 1972. By the end of 1999 Ireland on many metrics of economic development had not just caught up with but surpassed EU averages of economic development. Up to the late 1990s strong economic growth was fuelled by this catchup process, by high productivity, favorable demographics including rapid migration-led population growth, and wage moderation\(^2\)-\(^3\).

By early 2001, this catch-up process being completed the economy had begun to grow in other, ultimately less benign, ways. In tandem with the dot-com boom Ireland also was hit by the collapse of some significant homegrown companies\(^4\)-\(^5\). By the end of 2001, Ireland was reliant on direct fiscal stimulus to sustain economic activity, with General Government Total Expenditure rising from 30.54 percent of GDP in 2000 to 32.45 percent of GDP in 2001. By the beginning of 2002 the General Government Structural balance had moved from a 1.7 percent of GDP surplus in 2000 to a deficit of 1.8 percent in 2001, and has remained in deficit since. Despite a recovery in 2002-2003, this pump-priming failed to sustain an exports-led recovery leading to growing pressures on Government to continue to stimulate domestic investment and demand. A wide range of tax reliefs for property related investment were unveiled in the 2002-4 budgets. This took place against a background of a falling interest rate environment.

Cheap credit plus tax incentives plus a historic perspective of property as a good investment led to a credit-funded property boom. By 2006, an average Irish assets portfolio, for those participating in investment markets, was over 55 percent geared toward capital gains on direct property holdings\(^6\). In January 2003, total credit extended to households stood at €57 billion which by May 2008 stood at €157 billion. Mortgage lending increased from €44 billion to €127 billion over that period. The ratio of private sector deposits to private sector outstanding credit within the domestic banking sector fell from 70.01 percent in January 2003 to 43.67 percent in November 2008. By 2007, average house prices were almost 2.7 times 2000 levels, while investment in buildings rose from around 5 percent of GDP in 1995 to a peak of over 14 percent in 2008. Some estimates of tax take from the bubble suggested that up to 18 percent of total tax was dependent on the property boom. These fiscal problems are ongoing and a good discussion of the present situation can be found in a recent paper by Karl Whelan\(^7\).
The Irish banks having extended significant credit to the housing and construction industry were seriously overexposed to the dynamics of the property market. The global credit crunch which had been emerging since 2007 caused them to become increasingly illiquid. The popping of the credit-led housing bubble combined with an increasing reliance on overseas funding (itself at shorter and shorter maturities) left them both illiquid and insolvent. Table 1 and Table 2 show how the banks had in aggregate become de facto property plays. The aggregate level of bank lending to the property sector of 62 percent in 2008 also masked large variations across the banks. Two banks in particular, Anglo Irish Bank and Irish Nationwide Building Society (technically a mutual but run as a bank), were almost wholly property related. The Irish bank's dependence on property had been noted in the markets. From 2006 onward selloff of foreign holdings of Irish bank shares had been accelerating, and this rapidly escalated in early 2007. Figure 1 shows the dramatic collapse in the shares of the three largest banks, AIB, Anglo and Bank of Ireland. Ongoing as the share price fell was a drip-feed of revelations and realization that the banks were going to exhaust their capital from losses on large scale commercial property lending alone and would require additional capital, and this was only realistically available from the state. Banks became increasingly reliant on ECB funding, as shown in Figure 2.

In late September 2008 the government, extended a blanket guarantee on not only all deposits but on all senior and some junior debt of the six main banks. Indeed, a guarantee was given not only on existing but on any future bonds to be issued. This was at the time, and has subsequently been, severely criticized. Extensive discussions of the decision are contained in Honohan8-9 and Kelly10. Despite this it became clear over the winter of 2008 that even further action was required. First, Anglo Irish Bank was nationalized, in early 2009, and some limited recapitalization, in the form of preference shares, was placed into the two larger banks: Allied Irish Bank and Bank of Ireland. Second, the government proceeded with the setting up of a ‘bad bank’, the National Asset Management Agency (NAMA). The essence of the approach was to strip from guaranteed banks the entirety of their development and land loans at a discount and to pay for these with government bonds issued by NAMA. This amounted to the state paying €31 billion to take €70 billion of loans off the books of the banks. The embedded losses and recapitalization of the banks amounted to a sum of €64 billion more; a total direct cost equivalent to two-thirds of 2009 Irish GDP.

2. Poor Risk Management Oversight by Board of Directors in Irish Banks?

How did these catastrophic events come to pass? How did the risk management processes established in the Irish banks not prevent or slow down such a fraught move to specialization in property?

In this section we explore the role of Boards in their control and oversight function of risk and particularly highlight some of the behavioural perspectives on optimal Board composition. This research is applied in an Irish context to gain understanding of why directors in Irish banks apparently failed so dramatically at their risk management oversight function.

Existing studies of risk governance by Board of Directors generally ignore this role of behavioral characteristics of directors, both individually and as a group, despite
significant recent evidence that these behavioral characteristics can play an important part in determining firm risk attitudes and carrying out the risk oversight function.

The board of directors is considered to be the highest-level of control mechanism in an organization as they possess the ultimate power to compensate the decisions that are made by top management. Driven by this, modern risk governance research focuses to a significant extent on the role of the Board of Directors in monitoring (and optimizing) firm risk taking behaviour.

A number of prior findings suggest that Board composition can influence the effectiveness of the oversight role. This research has primarily focused on the size of the Board and the presence of independent directors. Thus, Ghosh, Marra and Moon, using a US dataset, find a decrease in earnings management, as measured by discretionary accrual levels, as board size increases. Coles, Daniel and Naveen argue that small boards with a majority of independent directors are effective at monitoring, while large boards provide a valuable advisory function to top management. Cheng find a reduced level of acquisitions, amongst a range of other reduced risky activities, for large board sizes and posit the explanation that this is due to the increased difficulty of reaching consensus with large numbers of directors.

Independent directors are linked to the responsibility for monitoring managers and thereby reducing agency costs that arise from the separation of ownership and control. Osman finds that independent directors are capable of identifying and restraining earnings management. Jaggi, Leung and Gul find that independent boards provide effective monitoring of earnings management practices. Kolasinski and Li find reduced acquisitiveness related to the increased presence of independent directors.

While Board size and the impact of independent directors has dominated the prior research, relatively understudied until recently has been the influence of director behavioral characteristics. Partially the lack of research in this area is due to the difficulty of measuring such characteristics. One approach that has been adopted is to examine the behavioral implications of the demographics of gender and age on the Boards’ monitoring effectiveness. Another approach is to examine the influence of social interconnectedness on Board performance. We now review these approaches.

Gender differences in attitude towards risk and risk behaviour are well-documented in the psychology and decision-making literatures. Eckel and Grossman, in a comprehensive review, summarize the findings in this area as showing women to be more risk averse across a wide variety of activities. Explanations for the heightened risk aversion amongst females include sociobiological: i.e. that risk aversion is beneficial during child rearing; and neurobiological: females have a lower level of testosterone which is linked with risk-taking through reduced fear levels. Age and risk attitudes are less researched, but the existing findings suggest that younger people are more overconfident compared to older people.

In terms of gender and Board of Directors, a comprehensive review of the literature on the influence of female directors by Terjesen, Sealy and Singh provides significant evidence of the impact on corporate governance. Female directors are more active compared to male directors; attending more board meetings and being more likely to sit on monitoring committees. Krishnan and Parsons compared the earnings quality in companies with higher percentages of female directors to those with fewer female directors on their boards and find that companies with more female senior managers are more profitable. Finally, higher proportions of female directors are associated with
reduced acquisitiveness\textsuperscript{26}. With regard to age, Yim\textsuperscript{27} finds reduced risk taking, as measured by acquisitiveness, in firms with an older CEO.

Missing from these studies of Board of Director demographics and the relationship with oversight and control has been a focus on firm risk management measures. One recent study which does partially address this from a banking perspective is Berger, Kick and Schaeck\textsuperscript{28}, which utilises a comprehensive dataset of German bank directors. The background is that German banks have, in recent years, faced considerable pressure to appoint more diverse Boards; particularly Boards that reflect the gender makeup of broader society. The authors find that the increased presence of female directors influences organisational risky decision making with female directors being associated with greater profit variability in German banks. This is a surprising finding given the prior literature reviewed above which suggests that female directors play more of a role than male directors in overseeing the risk management processes of the firm. However, in subsequent tests they show that this appears to be driven by the younger age and thus relative inexperience of the female directors. Apparently the pressure to rapidly appoint female directors in German banks, and the limited pool of suitably experienced candidates, has led to appointing female directors at a younger average age than that at which male directors are usually appointed. This study points to a useful interaction between age and gender in terms of Board composition.

Thus far we have covered the size of Boards, the number of independent directors, and the behavioural demographic measures of gender and age. These all appear to play a role in the risk management function of the Board of Directors. The aforementioned Berger, Kick and Schaeck study suggests that these principles are applicable to understanding the situation of banks. One final behavioural issue to consider is the role of social interconnectedness in the risk management oversight process. Specifically, recent research has examined the effectiveness of directors when they have particular prior experiences and when they sit on multiple Boards, often when there is a connection between the multiple firms on whose Boards they sit. This appears to be strongly related to the types of risky activities a firm engages in, and also the extent to which a Board is willing to exercise their control duties.

With regard to the experience of directors, Dionne and Triki\textsuperscript{29} show that firms with high numbers of directors with financial expertise, i.e. having worked in a finance career, is related to increased levels of hedging. Burak Guner, Malmendier, and Tate\textsuperscript{30}, however, find that the type of financial expertise that directors have matters; they find, for a sample of US non-financial firms, that when commercial bankers are appointed to a Board there is increased levels of debt issuance and other financing activities likely to increase the fees accruing to commercial and investment banks. In general, there is an increase in risk taking.

These findings encourage Minton, Taillard, and Williamson\textsuperscript{31} to investigate the influence of financial expertise in directors of US banks over the period 2003-2008 on bank risk taking. They find that increased levels of directors with financial expertise is associated with higher Tobin’s Q, a standard measure of the riskiness of firms. Thus, the current evidence suggests that the presence of financial expertise among directors is actually associated with increased risk taking (perhaps, contrary to expectations). This is confirmed in Hagendorff and Keasey\textsuperscript{32} which finds, for a sample of European banks, that the banking experience of directors does not influence the ability to effectively monitor the activities of bank managers. This has important implications in terms of the risk management function of bank Boards of Directors, as a default presumption that
increasing the depth of banking knowledge as a basis for director appointments may not achieve a desired outcome of improving risk oversight.

A final behavioral characteristic to consider, when examining Board aggregate attitudes to risk management, is that of Boards where directors occupy multiple directorships across related companies. A recent paper by Shropshire\(^{32}\) shows how director experience of multiple companies leads to a diffusion of knowledge across the firms with which directors are linked. This is generally viewed as a positive outcome, and one of the usual criteria considered when appointing directors. However, there are some negative effects of a Board having directors with multiple other directorships; Field, Lowry, and Mkrtchyan\(^{34}\) find (using Forbes 500 firms) that 'busy directors' with multiple directorships are less effective at their monitoring role.

Social interlinkages between directors has also been a topic of recent interest. For example, Hwang and Kim\(^{35}\) find that while 87 percent of large US firm’s Boards are notionally independent, but when you strip out financial and familial linkages it is actually only 67 percent of Boards which are truly independent. This is shown to have implications for governance, such as higher compensation for top management in Boards with strong social interlinkages. In general, the presence of director ‘interlockages’ (where firms share one or more directors on their Boards) is significantly associated with poor corporate governance\(^{36}\), suggesting that the monitoring and oversight of tasks such as risk management is not being effectively conducted by these interlocked directors.

When we apply these findings in an Irish context we see a confluence of characteristics of Irish bank’s Boards that can explain some of the apparent lax oversight of risk management procedures. A key source for this analysis is a 2010\(^{37}\) report carried out for TASC, an Irish policy research group.

Starting with the Board size and independent director information. The average Board size for the four main Irish banks (AIB, Bank of Ireland, PermanentTSB, and Anglo Irish Bank) in 2007 was 14 directors, compared with a 2011 average Board size for FTSE100 companies (FTSE100 data sourced from Thomson One Banker and used as a reasonable external comparison) of 10.6. This marginally suggests that Irish bank Boards were primarily intended for their advisory capacity rather than their monitoring capacity, given the lower monitoring rate of large Boards. The proportion of independent directors for Irish banks was quite similar at 63% to the proportion of independent directors in FTSE100 companies in 2011 (58%).

The female director figures are most striking. Three of the four banks had just two female directors in 2007, while Bank of Ireland fared even worse with just one female director. Given the link between monitoring and female directors, and indeed from a social justice perspective, these numbers can be negatively construed. The Central Bank of Ireland is clearly concerned with this, as in late 2013 they launched plans to ensure a minimum of 40 percent female directors in Irish financial institutions.

A final behavioural characteristic of Irish bank Boards is the issue of social connectedness and director interlockages. The TASC report\(^{37}\) concentrates on this issue. This report concentrates on the 40 largest companies in Ireland and notes a ‘golden circle’ of 39 directors with multiple linkages across these organisations. Their overall summary is that the golden circle is "made up largely of men who are relatively near to each other in age, live in close geographical proximity and are likely to have attended the same schools and university"\(^{37}(p.24)\). Through a social network mapping exercise, the Irish banks are shown to be at the heart of this golden circle. The most extreme example is Anglo Irish Bank.
which shared directors with 10 of the other 39 institutions, but the other banks were not far behind (Bank of Ireland – 8; PermanentTSB – 8; AIB – 7).

Thus, Anglo Irish Bank and one of their major borrowers, property development company McInerney Holdings, shared a director. Similarly, AIB and one of their major borrowers, the media company Independent News and Media, also shared a director. Given the research previously noted from Devos, Prevost, and Puthenpuracka\textsuperscript{36} which found that director interlockages are significantly associated with poor corporate governance, this suggests a potential contribution towards poor oversight of risk management in the banks. A final contributory factor is the extent to which Irish bank directors were extremely ‘busy’; the TASC report finds that 24 (43 percent) of the bank directors in 2007 held a total of 63 directorships in the top 40 institutions in Ireland and also an additional 270 directorships in smaller organisations.

We have highlighted a number of characteristics of Irish bank Boards that international research suggests leads to poor governance and oversight. A somewhat satisfying note is that there is some evidence that authorities like the Central Bank of Ireland are becoming increasing aware of the importance of diversified Boards in terms of monitoring activities and risk-taking. In the next section we delve further into the nature of behavioral influences on financial decision making, by examining specific behavioral biases that are likely to affect risk management attitudes with an application to Irish banks.

3. Biases and Heuristics in the Crash

The previous section has addressed the overall behavioral characteristics of Boards of Directors and the influence of these characteristics on issues such as risk monitoring and the oversight of the risk management processes. This section builds on this by examining the specific behavioral biases that are likely to influence executive and director decision-making and lead to non-optimal decisions, such as poor oversight of risk management processes.

Behavioral biases and heuristics are widely noted to apply in financial decision making, and understanding the impact of these biases are a core part of the behavioral finance research agenda (see Hirshleifer\textsuperscript{38} for a comprehensive overview of the area). While the area was originally confined to an understanding of how uninformed investors might make poor investment decisions, there is voluminous support that financial decision making in companies is similarly influenced by the same biases including biases in approaches to risk management (a recent authoritative survey of the application to corporate finance is Baker and Wurgler\textsuperscript{39}).

The numerous noted behavioural biases and heuristics draw on the fields of cognitive, emotion, and social psychology, and a comprehensive discussion is beyond the scope of this paper. Helpfully, Lunn\textsuperscript{40} collapses the biases applicable to the financial crisis to seven main categories and this provides us with a useful starting point for our analysis of the Irish banks. See TABLE 3 for a summary of these biases.

At a national or aggregate level in Ireland all these biases were demonstrably present. There was a general consensus, for example, in the national elections of 2002 and 2007 that the economic circumstances would continue to be benign; Whelan\textsuperscript{3} demonstrates that macroeconomic forecasts for Ireland were consistently overoptimistic; central bank and stability reports showed no major concern with the housing bubble; there was no
willingness to challenge the consensus and change economic course; the short-term liquidity issues of the banks in 2008 dominated the long-term questions on solvency; banks and policy makers continued to pour money into manifestly insolvent banks and banks likewise poured money into insolvent borrowers rather than take the embedded losses.

At the level of the banks we can see these issues also playing out. The degree of social interconnectedness between Irish corporate Boards, noted in the previous section, is a prime cause of groupthink and herding, with groupthink being highlighted as a partial driver of the collapse of a similar bank in the UK at the beginning of the financial crisis. Rost and Osterloh note that an overreliance on financial experts on the boards of financial companies may have exacerbated failures in these companies in the crisis. Irish bank boards were and remain heavily dominated by financial experts, in particular accountants. Muller-Kahle and Lewellen note that financial companies in the USA that engaged in riskier lending tended to be busier (in terms of overlapping board memberships) and to be less gender diverse. Irish bank boards, as we have seen are exceptionally non-gender diverse.

Confirmatory bias was a key issue when seeking to understand the Irish banks seeming oblivion to the risks they were taking. In this context we see that a degree of ‘overconfidence being learned’ is evident. Banks accumulated property loans as property lending had historically allowed high profits to be returned. From analysis of the Central Bank of Ireland data, the Euro Area Bank Lending survey, we see that banks expressed competition from banks and non-banks as being a key source of pushing lending. A review of the 2007 Anglo Irish Bank annual report shows a very myopic perspective, with a large part of the CEO and Chairperson’s reports devoted to discussion of recent success. In this context also overconfidence can be seen. The 2007 report does acknowledge the ‘recent dislocation’ in credit markets but there is no sense that there is a looming disaster. Honohan stresses the importance of poor risk stressing, with overconfidence in both the models and the inputs being a major problem. Again looking at the 2007 reports of the main Irish banks we see a great confidence – Anglo expect to maintain a 15 percent EPS growth, Bank of Ireland were ‘confident’ of emerging stronger, Allied Irish had ‘strength to meet the challenges’. All the Irish bank reports for 2007 display, in retrospect, an insouciance and overconfidence.

A recent case study of an (unnamed) Irish bank CEO elaborates on the presence of overconfidence amongst Irish bankers. The authors analyse the CEO’s statements to shareholders in the bank’s annual reports over 10 years and find that not only did the CEO display more hubris than is found in previous studies but this was increasing over time, peaking in 2008 just as the crisis intensified. Only 2 percent of sentences used contained any bad news, and in general good news was attributed to the CEO’s own actions while bad news was blamed on external conditions: suggestive of strong self-attribution bias which is one of the main causes of overconfidence. This case study illustrates the real nature of behavioral biases affecting senior executives in Irish banking.

The banks also display a weddedness to continuing on an existing path. This ambiguity aversion is not so much an overfamiliarity perhaps as a pure aversion to change. Lunn provides a number of quotes from 2005 and 2006 from banks showing a high degree of extrapolation bias. A November 2007 Irish Times survey of the property market (conducted amongst property market players) demonstrated no concerns. Mercille notes the very close relationships between the media and the financial system in Ireland, drawing on work by Fahy, O’Brien, and Poti, thus aiding confirmation bias amongst key
decision makers and allowing overconfidence to permeate. Extrapolation and overconfidence are two sides of the same coin, and also in this context feeds into ambiguity aversion. Thus the banks confirmed to Honohan\(^9\) that in 2008 they had no concerns with their forecasts, and no concern about their business model.

The endowment effect is the well-known tendency to ride losers in the hope that they will eventually come good. Again Anglo Irish Bank provides an excellent case study here. In this case the bank in 2007-8 provided non-recourse loans totaling €450 million to 10 borrowers. This lending was then, it is alleged, used by these borrowers to purchase shares in the bank, with a view to supporting the share price (a much larger borrower having already taken a large position in the bank indirectly via contracts for differences). This group were called the 'Maple 10' in internal bank documentation\(^47\). This is a classic case of riding losses downward. Anglo was not the only bank.

Throughout the last number of years Irish banks have also been rolling up interest on loans. Eventually these loans were in the most part transferred to the state. Rolling up interest unpaid, as is happening now in the domestic and investment residential mortgage market, is a hallmark of being unwilling to crystallize losses. Indeed the whole creation of the National Asset Management Agency, NAMA, which took from the banks some €70 billion of loans in return for €31 billion in government bonds can be seen as a partial response to this bias. Combined with the 2008 bank liability guarantee discussed in Section 1, which emerged as a direct result of banks and the states unwillingness to face the consequences of embedded losses, this provides a classic case of this bias in action.

It is hard to imagine that in the presence of these biases on the part of senior executives, especially when coupled with the aforementioned poor Board structure of Irish banks, that risk management strategies were being stringently overseen and scrutinised.

A final part missing from this analysis is the lack of awareness on the part of the Irish bankers as to how behavioural biases might cause their major borrowers to act irrationally before and after the advent of the financial crisis. This is, sadly, an aspect of lending often excluded from the learning that bankers undertake before commencing their careers. A lack of understanding of the biases of bank customers can lead to a bank taking risks that are not actively managed - the standard bank risk management approaches might not be designed to analyse some behavioural risks of borrowers.

The main biases include representativeness\(^48\): relying on small data samples to extrapolate continuing price rises; home bias\(^49\): displaying excessive confidence and optimism about the home market; and herding\(^50\): the tendency for the thoughts of a socially interconnected group to converge.

While we can’t directly observe the presence of these behavioural biases, we can imply their presence based on outcomes. Particularly these biases become evident when we examine the loans of major property developer borrowers which formed the bulk of the non-performing loans transferred to NAMA. The representativeness / excessive extrapolation problem is evident from the large proportion of property developer non-performing loans that emerged after the financial crisis hit – 83 percent of these nominal €70 billion of loans were non-performing by early 2013\(^51\), many with ruinous personal asset guarantees to cover the loan amounts\(^52\). The home bias and herding is evident from the geographic breakdown of these loans – 90 percent were in Ireland and the UK; 36 percent in Dublin alone; and 21 percent in London\(^53\). Thus, even when the developers moved abroad they seemingly moved abroad in packs, often chasing the same assets.
It seems reasonable to suggest that the Irish banks should have been aware, at a minimum, of such basic borrower behavioural biases and incorporated monitoring of the related risks in their risk management models.

4. Some Concluding Thoughts

We have approached risk management from a top-level behavioral perspective that offers some novel insights into the causes of the Irish banking crisis. We argue, based on international evidence, that Irish bank Boards of Directors were not sufficiently diversified to be able to effectively oversee and monitor the risk management strategies adopted by banks, and that senior decision makers in Irish banks were subject to considerable behavioral biases affecting their approach to risk taking. Some comfort can be taken from the recent decision of the Central Bank of Ireland to attempt a fix of the lack of diversification among directors in Irish financial institutions, but there remains a need for policy makers to develop a deeper insight into the dynamic behavioral drivers that can cause future deviations from optimal risk management strategies.
References


Table 1: Aggregate Balance Sheet of Irish Credit Institutions

<table>
<thead>
<tr>
<th></th>
<th>1999</th>
<th>2008</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foreign Bank Deposits</td>
<td>19.80%</td>
<td>29.10%</td>
</tr>
<tr>
<td>Irish Bank Deposits</td>
<td>8.20%</td>
<td>17.00%</td>
</tr>
<tr>
<td>Foreign Customer Deposits</td>
<td>5.50%</td>
<td>4.60%</td>
</tr>
<tr>
<td>Irish Customer Deposits</td>
<td>44.80%</td>
<td>22.20%</td>
</tr>
<tr>
<td>Bonds - Non Irish</td>
<td>0.10%</td>
<td>8.50%</td>
</tr>
<tr>
<td>Bonds – Irish</td>
<td>0.30%</td>
<td>3.70%</td>
</tr>
<tr>
<td>Other Liabilities</td>
<td>12.30%</td>
<td>11.10%</td>
</tr>
<tr>
<td>Capital</td>
<td>8.90%</td>
<td>3.80%</td>
</tr>
</tbody>
</table>

Source: Central bank of Ireland

Table 2: Sectoral Distribution of Credit in Irish Credit Institutions

<table>
<thead>
<tr>
<th></th>
<th>1999</th>
<th>2008</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction</td>
<td>2.50%</td>
<td>5.20%</td>
</tr>
<tr>
<td>Financial Intermediation</td>
<td>31.70%</td>
<td>19.00%</td>
</tr>
<tr>
<td>Real Estate</td>
<td>5.50%</td>
<td>21.20%</td>
</tr>
<tr>
<td>Mortgages</td>
<td>25.40%</td>
<td>34.80%</td>
</tr>
<tr>
<td>Other Personal</td>
<td>7.10%</td>
<td>5.50%</td>
</tr>
<tr>
<td>Wholesale/Retail Trade</td>
<td>3.90%</td>
<td>3.30%</td>
</tr>
<tr>
<td>Other Business</td>
<td>23.90%</td>
<td>10.90%</td>
</tr>
</tbody>
</table>

Source: Central bank of Ireland
Table 3: Main Behavioural Biases

<table>
<thead>
<tr>
<th>Bias</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Behavioural convergence (Bandwagon effects, herding, information cascades, conformity, groupthink)</td>
<td>The tendency to copy similar decisions made by others, or conform to majority views</td>
</tr>
<tr>
<td>Extrapolation bias (Projection bias, overinference)</td>
<td>When predicting future outcomes based on the past, placing more weight on the most recent events</td>
</tr>
<tr>
<td>Confirmation bias (Myside bias)</td>
<td>The inclination to place greater weight on and actively to seek information consistent with prior beliefs</td>
</tr>
<tr>
<td>Overconfidence bias (Over-optimism bias, miscalibration)</td>
<td>A tendency to predict outcomes too positively and to overestimate the accuracy of predictions</td>
</tr>
<tr>
<td>Ambiguity aversion (Aversion to Knightian uncertainty, competence hypothesis)</td>
<td>Greater willingness to take risk in contexts where people can quantify the risk or feel competent to assess the risk</td>
</tr>
<tr>
<td>Time inconsistency (Present bias, hyperbolic discounting)</td>
<td>Systematic changes in individual preferences over time, whereby more immediate rewards become disproportionately more attractive</td>
</tr>
<tr>
<td>Loss/gain asymmetry (Loss aversion, endowment effect, Prospect theory)</td>
<td>Giving greater weight to losses than to equivalent gains, including willingness to take risks to avoid or recover loss</td>
</tr>
</tbody>
</table>

Source: Lunn (2013)
Figure 1: Irish Banks Share Price Collapse

Source: Thompson One Banker. AIB: Allied Irish Bank; BoI: Bank of Ireland; Anglo: Anglo Irish Bank

Figure 2: Irish Banks Liquidity Positions

Source: Central bank of Ireland