1. **Introduction**

1.1 The Global Financial Crisis and Risk Management Practices

The Global Financial Crisis (GFC) was the most severe international economic crisis since the Great Depression. The GFC had far-reaching consequences for the financial system, the housing market, the economy and wider society in general. It resulted in a recession leading to extremely high levels of unemployment in the United States and most of Europe, homelessness crises and general economic turmoil (Consequences of the Global Financial Crisis, Grant, Wyn (editor)). The crisis consisted of wide-ranging issues in credit markets centred in the United States of America, Europe and the United Kingdom. Housing bubbles in the United States, the United Kingdom, Spain and Ireland were caused by banks providing households with loans at very low interest rates. Households were able to borrow at levels that they could not realistically afford and purchase larger properties. Turmoil began to unfold when property prices began to drop and households found themselves in crippling levels of debt, in some cases their debt was larger than the value of the property. It later emerged that complex financial instruments had been built by large banks on these underlying household loans that were ultimately extinct (McKinsey). A quintessential component of the financial system is the prudential measures applied to combat against malpractice and avoid devastating impacts as observed by the fall out of the GFC. Following the GFC greater efforts were made by regulatory bodies to provide frameworks by which financial institutions must comply by to ensure sufficient and adequate risk management practices in lending money. The Basel III framework was published in June 2011 as part of the Basel Committee’s response to the GFC. It addresses several shortcomings in the pre-crisis regulatory framework and provides a foundation for a resilient banking system that will help avoid the build-up of systemic vulnerabilities. Basel III scrutinised the pre-crisis risk management practices of financial institutions. A particularly important component of the Basel III framework was the increase in the level of capital requirements to ensure that banks are sufficiently resilient to withstand losses in the times of stress. This increased scrutiny on the capital requirements for banks provided an impetus for institutions to improve risk management practices, one of which being the credit risk framework.

* 1. Risk Weighted Assets and Credit Risk Modelling

According to the CFA Institute, credit risk is the risk of loss resulting from a borrower failing to make full and timely payments of interest and/or principal (CFA). Credit risk is the biggest risk for banks. Other types of risks include market risk, operational and concentration risk. However, poor credit risk management can result in bank failure, and this was accentuated by failures of banks such as Northern Rock and Anglo-Irish bank during the GFC. Therefore, it is worthwhile for banks to implement sound and effective credit risk management systems/frameworks to remain sufficiently capitalised and resilient to economic shocks. Banks have developed sophisticated systems to model the credit risk arising from important aspects of their business lines. These sophisticated models are intended to aid banks in quantifying, aggregating, and managing risk across different segments of their disparate business services. The output produced by these models play a significantly important role in the risk management processes. The Basel Committee on Banking Supervision found that credit risk modelling may prove to result in better internal risk management (Basel paper 1999). The output that is produced by credit risk models are used as parameters to compute a bank’s level of capital requirements. Credit risk modelling practices assist in the computation of regulatory capital. Regulatory capital is a component of ‘Pillar One’ of the Basel capital framework, which sets out an institution’s minimum capital requirements. The quantitative regulatory capital under Pillar One has a core simple equation, to maintain financial resources equal to or greater than a percentage of its risk weighted assets (RWAs). Risk weighted assets (RWAs) are a measure of a bank’s assets adjusted for their perceived risks (Irish RWA paper). Capital requirements are in line with RWAs, for example the minimum risk-based capital requirements as established by the Basel framework is that total capital held by an institution must be at least 8% of RWA. The Basel Framework describes how to calculate RWA for credit risk. RWA for credit risk can be calculated either using the standardised approach or the internal ratings-based (IRB) approach. The IRB approaches are complex and require considerable resources as well as robust systems. Banks aspire to use IRB models as they are a mark of greater sophistication and usually, they produce lower risk calculation than the standardised approach (Irish RWA). There are three parameters in developing IRB models: Probability of Default (PD), Loss given default (LGD) and Exposure at default (EAD). This paper places a greater emphasis on the PD parameter.