AMERICAN UNIVERSITY OF BEIRUT

TREATMENT OF SOVEREIGN RISK UNDER IFRS 9 – PROPOSED APPROACHES AND APPLICATION FOR THE LEBANESE BANKING SECTOR

by
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AN ABSTRACT OF THE PROJECT OF

Joelle Georges Barbar for Master of Business Administration
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The new impairment requirements stipulated by IFRS 9 (the Standard) represent a true challenge for the banking industry in terms of implementation effort, cost and time. The Standard was introduced as a direct response to address the banking sector's weaknesses exposed by the recent financial crisis, which resulted in a delayed recognition of credit losses and accordingly huge losses borne by banks internationally. The Standard advocates a forward-looking impairment methodology for the calculation of Expected Credit Loss (ECL) on all portfolios held by financial institutions so as to build adequate provisions right upon initiation, even before any signs of actual impairment exist, based on holistic and forward-looking credit information. The institution must then track specific indicators of significant increase in credit risk and build provisions over the lifetime of those exposures which show signs of credit deterioration over time.

IFRS 9 impairment requirements were applied by Lebanese banks in line with the Central Bank of Lebanon (the Regulator or BDL) requirements through issued guidance. One major implementation issue is the treatment of Sovereign exposures, which remains an unaddressed area by the current local guidance and a top item on the agenda of many Risk Managers.

The present work intends to explore the available methodologies for computing ECL on the Sovereign portfolio and to propose an analytical framework for understanding and quantifying Sovereign credit risk within the Lebanese context. By reviewing the available market approaches adopted by other developed and developing countries along with those studied in the Sovereign risk literature, the research assesses the resulting approaches against Standard requirements and proposes potential options for consideration within the Lebanese context.

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CHAPTER I

INTRODUCTION

"National governments are the largest borrowers and their credit standing provides a benchmark for other issuers of debt" (Moody's, 2016a, p. 2). Moreover, their credit risk is perceived as a "floor to other risks in the economy" (European Systemic Risk Board, 2015). Therefore, the study of Sovereign credit risk has long been known to be at the cornerstone of effective risk management and financial regulation.

More recently, interest continues to surge in the Sovereign risk financial literature. In fact, regulators and financial institutions alike still reflect on the recent global financial crisis, its causes and effects, hindsight predictability and prevention mechanism. The crisis surely highlighted a proven interconnectedness of sovereigns through the exacerbation of financial contagion effects internationally as well as the close links between sovereigns and the financial sector of the economy. The dissemination of systemic risk in the economy led to several banks' bankruptcies and bailouts. Had banks been adequately provisioned in line with the true risk inherent in their portfolios, the impact of the crisis would have been absorbed by the banking system.

Amidst the financial vulnerabilities exposed by the crisis, international financial regulators have been continuously concerned with devising more resilient financial systems through regulations that address the heightened risk levels inherent in financial markets, that monitor excessive build-up of systemic risk in the financial system and that achieve overall financial stability. As such, the International Accounting Standards Board (IASB) proposed to address the delayed recognition of losses through its new forward-looking loss provisioning approach stipulated under the

International Financial Reporting Standard 9 ("IFRS 9" or "the Standard"). The new IFRS 9 impairment requirements represent an opportunity for regulators, accounting standard setters and financial institutions alike to mutually engage in a conversation to rethink how to manage and measure Sovereign risk amidst the turmoil created by the recent global financial crisis. The Standard advocates a forward-looking impairment methodology for the calculation of expected credit loss (ECL) on all portfolios held by financial institutions so as to build adequate provisions right upon initiation, even before any signs of actual impairment exist, based on holistic and forward-looking credit information. The institution must then track specific indicators of significant increase in credit risk and must build a provision over the lifetime of those exposures which show signs of credit deterioration over time.

The impairment requirements continue to represent a true challenge for the banking industry in terms of implementation effort, cost and time. IFRS 9 impairment requirements were applied by Lebanese banks in line with the Central Bank of Lebanon's (the Regulator) requirements through issued guidance (the Banking Control Commission of Lebanon (BCCL) Circular 293, Banque Du Liban (BDL) Basic Circular 143 and Intermediate Circular 512). While the degree of IFRS 9 approaches' sophistication varies amongst individual banks and depends on the availability of information and in-house modeling capabilities, the application of the Standard's requirements to the lending portfolio can be considered as less challenging than the application to remaining portfolios. This is mainly due to the banks' existing internal rating systems that are capable of discriminating amongst the credit quality of individual exposures and providing timely information on the changes in the credit quality of specific counterparties. Yet, one major implementation issue is the treatment of Sovereign (Central Bank and Government) exposures, which remains an area to be

further addressed by the regulatory guidance and a top item on the agenda of many Risk Managers.

The Lebanese banking sector's business model is based on funding the Lebanese Sovereign through frequent subscriptions to debt issuances by the Government. It is estimated that more than half of individual banks' assets and twice the sector's capital base represent Sovereign exposures. As such, the structure of the banks' combined balance sheets is highly dependent on the Lebanese Sovereign. Given this interdependency and concentration, adverse events affecting the Lebanese Sovereign can lead to significant distress within the financial sector. From a regulatory perspective, this relationship implies that a careful understanding of Sovereign risk and the assessment of available approaches to measure it are instrumental to achieve the imminent objectives of systemic stability, financial system soundness and resilience.

The present work intends to explore the available approaches and methodologies for computing ECL on the Lebanese banks' most material asset class and to propose an analytical framework enabling the understanding and quantification of Sovereign credit risk. Through a review of the Sovereign risk literature, specific approaches for measuring Sovereign credit risk and Sovereign risk parameters (Probability of Default and Loss Given Default) are identified. Moreover, through the review of issued IFRS 9 guidance by a sample of developing and developed countries in the MENA region, insights are provided on the applied Sovereign ECL market approaches enabling the interpretation of Sovereign risk perception between these two classifications. The outcome of these reviews facilitates gaining a solid understanding of how market participants, regulators and financial institutions perceive and quantify Sovereign risk. Equipped with the current market and literature views on Sovereign risk, the research assesses the identified approaches against Standard requirements and

proposes specific model adjustments to ensure the alignment of the identified approaches with the Standard, whilst also calibrating these approaches to constitute a fit with the Lebanese Sovereign risk situation, economic conditions and banking sector profile.

The research aims to achieve a level of consistency in the application of IFRS 9 Sovereign ECL approaches amongst banks in Lebanon, reflecting a unified understanding and assessment of Sovereign credit risk. Banks and financial institutions can consider applying the proposed approaches to their Sovereign portfolio holdings and examine the difference with their existing provisioning practices. The research can also serve as a policy reflection tool for the Regulator whereby the results can be leveraged in formulating and/or reconsidering specific prescribed policy options. The achieved consistency limits management discretion, expert judgment and assumptions, which enable easier regulatory review of impairment provisioning and greater financial reporting comparability. In the long-term, it is expected that the application of consistent IFRS 9 Sovereign approaches by the different banks in Lebanon serves to promote the stability of the banking sector based on a unified assessment of Sovereign risk whilst ensuring that the banking sector is adequately provisioned to face systemic crises, if and when they occur.

To the best of my knowledge, the present work is the first to shed light on Sovereign risk approaches within the context of IFRS 9 in Lebanon whilst calibrating the proposed approaches to fit the Lebanese banking sector particularity. The paper's unique contribution to the on-going discussions on the IFRS 9 Sovereign risk quantification and measurement is that it blends the understanding from the finance literature, existing market practice and my direct experience in the field advising and reviewing banks' IFRS 9 approaches to propose approaches that address the Standard's

requirements whilst also consider the peculiarities of our Sovereign and banking sector. Ultimately, both the Regulator and banks' perspectives are addressed.

Finally, it is important to note that the findings of this research constitute my personal view and do not necessarily reflect the views of EY. As such, the results do not intend to provide any form of assurance or clearance from an audit perspective on any particular IFRS 9 approach. Also, the outcome of the research shall be revisited based on updated regulatory requirements and upon the occurrence of any material events or systemic crisis.

The remainder of this research is structured as follows. Chapter II provides a brief overview of the Sovereign risk situation in Lebanon. Chapters III and IV introduce the IFRS 9 basic Standard requirements and highlight the interactions between the Standard and the existing prudential requirements stipulated by Basel capital adequacy framework. Chapter V discusses the application of IFRS 9 impairment requirements in Lebanon. A comprehensive discussion of all issues related to Sovereign risk including definition of the Sovereign and its risk, the Sovereign-Bank nexus, motivations for holding Sovereign debt and determinants of Sovereign defaults along with the Sovereign risk measurement approaches (in terms of PD and LGD) follows next under Chapters VI and VII. Chapter VIII explores the market approaches applied in sample MENA countries and examines how the perception of Sovereign risk differs between developing and developed economies. Having built the required theoretical foundation on Sovereign risk coupled with the view of the current IFRS 9 market practices, Chapter IX proposes IFRS 9 Sovereign risk measurement approaches based on (1) forward-looking ratings using Credit Default Swap spreads and (2) forward-looking conditional PDs calibrated using the "Asymptotic Single Risk Factor (ASRF)" model as originating from Basel IRB approach (Basel Committee on Banking Supervision, 2005).

Concluding remarks along with areas for further research are finally set out in Chapter X.

CHAPTER II

THE CASE OF LEBANESE SOVEREIGN RISK

The current economic and financial situation in Lebanon brought the stability of the Sovereign and its credit risk at the forefront of heated discussions.

The Financial Times reported in October 2018, that investors holding Lebanese bonds are becoming increasingly risk averse as evidenced by the increase of spreads in the fixed-income market which reached 7.3% over US treasuries as well as in the Credit Default Swap credit protection market which reached around 700 bps in October 2018 for 5 years' CDS contracts (Johnson, 2018). Johnson (2018) notes that the inversion of the CDS spreads' term structure i.e. the higher cost of insuring shorter-term as compared to longer-term Sovereign debt, signals that investors are afraid of a near-term credit event. According to the same article, Lebanon's debt servicing capacity and debt sustainability come into question at the current level of debt which constitutes around 153% of the nation's Gross Domestic Product (and forecasted to grow to 180% of GDP according to the *IMF Staff Concluding Statement of the 2018 Article IV Mission* (International Monetary Fund, 2018)) and with the rising costs of borrowing in the fixed income market.

As the Financial Times article describes, the economic model of the country is centered on the interactions amongst three main pillars: the Central Bank, the local banking sector and the Lebanese diaspora. The Central Bank managed throughout the years, including the years of war and conflicts, to maintain the health and resilience of the financial system through its conduct of various financial engineering schemes devised to protect the Lebanese Pound (LBP) and manage the country's capital flows. In turn, commercial banks currently hold a sizeable portion of their assets in the form of

Sovereign debt. This reality indicates the degree to which the sector is prone to macro-economic shocks and rises in systemic risk. In order to fund their asset base composition, local banks aim to attract stable deposit inflows from Lebanese diaspora abroad through a surge in offered deposit rates.

Similar concerns were raised by the IMF after concluding its Article IV mission in Lebanon early February 2018. Given the current status-quo, the IMF projected that the debt burden will become unsustainable with increasing government financing needs amidst a rising interest rate environment, a fixed exchange rate regime depending on stable deposit inflows and the interdependencies between banks and their Sovereign (International Monetary Fund, 2018). The IMF also highlighted the vulnerabilities within the banking sector and claimed that "banks' capital buffers are modest in light of their significant exposure to local-currency sovereign debt and foreign-currency BDL instruments—and sovereign risk weights are not in line with international standards" (International Monetary Fund, 2018, p. 4) . Thus, IMF recommends that "banks should engage in forward-looking capital planning in line with their risk profiles" (International Monetary Fund, 2018, p. 4).

Given the economic and financial outlook of the country, the external rating agency, Moody's downgraded Lebanon's B3 rating to Caa1 during 2019 (Moody's, 2019). According to Moody's, the main drivers for this rating action are related to the country's deteriorating fiscal measures, delayed fiscal consolidation depriving Lebanon from donor disbursements pledged at CEDRE (Conférence économique pour le développement, par les réformes et avec les entreprises) and debt unsustainability amidst rising borrowing costs which all hint for some sort of Sovereign liability management measures (such as a debt restructuring program) (Moody's, 2019).

Amidst the current economic and financial situation of the country, risk managers face a significant challenge to quantify, manage and measure Sovereign credit risk. The current economic realities of the country shed the light on the importance of understanding the prevailing level of Sovereign risk, especially from the perspective of a major economic pillar: the banking sector. The new forward-looking IFRS 9 impairment provisioning requirements present an opportunity to address Sovereign risk from a fresh perspective. Within the Lebanese context, the IFRS 9 impairment requirements present banks with an implementation challenge in terms of the election of a suitable and compliant approach that incorporates the peculiarities of the Sovereign's risk profile while being realistic enough so as not to impose a significant burden on the Lebanese banks' operations.

CHAPTER III

IFRS 9 IMPAIRMENT BACKGROUND

The following section presents a brief overview of the IFRS 9 impairment requirements. The section will provide the necessary foundation to enable the assessment of key approaches for calculating IFRS 9 provisions on the Sovereign portfolio and is not meant to provide a comprehensive discussion of all Standard requirements. For additional details pertaining to specific Standard requirements, refer to the text of the Standard (IASB, 2014) and (EY, 2018).

A. Scope

IFRS 9 *Financial Instruments* was issued by the IASB in July 2014 replacing the prior International Accounting Standard (IAS) 39. The Standard includes requirements for classification and measurement, impairment and hedge accounting and is effective starting 1 January 2018, with permitted early adoption. In line with the research objectives, the scope of the present research will solely address the impairment requirements.

The Standard was motivated by the impact of the recent financial crisis whereby it was considered that "credit impairment provisioning, which should form the first layer of protection against losses, did not rise sharply enough to reflect the true extent of losses that would materialise from the crisis" (Deloitte, 2016, p. 2). Prior to the crisis, the heightened levels of Sovereign risk were not fully reflected in banks' financial reporting due to the accounting framework that was based on incurred losses for exposures with the Sovereign in the banking book (Bank for International

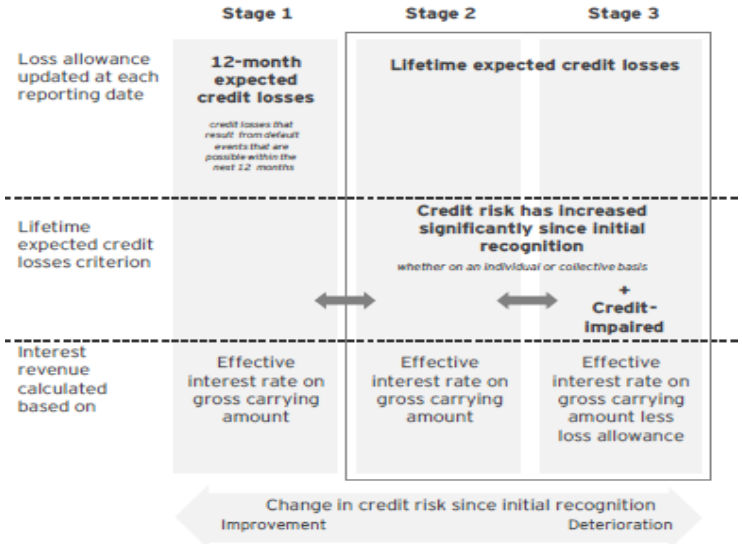
Settlements, 2013). As such, “the incurred loss models often resulted in provisions that were “too little, too late”” (Basel Committe on Banking Supervision, 2016, p. 1). The Standard represents a shift in the provisioning mandate from incurred losses to expected losses. It aims to eliminate the backward-looking nature of established loan loss provisions and advocates a forward-looking impairment model for all financial instruments within its scope to enable the timely recognition of losses on financial assets. According to the Standard, the entity must define an impairment approach to cover the following asset categories (EY, 2018):

- Financial assets held at amortized cost;
- Financial assets held at fair value through Other Comprehensive Income (FVOCI);
- Lease receivables;
- Contract assets;
- Loan commitments not measured at Fair Value through Profit and Loss (FVTPL);
- Financial guarantee contracts not measured at FVTPL.

B. Staging and Assessment of Significant Increase in Credit Risk (SICR)

For each in-scope portfolio and at every reporting date, the entity allocates its exposures into one of the following three stages by examining a range of criteria that are indicative of a change in the underlying credit quality. The staging process is described below:

Figure 3.1: IFRS 9 Three Stages' Model



Source: EY (2018), Applying IFRS: Impairment of financial instruments under IFRS 9 (EY, 2018, p. 9).

- Stage 1: This stage includes all financial instruments that have not witnessed a significant increase in credit risk since initial recognition. All originating financial instruments start within this stage and require a 12-month ECL calculation.
- Stage 2: This stage includes all financial instruments that are deemed by the entity to have witnessed a significant increase in credit risk. As the entity undertakes its SICR assessment at every reporting period, it monitors changes in forward-looking SICR criteria to assess instances of credit deterioration on individual facilities. The following presents a non-exhaustive list of SICR criteria and triggers that the entity can consider to determine whether an SICR event occurred as detailed under Appendix B - *Application Guidance* accompanying the Standard and found in Section *B5.5.17*:

- Adverse changes in external market indicators
- Adverse changes in external credit rating
- Adverse changes in internal credit rating and behavioral scorecard indicators
- Specific business conditions and results of the obligor's activities
- Breach of contractual covenants
- Past due and unpaid status, amongst other.

It is intended that the entity relies on more than just past-due status to determine changes in the underlying credit quality, in line with the forward-looking mandate of the Standard. As such, any change in one or more of the above indicators that is deemed significant by the entity (with significant change being defined as part of the entity's internal IFRS 9 policy), is indicative of SICR and results in a Stage 2 classification of the underlying exposure and an associated lifetime ECL calculation.

- Stage 3: This stage includes all credit-impaired i.e. defaulted exposures as defined by the entity. The Standard does not provide a precise definition of default but expects no more than a 90 days' past due backstop to be applied in line with international financial regulations that define non-performing status. The entity must ensure the alignment between its accounting and risk management/regulatory reporting of non-performing exposures.

There are two approaches for the conduct of SICR assessment: the individual and the collective approach. As forward-looking information on individual facilities/obligors might not always be available, the individual SICR assessment conducted at an instrument level can be supplemented with a collective assessment. Under the collective approach, the entity can detect instances of credit deterioration on a *group* of facilities that share similar credit risk characteristics. This approach aims to

achieve a timely recognition of losses even when no sufficient forward-looking information can be feasibly obtained at the level of individual facilities. For instance, management can group a set of borrowers based on industry of business activity. Management then identifies a set of risky industries based on forward-looking assessment and assigns all borrowers who conduct business activities within a particular risky industry to Stage 2, even if no signs of credit deterioration exist yet at the individual instrument level.

C. Operational Simplifications

The Standard acknowledges that in some circumstances obtaining "reasonable and supportable information" is not feasible "without undue cost and effort" (IASB, 2014). As such, the Standard provides a set of operational simplifications and presumptions to simplify the operational burden of implementation whilst achieving the Standard's objectives. Some of the major presumptions are listed below:

- Low credit risk simplification: For high-quality financial assets (e.g. investment grade financial instruments), an entity can assume that no SICR occurred at the reporting date and the asset will be classified under Stage 1 with a 12-month ECL calculation, provided that it maintains its high credit quality. This simplification is intended to be applied on debt securities rather than loans.
- 30 days' past due presumption: The Standard provides a quantitative delinquency backstop for detecting SICR on individual facilities. This is meant to prevent entities from delaying recognition of lifetime losses beyond the 30 days' past due threshold. The threshold is also consistent with the present Basel regulatory capital requirements. Entities have the

option to rebut the 30 days' past due delinquency threshold; provided that they can establish strong statistical evidence proving that a longer threshold is correlated with instances of SICR.

D. ECL Calculation Approach

As per the Standard, "expected credit losses are a probability-weighted estimate of credit losses (i.e. the present value of all cash shortfalls) over the expected life of the financial instrument. A cash shortfall is the difference between the cash flows that are due to an entity in accordance with the contract and the cash flows that the entity expects to receive" (IASB, 2014, p. 118).

Depending on the staging of specific exposures, a 12-month or lifetime ECL is appropriate. The following presents a distinction between both ECL calculations:

- 12-month ECL: It is the present value of all expected cash shortfalls over the remaining life of the exposure considering the possibility of counterparty default within the next 12 months' period. 12-month ECL is required for exposures classified under Stage 1.
- Lifetime ECL: It is the present value of all expected cash shortfalls over the remaining life of the exposure considering all possible default events over the entire lifetime of the exposure. Lifetime ECL is required for exposures falling under Stages 2 and 3.

The Standard does not prescribe a particular ECL calculation methodology. The most commonly employed approach is the PD and LGD approach. Other approaches include the flow rate as a proxy for the PD, the loss rate as a proxy for expected loss, the provision matrix simplified approach specifically for receivables, etc.

The ECL calculation is based on the concept of marginal ECL. As adapted from Example 3 provided in EY publication, ECL can be modeled as follows (EY, 2018):

$$ECL_{(t_n)} = \sum_{t_i = t_1}^{t_i = t_n} \frac{PD_{t_i} \times LGD_{t_i} \times EAD_{t_i}}{(1 + r_i)^{t_i}}$$

where:

- i: future payment date.
- t_i: maturity of payment i.
- t_n: expected life of the considered exposure.
- PD_{t_i}: is the 12-month point-in-time and marginal PD at time t_i (i.e. the cumulative PD at time (t_i) – cumulative PD at time (t_{i-1})) which gives the unconditional probability of default during time (t_i)).
- LGD_{t_i}: is the effective loss given default at time t_i expressed as a percentage of the EAD considering the effects of any collaterals provided by the borrower.
- EAD_{t_i}: is the exposure at default at time t_i incorporating any undrawn commitments and accrued interest.
- r_i: is the discount rate being the Effective Interest Rate (EIR), or the Contractual Interest rate, if the EIR cannot be reasonably estimated.

E. Probability-Weighted ECL under Multiple Scenarios

In line with the Standard's objective of incorporating the impact of forward-looking information and to ensure an unbiased measure of ECL, the entity is required to evaluate a range of possible outcomes for ECL calculation and to compute a probability weighted ECL figure encompassing multiple plausible scenarios. A scenario is defined

based on a set of macro-economic factors that are, in the view of management, correlated to default events within specific portfolios. Practically, an entity will model the impact of a particular scenario on its risk parameters and compute the resulting ECL estimate for each considered scenario separately. For instance, under a negative scenario of declining GDP growth, the entity predicts that the economic slowdown will affect its borrowers' financial condition and thus the probability of default will become more significant for every rating grade. The entity then assigns weights to each of the envisaged scenarios and reports the probability-weighted ECL figure within its financial statements.

CHAPTER IV

INTERACTIONS BETWEEN IFRS 9 AND PRUDENTIAL BANKING REGULATION

For an effective implementation of the impairment requirements stipulated by the Standard, the objectives of existing prudential regulation (i.e. the Basel Accords as prescribed by the Basel Committee on Banking Supervision (BCBS)) and the new IFRS 9 Standard must be clearly defined. The present effort on IFRS 9 impairment implementation can be further enhanced by examining how Basel's guidance perceives and treats Sovereign risk. Through leveraging the existing understanding of Sovereign risk as currently addressed by Basel's framework, a more suitable approach can be devised for banks for IFRS 9 Sovereign Impairment provisioning. The following section provides a basic understanding of the present Basel capital adequacy framework and presents the major distinctions and interactions between Basel guidelines and the Standard.

A. Objectives of Basel Capital Framework and IFRS 9 Impairment

"Since Basel I, the Basel Committee on Banking Supervision (BCBS) has recognised that there is a close relationship between capital and provisions" (Financial Stability Institute, 2017, p. 2). Traditionally, whilst accounting standards' setters have been concerned with achieving transparent reporting that allows financial statements' users to make informed decisions in financial markets, regulators have been trying to achieve a stable financial system that mitigates pro-cyclicality (Bushman & Williams, 2012) (i.e. the tendency to reinforce and magnify the effects of the existing business cycle). The resulting write-downs and capital drains faced by banks under the incurred

loss provisioning model highlighted the contribution of adequate accounting provisioning in preserving banks' solid capital bases and meeting capital adequacy requirements. Thus, it was noted that capital adequacy depends on good risk management practices which are reinforced by adequate provisioning practices.

Brushman and Williams (2012) found that adopting forward-looking provisioning practices that incorporate holistic macro-economic information and future expectations can actually reduce pro-cyclicality of the incurred loss model and is associated with an enhanced risk-taking behavior within banks, provided that they do not engage in opportunistic behavior as a result of increased accounting discretion (Bushman & Williams, 2012). Also, as a direct response to the financial crisis, the World Bank issued policy discussion reforms stipulating that "tougher" provisioning rules can mitigate existing pro-cyclicality of capital requirements (Stephanou, 2009). By building-up provisions in good times to be drawn upon in the trough of the business cycle, banks recognize losses early on, resulting in lower pressure on their capital resources. Thus, it can be argued that the new IFRS 9 expected loss provisioning model facilitates achieving prudential objectives.

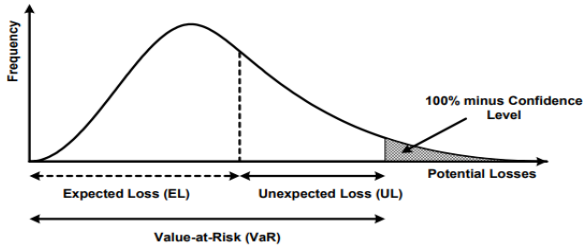
Prudential regulation has both an ex-ante and ex-post impact on banks' holdings of Sovereign instruments. In fact, the regulation limits banks' incentives to engage in excessive risk-taking due to an alteration of their risk-return trade-off (ex-ante) and ensures that adequate capital charges exist to support each transaction commensurate with the risks that are borne by the bank (ex-post) (European Systemic Risk Board, 2015, p. 84). Similarly, with the introduction of the new IFRS 9 impairment requirements, accounting provisions have now the same dual timing of interference and impact on banks. As under the prior requirements of IAS 39, banks shall continue to have sufficient specific provisions in case of separately identifiable default events (ex-

post). However, IFRS 9 introduces an ex-ante impact on banks whereby some banks might elect not to engage in particular transactions as they might be perceived as more costly with a limited profit potential as a result of the required expected credit losses to be booked at origination.

B. EL, UL and ECL

Under Basel's framework, regulatory expected credit losses (referred to as regulatory EL) are defined as the average losses that the bank anticipates as a result of its normal course of lending business. Such losses are to be reflected in the pricing of financial products and through provisioning (Basel Committee on Banking Supervision, 2005).

Figure 4.1: Expected and Unexpected Loss



Source: An Explanatory Note on the Basel II IRB Risk Weight Functions (Basel Committee on Banking Supervision, 2005, p. 3).

On the other hand, unexpected losses (referred to as UL) represent severe losses that are borne by the bank beyond the average expected levels. The bank cannot know beforehand the exact size or timing of such losses. In this case, it must hold sufficient capital to absorb UL. Basel defines Value at Risk (referred to as VaR) as the threshold level of loss (i.e. the sum of EL and UL) that will be exceeded by the bank only in 0.1% of the times (i.e. 100% minus the supervisory prescribed confidence level

of 99.9%). Beyond the VaR, the bank becomes insolvent (Basel Committee on Banking Supervision, 2005).

Basel accords prescribe various approaches for computing capital requirements covering unexpected losses that emanate from the various risk types that the bank is exposed to including: credit, market, operational and other risk types. Under capital regulation, Sovereign credit risk is the credit risk-weighted Sovereign exposure, which subsequently results in specific capital requirements (8% under Basel III). Specifically, the following table illustrates the risk-weighting scheme that is required for the treatment of all Sovereign exposures:

Figure 4.2: Sovereign Risk Weights under Basel III

Risk weight table for sovereigns and central banks — Table 1

External rating	AAA to AA–	A+ to A–	BBB+ to BBB–	BB+ to B–	Below B–	Unrated
Risk weight	0%	20%	50%	100%	150%	100%

Source: Basel III: Finalising post-crisis reforms (Basel Committe on Banking Supervision, 2017a, p. 4)

Intuitively, the lower the credit rating, the higher the credit risk, the associated risk weight and capital charge.

Basel III maintains the national discretion provided for local regulators to assign a lower risk weight for their Sovereign exposures including Central Bank exposures that are denominated in *local* currency (Basel Committe on Banking Supervision, 2017a). The Basel Committee intends to continue the launched review of the treatment of Sovereign risk, initiated in 2014 through an assigned special task force, in order to prescribe an update on the treatment of Sovereign risk (Board of Governors of the Federal Reserve System, 2017). Until the date of this research, no consensus on a different treatment for Sovereign risk measurement in capital regulation was reached.

With the introduction of the Standard, at the initiation of every exposure subject to credit risk, banks are required to estimate the expected credit losses that might result from default, no matter how low that probability was. As such, banks must not only set aside capital resources for Sovereign credit risk but must also provide provisions for expected credit loss on these exposures.

C. Current Treatment of Accounting Provisions within the Basel Framework

Under the Standardized Approach for measuring credit risk, the current regulatory treatment of accounting provisions differentiates between two categories of provisions: specific provisions that are set aside to cover specifically identifiable losses and general provisions that are available to address potential losses that might arise on any of the bank's exposures (Basel Committe on Banking Supervision, 2016).

Due to the loss-absorption property of general provisions, Basel guidelines allow their inclusion in Tier II capital up to a limit of 1.25% of risk-weighted assets (RwA) as computed under the Standardized Approach for measuring credit risk (Basel Committe on Banking Supervision, 2016). It is to be noted that there is no "regulatory EL" measure under the Standardized Approach for measuring credit risk, as it is assumed that EL is solely covered by accounting provisions. Under the more sophisticated Internal Rating Based (IRB) approach, "regulatory EL" is computed as the product of internally derived risk parameters (i.e. Probability of Default (PD) x Loss Given Default (LGD) x Exposure at Default (EAD)) and is compared to total "eligible provisions" (Basel Committe on Banking Supervision, 2016). Any shortfall as compared to the "regulatory EL" requirement is directly deducted from Tier I capital (Basel Committe on Banking Supervision, 2016). The present treatment ensures that banks maintain adequate levels of provisions to address expected losses at all times.

D. Implications

The accounting provisions for expected credit losses have many implications on the banks' available capital base and resources. According to Deloitte, "impairment charges reduce retained earnings and by extension the Common Equity Tier 1 resources" (Deloitte, 2016, p. 5); where the Common Equity Tier 1 is comprised of retained earnings along with share capital and are considered as the most loss-absorbing type of capital.

Another impact is also anticipated on the banks' Tier II capital base through the inclusion of general provisions (Deloitte, 2016). With the new Standard, the distinction between general and specific provisions for the purpose of Tier II add-up is not consistently clear (Basel Committe on Banking Supervision, 2016). As such, the overall impact of IFRS 9 on banks' capital requirements and ratios (CET1 and Tier II capital ratios) cannot be easily predicted.

In light of this ambiguity, the Basel Committee intends to define an updated regulatory treatment for accounting provisions to address these concerns. The examined options include: (a) defining regulatory EL rates under the Standardized Approach, (b) maintaining the current regulatory treatment of accounting provisions, (c) defining a universal distinction between general and specific provisions (Basel Committe on Banking Supervision, 2016).

The identified interactions between the Basel capital adequacy framework and IFRS 9 impairment requirements imply, at an operational level, the need for a closer coordination between Risk and Finance functions. "The finance function is focused on product (i.e., internal reporting based on internal data) and is driven by accounting standards. The risk function, however, is focused on the counterparty (i.e., probability

of default) and is driven by a different set of regulations and guidelines" (Moody's, 2016b). This leads to a different understanding of losses and approaches to model those losses (Moody's, 2016b). For a successful transition to IFRS 9, synergies must be cultivated between both functions. The Standard presents an opportunity to align both functions' efforts through leveraging a mutual and expanded understanding of the business from both perspectives. Banks can leverage their existing systems, data and models that are already established for Basel reporting, with adjustments to address specific Standard requirements (Moody's, 2016b).

CHAPTER V

APPLICATION OF IFRS 9 IMPAIRMENT REQUIREMENTS IN LEBANON

In Lebanon, banks and financial institutions have early adopted the classification and measurement requirements of the Standard by 1/1/2011 and have complied with the impairment requirements of the Standard by 1/1/2018 (Banking Control Commission of Lebanon, 2015). Within the Lebanese context, the Standard affects the provisioning practices on the performing portfolio (Stages 1 and 2 under IFRS 9). As for credit-impaired exposures (Stage 3 under IFRS 9), the current provisioning methodology based on individual cash flow assessment is maintained.

In order to guide the implementation of the Standard requirements, the Central Bank of Lebanon issued Basic Circular No.143 which was subsequently followed by Circular No. 293 as further operational guidance by the Banking Control Commission. By the end of 2017, BDL issued regulatory EL rates under its Intermediate Circular No. 512 for consideration within banks' capital adequacy calculations.

In its Basic Circular No.143, the Central Bank of Lebanon outlined the key sources of funds to provide for banks' required IFRS 9 ECL provisions upon first-time adoption. It specified that banks must provide for the amount of ECL from the existing balances of the accumulated general provisions, special and collective provisions, along with other surplus available from the conduct of the swap operations with BDL (Banque du Liban, 2017).

Where:

- General provisions refer to provisions that a bank builds against the possibility of future losses on exposures that are still currently considered

as performing and that do not show any sign of impairment. The definition excludes: specific and collective provisions (as defined in Basic Circular No.44).

- Collective provisions refer to provisions that a bank builds against shared risks and that are determined based on periodic impairment tests of the total portfolio of performing loans (as defined in Basic Circular No.81).
- Specific provisions refer to provisions that are built against specifically identifiable and known loss events attributed to individual financial instruments, i.e. provisions on impaired financial assets.
- Surplus resulting from BDL's swap operation in 2016 whereby banks were instructed to record the resulting surplus under Deferred Liabilities and were allowed to add it as a regulatory adjustment to Tier II capital as per the Intermediate Circular No. 446.

The specified sources of funds for IFRS 9 purposes tend to limit the impact of the Standard on draining Retained Earnings, restrain profit and loss volatility and conserve the quality of banks' Common Equity Tier 1 (CET1) capital base (comprised mainly of Retained Earnings and Share Capital).

The Regulator did not require the use of a particular approach for calculating ECL. In fact, BDL Circular 143 mentions that banks are required to "build up provisions against expected credit losses, according to the approaches that are appropriate to each type of on-balance sheet financial assets and off-balance sheet financial liabilities involving a credit risk" (Banque du Liban, 2017, p. 3). The Circular lists the historical loss approach along with the PD/LGD approach as potential approaches for measuring ECL.

From a capital adequacy perspective, the current approach applied in Lebanon for treating Sovereign exposures relies on the use of Basel's national discretion. As per Basic Circular No.44, the discretion is applied on *foreign* currency exposures whereby banks assign a preferential risk weight of 50% to Sovereign exposures with the Central Bank of Lebanon in foreign currency as opposed to the 100% risk weight that is assigned for the remaining Sovereign exposures in foreign currency. Under the present requirements, all local currency Sovereign exposures (whether with the Lebanese Government or the Central Bank of Lebanon) receive a 0% risk weight.

As part of Intermediate Circular No. 512 (amending Basic Circular No.44 as related to the Capital Adequacy Framework), the Central Bank of Lebanon prescribed regulatory target EL rates which lead to a prescribed reduction in CET1 to ensure the alignment of approaches between banks and the sufficiency of the booked provisions. Banks shall compare the balance of their IFRS 9 accounting provisions with the provisions that are computed based on the regulatory EL rates and deduct any shortage from their CET1. Moreover, BDL allows a Tier II add-back of Stage 1 provisions calculated under IFRS 9, which are regarded by the Central Bank as general provisions and eligible for inclusion along with the bank's existing general provisions up to a limit of 1.25% of RwA.

CHAPTER VI

SOVEREIGN RISK – KEY CONCEPTS AND DEFINITIONS

The following section provides an overview of major concepts and definitions enabling the understanding of Sovereign risk and setting the required foundation for the subsequent discussion on Sovereign risk measurement.

A. Sovereign Definition

A preliminary issue to address is the scope of the Sovereign definition and the entities that are to be included as part of the Sovereign definition. The financial literature considers the following entities as part of the Sovereign definition (Basel Committee on Banking Supervision, 2017b):

- The Central Bank
- The Government
- Other Sovereign entities which are "public sector entities", provided that they possess "unconditional support" from the government to meet their financial payments as they come due (Basel Committee on Banking Supervision, 2017b).

B. Sovereign Risk Definition

According to the "ESRB report on the regulatory treatment of sovereign exposures" published by the European Systemic Risk Board, any regulation aiming to address Sovereign risk shall answer the fundamental question of whether Sovereign exposures can be rightfully considered as risk-free (European Systemic Risk Board, 2015).

Sovereign risk continues to warrant special attention in the finance literature and amongst regulators and banks. The risk-free status traditionally attributed to Sovereign exposures was not supported by strong empirical evidence. This was highlighted by various prominent speakers including central bankers, policy-makers, academics and other figures at a seminar on Sovereign risk held by the Bank for International Settlements back in 2013. Alberto Giovannini, CEO of Unifortune Asset Management, indicated that the risk-free status that was traditionally associated with Sovereign exposures was mainly justified by the taxation power of the government and the ability of the central banks to fund the government through money creation; both of these tools could be theoretically deployed to service debt payments. However, he argued that this depicted standard model is far from the current realities of the financial system, amidst the deteriorating government financial conditions and limits on Sovereign's ability to resort to the aforementioned measures (Bank for International Settlements, 2013). Similarly, Robert Jenkis, then member of the Financial Policy Committee of the Bank of England, argued that Sovereign exposures lost their risk-free status because markets have been educated, with the passage of time, about the possibility for Sovereign debt to undertake an unsustainable path at a given level of financing cost (Bank for International Settlements, 2013).

Given that Sovereign exposures are subject to credit risk, defining this risk is crucial in order to effectively manage and control it. In simple terms, the ESRB report defines Sovereign risk as follows:

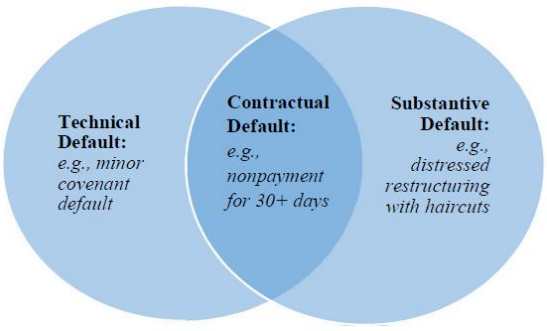
> Sovereign risk arises from the fact that a sovereign may, for a significant time, have higher expenditures than tax revenues and go so much into debt that, eventually, it finds it impossible or undesirable to pay its debts as they fall due or, more generally, may not comply with its contractual debt obligations. (European Systemic Risk Board, 2015, p. 45)

The ESRB report considers that "the general category of credit/default risk also includes specific risks like migration risk (due to rating downgrades) or spread risk (due to increases in the spread between yields registered on the secondary market and corresponding risk-free rates)" (European Systemic Risk Board, 2015, p. 45).

More formally, Moody's considers a default event to have occurred in case (i) the obligor missed a contractual payment of interest or principal beyond the allowable grace period or (ii) the obligor offered creditors a restructured debt resulting in a "distressed exchange" or (iii) the obligor unilaterally modified its payment terms to decrease its financial obligation (e.g. maturity, currency, etc.) (Moody's, 2018a).

Other academics have attempted to define Sovereign risk by identifying the various events constituting Sovereign distress within a formalized and holistic framework of Sovereign default. In their proposed definition, Ams et al. (2018) consider both the contractual and economic substance of the particular distress event. Specifically, the authors classify default into the following categories (Ams, Baqir, Gelpern, & Trebesch, 2018):

Figure 6.1: Sovereign Default Definition



Source: Julianne Ams, Reza Baqir, Anna Gelpern and Christoph Trebesch, Chapter 7 – Sovereign Default (Ams, Baqir, Gelpern, & Trebesch, 2018, p. 4)

The authors define each default case as follows:

- Technical default is a breach of contractual terms or covenants that is not due to a fundamental payment difficulty by the Sovereign and that is not perceived as significant by market participants and credit rating agencies. Examples include: delays in payment due to administrative reasons such as a delay in payment processing or system errors, a violation of some minor covenants such as minimum debt coverage or maximum leverage covenants (Moody's, 2018a), amongst other. Under this classification, default is deemed to have occurred from a legal perspective and on a contractual basis as a result of the breach of some terms, yet market participants do not regard this event as a real and significant default as the underlying creditworthiness of the Sovereign is not the driver for the specified credit event (Ams, Baqir, Gelpern, & Trebesch, 2018).
- Contractual default is typically associated with payment default whereby the Sovereign is unable to service its debt principal or interest payments as they come due as a result of significant deterioration in creditworthiness and payment difficulties. Typically, contractual default is considered to have occurred after the elapse of a 30 days' grace period (or other specified period) applicable on the missed due payment. According to Ams et al. (2018), contractual default also includes cases of repudiation (i.e. the Sovereign's outright denial of its obligation to pay), cross-default (i.e. default on another obligation issued by the same Sovereign) and covenant default (i.e. material violations of covenants) (Ams, Baqir, Gelpern, & Trebesch, 2018).

- Substantive default represents a default that is perceived by market participants in practice (i.e. meeting the rating agencies' and CDS contracts' default definition) even though no contractual breach occurred on existing outstanding debt. For instance, the authors classify distressed debt exchanges and debt restructurings (such as reduction of principal or interest, extension of maturity, etc.) for credit-related reasons leading to investor losses under this category (Ams, Baqir, Gelpern, & Trebesch, 2018). Ams et al. (2018) consider that restructurings and other unilaterally imposed debt modifications by the Sovereign are typically associated with domestic debt which is less prone to formal outright events of default. In such cases, the Sovereign seeks to implement modifications to its debt through its monetary and fiscal powers so as to reduce its payment obligations or the value of its outstanding debt. These events include: currency redenomination along with the pursuit of intentional inflationary policies that reduce the value of debt, etc. (Ams, Baqir, Gelpern, & Trebesch, 2018).

C. The Sovereign-Bank Nexus

According to Basel, Sovereign risk is disseminated throughout the banking system via one or a combination of the following main direct and indirect channels of contagion (Basel Committee on Banking Supervision, 2017b):

- A "direct exposure channel" whereby Sovereign risk has a direct impact on banks' statement of financial position through the holding of particular Sovereign exposures. This can lead to valuation losses, higher insolvency

risk and increases in the cost of funding (European Systemic Risk Board, 2015).

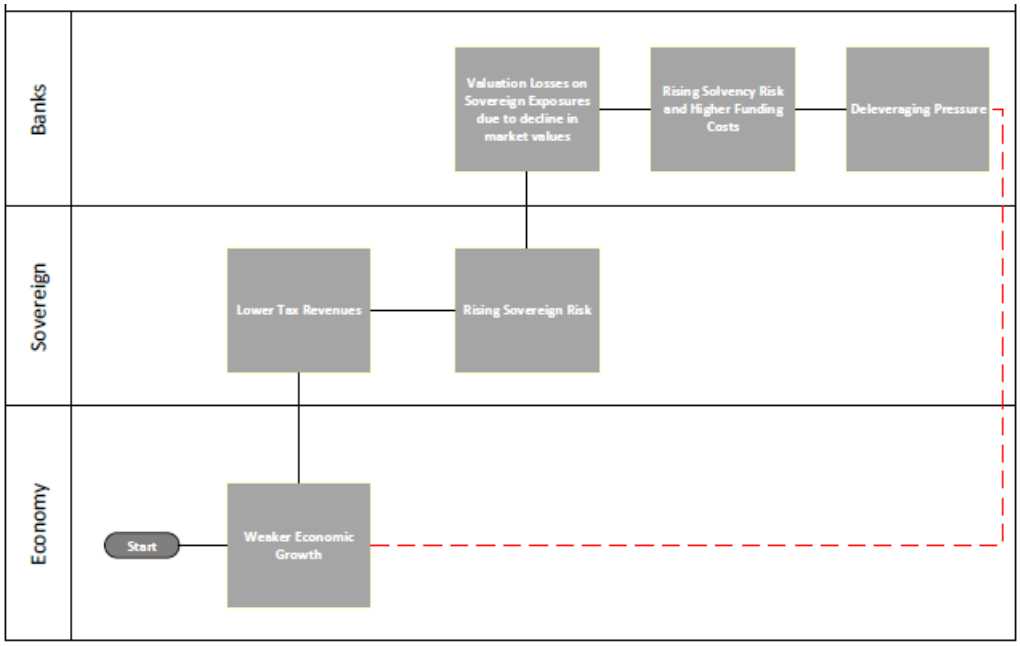
- A "collateral channel" whereby the value of Sovereign backed collaterals used by banks declines and leads to an increase in their funding costs. This channel is mainly relevant for banks that secure funding through repurchase agreements (i.e. a type of money market transaction where the bank borrows money overnight by selling treasury bills, which are perceived as underlying collateral for the obligation, with the intent to repurchase them back at a higher price covering interest for borrowed money).
- A "credit rating channel" whereby any Sovereign downgrade leads to more costly transactions with international banks, higher capital requirements and a decline in the banks' own creditworthiness. As Sovereign external rating constitutes a "ceiling" on the rating of other assets in the economy, significant changes in the creditworthiness of the Sovereign can subject assets to rating "cliff effects" (Basel Committee on Banking Supervision, 2017b). These effects further support pro-cyclicality and increase systemic risk (European Systemic Risk Board, 2015).
- A "government support channel" whereby the Sovereign's ability to provide required financial support for banks through bailouts and other measures is jeopardized with heightened Sovereign risk.
- A "macro-economic channel" whereby Sovereign distress can lead to recession and can negatively impact borrowers' ability to repay debt, resulting in more default events and higher costs borne by banks.

The interconnectivity, dependence, spillover and feedback effects between the Sovereign and the banking sector are referred to in the finance literature as the

"Sovereign-bank nexus" (Basel Committee on Banking Supervision, 2017b). It can act as either an amplifier or absorber of shocks in times of stress depending on the level of distress and the degree of dependence between the banking sector and the Sovereign (Basel Committee on Banking Supervision, 2017b). For instance, the Committee considers that the banks' role as absorbers of shocks is exercised when they act as investors in government debt. This role was evident during the recent financial crisis where "the increase in domestic sovereign exposures by banks in financially weak countries was a reaction to the crisis and instrumental to preserving financial stability in the euro area" (Lanotte, Manzelli, Rinaldi, Taboga, & Tommasino, 2016, p. 17).

The following figure summarizes the interaction between the Sovereign and banks and illustrates the feedback cycle following an increase in Sovereign risk on the banking sector:

Figure 6.2: Sovereign-Bank Nexus and the Feedback Loop



Source: Adapted from IMF (2012) as cited in European Systemic Risk Board - ESRB Report on the Regulatory Treatment of Sovereign Exposures (European Systemic Risk Board, 2015, p. 63)

According to the IMF (2012) and the ESRB (2015), the cycle starts with rising levels of Sovereign risk due to deteriorating fiscal positions and weaker economic fundamentals which leads to valuation losses on government bonds and other Sovereign exposures held by banks and financial institutions. A declining asset base along with an unchanged liability structure tends to weaken banks' solvency. Moreover, market risk aversion and an increased risk premium limit the wholesale funding available for banks and increases the cost of funding. As a response, banks react by restricting their lending business through deleveraging. The cycle continues with restricted economic growth, lower tax revenues and system instability (International Monetary Fund, 2012; European Systemic Risk Board, 2015).

According to Lanotte et al. (2016), the solution to the Sovereign-bank loop is unlikely to be solely addressed by micro-prudential tools (i.e. capital requirements calibrated based on bank specific exposures) as currently prescribed by Basel capital adequacy framework since these tools address the contagion resulting only from the direct exposure channel (Lanotte, Manzelli, Rinaldi, Taboga, & Tommasino, 2016). As the residual Sovereign risk can also disseminate through the other indirect channels of contagion, the authors consider that macro-prudential tools prescribing a regulatory treatment to Sovereign exposures based on country-specific (such as fiscal sustainability, debt burden, etc.) rather than bank-specific indicators (such as the bank's size of Sovereign exposures' holding) might prove to be more useful and warrant further investigations (Lanotte, Manzelli, Rinaldi, Taboga, & Tommasino, 2016).

D. Motivations for Holding Sovereign Debt

According to Basel Committee, banks hold Sovereign assets as part of their portfolios for the following main reasons (Basel Committee on Banking Supervision, 2017b):

- "Balance Sheet Management" (Basel Committee on Banking Supervision, 2017b): Sovereign assets are one of the most liquid asset classes traded in financial markets. As such, they constitute an effective tool for the implementation of active liquidity management by banks. These instruments are eligible for inclusion within the High-Quality Liquid Assets (HQLA) of the Liquidity Coverage Ratio as part of Basel's liquidity requirements to satisfy banks' prudential and internal liquidity thresholds and buffers (European Systemic Risk Board, 2015).
- "Legislation and Regulation" (Basel Committee on Banking Supervision, 2017b): The preferential national treatment of Sovereign exposures in capital regulation provides banks with a strong incentive to hold Sovereign assets as they typically result in lower capital charges as compared to other asset categories. In Lebanon, besides the favorable zero risk weight prescribed for local currency Treasury-bills and placements in local currency with the Central Bank, placements in foreign currency with the Central Bank receive a 50% preferential risk weight as opposed to the 100% risk weight on Eurobonds issued by the Lebanese Government. This motivates banks to maintain their roles as the main actors within the primary government debt market through their frequent subscriptions to debt issuances by the Lebanese Government and to keep investing their excess liquidity with the Central bank through certificates of deposits.

Moreover, the Central Bank of Lebanon continues to provide key incentives for banks to hold Sovereign assets. For instance, by the end of 2017, the Central Bank increased the interest rate on the banks' long-term placements by around 3% to lengthen their maturity and motivate banks to continue to invest in these placements and in turn attract long-term deposit flows (International Monetary Fund, 2018). In general, the ESRB report refers to such motivations as "moral suasion" as the decision to hold Sovereign assets is mainly exogenous to banks and is the result of specific local requirements imposed on banks (European Systemic Risk Board, 2015).

- "Investment Opportunities" (Basel Committee on Banking Supervision, 2017b): Sovereign assets provide an attractive risk-return proposition as compared to other alternative investment opportunities.

Moreover, the ESRB report identifies additional motivations for holding Sovereign debt as follows (European Systemic Risk Board, 2015):

- Limited lending market: The limited target market for lending makes competition between banks for market share more challenging. As such, banks' motivation to hold Sovereign assets can be explained by their search for profitable opportunities.
- "Self-preservation" (European Systemic Risk Board, 2015): The holding of Sovereign exposures by banks is attributed to the fact that banks intervene by supporting their Sovereign in order to decrease the probability of its default and to minimize systemic risk which causes all the negative repercussions on the banks' financial position (as discussed above).

The favored holding of domestic Sovereign exposures as compared to other exposures is termed in the finance literature as the "home country bias". This phenomenon is explained by the relatively low information acquisition costs on these investments and the asymmetry of information that exists between domestic and foreign Sovereign investments whereby it is more difficult for investors to gather the required information enabling the assessment of the financial conditions of foreign as opposed to domestic Sovereigns ((Coeudarcier and Rey, 2013; Lewis, 1999 as cited in (Lanotte, Manzelli, Rinaldi, Taboga, & Tommasino, 2016)). In the long-run, the favored holding of Sovereign instruments can lead to a crowding-out effect of lending to other market participants (European Systemic Risk Board, 2015) and supports "financial repression" i.e. when private savings are channeled to the Sovereign leading to a misallocation of resources in the long-term (Bank for International Settlements, 2013).

E. Determinants of Sovereign Default

At the most basic level, Sovereign distress is experienced due to fiscal imbalances as indicated by a decline in tax revenues and/or "excessive public spending" (European Systemic Risk Board, 2015). Subsequently, the literature on early warning indicators of Sovereign defaults attributed Sovereign default events to either domestic or external factors (Ams, Baqir, Gelpern, & Trebesch, 2018).

According to Ams et al. (2018), domestic determinants of default pertain to debt mismanagement as manifested by an underlying "crisis of economic fundamentals" within a particular country (Ams, Baqir, Gelpern, & Trebesch, 2018). In turn, debt mismanagement can be viewed through either a liquidity or solvency perspective (Manasse and Roubini (2009) as cited in (Ams, Baqir, Gelpern, & Trebesch, 2018)). A Sovereign default event can be triggered by a domestic liquidity crisis whereby the

Sovereign finds “difficulties in refinancing short-term debt” (Ams, Baqir, Gelpern, & Trebesch, 2018). Manasse and Roubini (2009) showed that under this case, the risk of default is significant when short-term debt is measured above 130% of the country’s reserves (as cited in (Ams, Baqir, Gelpern, & Trebesch, 2018)). Alternatively, a Sovereign default event can be the result of an unsustainable debt burden that leads to insolvency. Manasse and Roubini (2009) showed that under this case, the risk of default is significant when external debt exceeds 50% of the country’s GDP (as cited in (Ams, Baqir, Gelpern, & Trebesch, 2018)). Unlike common views, the same study did not find the total debt to GDP as a useful predictor of Sovereign defaults. Similarly, Reinhart et al. (2003) proved that debt intolerance is not necessarily manifested at high levels of total debt to GDP ratios as evidenced by the occurrence of many Sovereign defaults at significantly low debt to GDP ratios (as low as 20%) (as cited in (Ams, Baqir, Gelpern, & Trebesch, 2018)).

This analytical result is also consistent with the Basel Committee’s view on the determinants of Sovereign defaults. According to the Committee:

> Sovereign defaults may be less likely to occur in countries where domestic agents/banks hold more domestic sovereign debt, as this concentrates the costs of a government default on resident citizens and banks, thus creating a commitment device for the sovereign. (Basel Committee on Banking Supervision, 2017b, p. 5)

As Sovereigns have theoretically no incentive to default on their domestic debt i.e. debt denominated in local currency, the total size of outstanding debt to GDP is thus less relevant to determine the likelihood of default but rather the debt composition (i.e. mix of local vs. foreign currency) as compared to the size of the economy is what drives the probability of Sovereign distress.

Reinhart et al. (2003) also found that despite a weak Sovereign solvency, a historical track record of no default is indicative of lower chances of default on future

obligations and is associated with a higher perceived Sovereign creditworthiness (as cited in (Ams, Baqir, Gelpern, & Trebesch, 2018)).

According to Kaminsky and Vega Garcia (2016), the external determinants of default are mainly related to external "systemic debt crisis" that are disseminated via contagion channels (as cited in (Ams, Baqir, Gelpern, & Trebesch, 2018)). Also, findings by Reinhart et al. (2016,2018) showed that a sudden decline in international capital flows between countries that is simultaneously matched with a global decline in commodity prices are powerful determinants of default (as cited in (Ams, Baqir, Gelpern, & Trebesch, 2018)). The ESRB report further identifies an additional factor related to investor sentiment that leads to "self-confirming expectations" about Sovereign default (European Systemic Risk Board, 2015). When investors are unsure about the Sovereign's potential ability to repay its debt, they bid up the level of interest rates to an extent that the Sovereign can no longer service its debt payments (European Systemic Risk Board, 2015).

CHAPTER VII

LITERATURE REVIEW OF SOVEREIGN RISK MEASUREMENT APPROACHES

The review of prior literature on Sovereign risk aims to explore the various approaches that were developed throughout the years in order to measure and manage this risk. Models for measuring the probability of default and loss given default will be separately reviewed. The resulting methodologies will be the starting point for the development of an IFRS 9 compliant Sovereign ECL approach.

A. Overview of Approaches for Measuring Sovereign Default Probabilities

Traditional literature on Sovereign and country risk dealt with top-down approaches that relied on regression models of explanatory variables pertaining to macro-economic and financial conditions along with other country-specific indicators assumed to explain and predict credit events within a particular country. At that stage, academics were interested in explaining the determinants of Sovereign credit rating and probability of default.

Cantor and Packer (1996) were amongst the first to research the main determinants of Sovereign credit ratings. Through regression analysis, they measured the explanatory power of eight financial variables and determined that the following six variables are significant in determining Sovereign credit ratings: per capita income, GDP growth, inflation, external debt, economic development and default history (Cantor & Packer, 1996).

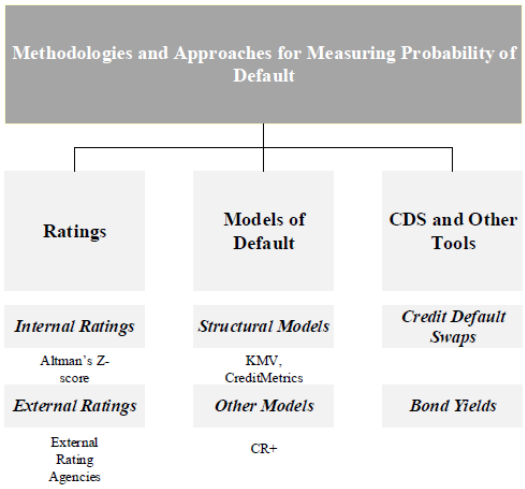
The subsequent body of research studied fundamental determinants of country risk covering three perspectives: debt intolerance, original sin and currency mismatches

(Remolona, Scatigna, & Wu, 2008a). Reinhart et al. (2003) found that emerging countries with a poor repayment history are likely to experience debt intolerance at even low thresholds of debt burden (at 10% to 15% of GNP) (as cited in (Remolona, Scatigna, & Wu, 2008a)). Eichengreen et al. (2003) found that a country's inability to borrow in its local currency in international markets (i.e. a higher original sin) is associated with higher country risk (as cited in (Remolona, Scatigna, & Wu, 2008a)). Goldstein and Turner (2004) found that higher currency mismatches defined as the degree of vulnerability of a Sovereign's net worth to adverse movement in the exchange rate renders the Sovereign more prone to crisis (as cited in (Remolona, Scatigna, & Wu, 2008a)).

Similarly, Kriz, Wang and Issarachaiyos (2015) found a statistically significant positive relationship between Sovereign external debt and its market-assessed probability of default implied from CDS spreads, emphasizing the importance of debt burden in the market perception of the Sovereign default probability (Kriz, Wang, & Issarachaiyos, 2015). The researchers also found that the Sovereign PD is negatively related to selected economic factors including: GDP growth, cash surplus (defined as government revenue minus total expenditure) and the Sovereign credit rating while also being positively related to the change in the inflation rate and the government revenue as a percentage of GDP (i.e. government size) (Kriz, Wang, & Issarachaiyos, 2015).

Over time, researchers were more interested in deriving formal models and measures of Sovereign default. The plethora of approaches proposed by academics and researchers for measuring the traditional probability of default on all portfolios can be categorized in accordance to the diagram below. While some of these models have a widespread application to Sovereign portfolios, other models might require some calibration to be employed for Sovereign portfolios.

Figure 7.1: Methodologies and Approaches for Measuring the Probability of Default



Source: Adapted from edX, Introduction to Credit Risk Management (edX - Deflt University of Technology, 2016)

- Ratings: The most developed and researched class of PD models is the one that relies on ratings. Ratings are "assessments of the relative likelihood that a borrower will default on its obligations" (Cantor & Packer, 1996, p. 38). They can be either sourced from an external rating agency (such as Moody's, S&P or Fitch) or developed through internal rating models. Within the context of Sovereign portfolios, external ratings will be more relevant to explore due to the prevalence of Sovereign rating assessments as conducted by external rating agencies. As such, the role of *external* ratings, their discriminatory power and the rating assessment criteria will be further discussed. Such models will be referred to as "ratings-implied" as they rely on the rating-agencies' assessments to derive a measure of expected loss based on actual default rates published by rating agencies for each credit rating (Remolona, Scatigna, & Wu, 2008a).

- Structural models of default: Other academics employed complex market models to estimate probabilities of default by relying on options' pricing theory, asset values and volatility. This class of models is referred to as the "structural" approach (Gray, Merton, & Bodie, 2007). The basic methodology relies on modeling the established relationship between assets and liabilities (which are modeled as "contingent claims" on assets) to estimate "distance to distress", the "distress barrier" along with other credit risk measures including the PD (Gray, Merton, & Bodie, 2007). The structural approach was originally developed for publicly listed corporate entities under Moody's KMV model (refer to (Crosbie & Bohn, 2003)). However, Gray et al. (2007) and Gapen et al. (2008) extended similar analysis to Sovereign portfolios (refer to (Gray, Merton, & Bodie, 2007) and (Gapen, Gray, Lim, & Xiao, 2008)).

  Due to the inherent complexity of such models and the significant implementation burden that they impose as pertaining to the required modeling capabilities, these models will not be deemed feasible to employ for IFRS 9 purposes.
- Other models of default: Other academics suggested the use of bottom-up approaches to measuring Sovereign risk. For instance, Altman et al. (2011) developed a model for measuring Sovereign risk based on the premise that the health of the corporate sector within a country is a key determinant and predictor of the Sovereign's default risk (Altman & Rijken, 2011). Through a credit scoring model that relies on multiple financial, market and macro-economic variables, the authors rated corporate entities within a particular country, transformed the credit score into a default measure and aggregated

the resulting individual corporate PDs into a combined Sovereign PD measure (Altman & Rijken, 2011).

The application of such approaches within the Lebanese context has serious limitations due to the limited diversification of corporate activity and the current limited activity of the Beirut Stock Exchange with a current market capitalization of 9.8 billion USD and only 10 listed entities, more than half of which are banks (Beirut Stock Exchange, 2018).

- Measures of default based on credit default swaps and bond yields:

  Measures of default risk based on market prices mainly relate to the use of either Sovereign CDS or bond yields to determine the probability of Sovereign default. This class of models considers that ratings shall not be the starting point of the Sovereign risk assessment as they are typically not responsive on a timely basis to changes in credit quality. Recently, the interest in the use of CDS spreads rather than bond yield spreads as a measure of credit risk has been widely endorsed by academics. Ericsson, Jacobs, and Oviedo (2009) found that CDS spreads are superior to bond yield spreads in measuring default risk due to the added noise arising from the specification of a risk-free yield curve in the case of bond yields which is not required when dealing with CDS spreads (as cited in (Kriz, Wang, & Issarachaiyos, 2015)). Similarly, Ericsson, Jacobs, and Oviedo (2009) found that CDS spreads "reflect changes in credit risk more quickly and accurately than bond yield spreads" (as cited in (Kriz, Wang, & Issarachaiyos, 2015)). Longstaff et al. (2011) also argue that the use of CDS spreads rather than bond yields for modeling default risk is favored

due to the higher liquidity of the CDS market and the resulting accuracy of the estimates (Longstaff, Pan, Pedersen, & Singleton, 2011).

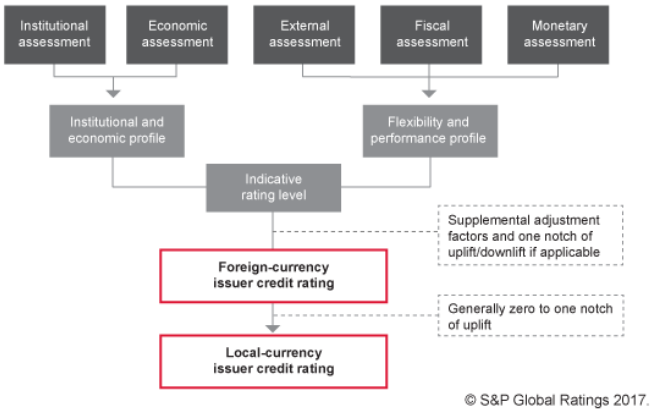
After investigating the various approaches for measuring Sovereign PD, the research will focus on "ratings-implied" PD models and "CDS-implied" PD models.

1. *Ratings'-Implied PD Models*

"Sovereign ratings pertain to a sovereign's ability and willingness to service financial obligations to nonofficial (commercial) creditors" (S&P, 2017b). In order to rely on PDs published by external rating agencies, it is important to understand how they rate Sovereign issuers.

The three main credit rating agencies are: Moody's, Standard & Poor's (S&P) and Fitch. Partnoy (2009) and Schroeter (2011) designate rating agencies as "information intermediaries" (as cited in (Bank for International Settlements, 2013)). These agencies rely on multiple data sources including non-public information sources, to provide valuable insights that transcend traditional accounting analysis (Bank for International Settlements, 2013). They agencies publish their general rating methodologies and approaches for assessing the creditworthiness of issuers. According to S&P, the five key areas that are considered in the Sovereign issuer's rating assessment are the following (S&P, 2017b):

Figure 7.2: S&P Sovereign Rating Framework



Source: Sovereign Rating Methodology (S&P, 2017b)

- "Institutional Assessment": This assessment determines the quality and transparency of a country's institutional framework in terms of laws, regulations and policies that influence the Sovereign's ability to service its debt.
- "Economic Assessment": This assessment determines the health of the country's economy as measured by various indicators including GDP per capita, degree of economic diversification and growth, amongst other.
- "External Assessment": This assessment determines the degree of a country's currency strength and external liquidity in international transactions and exchanges with the rest of the world.
- "Fiscal Assessment": This assessment determines the degree of debt sustainability by considering various indicators including debt composition, access to finance amongst other.
- "Monetary Assessment": This assessment determines the strength of a country's monetary policy enacted by the Central Bank by examining the

exchange rate regime (whether floating or fixed), inflation trends amongst other.

Each of the identified factors considered within each of the five areas discussed above, is scored from 1 (strong) to 6 (weak). Interestingly, the rating agency S&P refers to the process of assigning scores to the different criteria as being based on "forward-looking" assessments of both qualitative and quantitative factors (S&P, 2017b). S&P then determines the country's institutional and economic profile by averaging the scores of both the institutional and economic assessments. Likewise, the country's flexibility and performance profile is obtained by averaging the related scores of the external, fiscal and monetary assessments. At this stage, an indicative rating level can be determined based on the below matrix:

Figure 7.3: S&P Sovereign Indicative Rating Matrix

		INSTITUTIONAL AND ECONOMIC PROFILE										
	Category	Superior	Extremely strong	Very strong	Strong	Moderately strong	Intermediate	Moderately weak	Weak	Very weak	Extremely weak	Poor
FLEXIBILITY AND PERFORMANCE PROFILE	*Category*	Assess-ment	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
	Extremely strong	1 to 1.7	aaa	aaa	aaa	aa+	aa	a+	a	a-	bbb+	bb+	bb-
	Very strong	1.8 to 2.2	aaa	aaa	aa+	aa	aa-	a	a-	bbb+	bbb	bb+	bb-
	Strong	2.3 to 2.7	aaa	aa+	aa	aa-	a	a-	bbb+	bbb	bb+	bb	b+
	Moderately strong	2.8 to 3.2	aa+	aa	aa-	a+	a-	bbb	bbb-	bb+	bb	bb-	b+
	Intermediate	3.3 to 3.7	aa	aa-	a+	a	bbb+	bbb-	bb+	bb	bb-	b+	b
	Moderately weak	3.8 to 4.2	aa-	a+	a	bbb+	bbb	bb+	bb	bb-	b+	b	b
	Weak	4.3 to 4.7	a	a-	bbb+	bbb	bb+	bb	bb-	b+	b	b-	b-
	Very weak	4.8 to 5.2	bbb	bbb	bbb-	bb+	bb	bb-	b+	b	b	b-	b-
	Extremely weak	5.3 to 6	bb+	bb+	bb	bb-	b+	b	b	b-	b-	b-	b-

Assigning 'CCC+', 'CCC', 'CCC-', and 'CC' ratings is based on "Criteria For Assigning 'CCC+', 'CCC', 'CCC-', And 'CC' Ratings," Oct. 1, 2012.

Source: Sovereign Rating Methodology (S&P, 2017b)

The indicative ratings provided in the matrix can be interpreted as follows: For a Sovereign that has a "Strong" Institutional and Economic profile and an "Intermediate" Flexibility and Performance profile, a rating of A (or within one-notch of A) will be

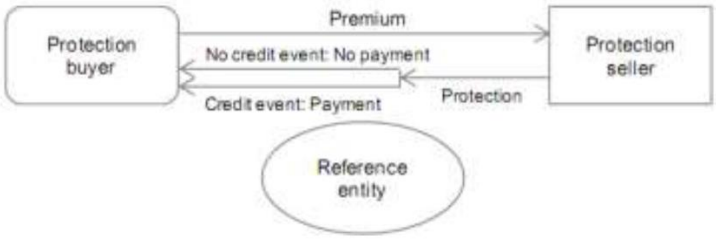
assigned for the Sovereign's *foreign currency* debt. However, a variation exceeding one-notch from the indicative rating level is deemed necessary in case the Sovereign meets supplemental adjustment factors that, in the view of S&P, positively or negatively impact the Sovereign's creditworthiness. As for local currency debt issued by countries that maintain control over their monetary policy (i.e. countries that are not part of a monetary union), the assigned rating can be up to one notch better than the foreign currency debt rating due to the inherent control that the Sovereign has over its local currency which acts to support its relative creditworthiness. The rating scale is then matched with a probability of default based on observed historical default rates for Sovereign issuers. Better credit ratings are associated with lower observed probabilities of default. Appendix I contains an illustrative table of Sovereign PDs for each rating grade as published by S&P and Moody's.

Finally, it is important to note the characteristics of ratings for the purpose of relying on rating agencies' assessments. As a variable, credit ratings tend to exhibit the following properties: (i) stability, (ii) pro-cyclicality and (iii) serial correlation (Bank for International Settlements, 2013). The stability feature of ratings is explained by the infrequency of rating changes. Ratings' pro-cyclicality refers to the tendency of ratings to move in the same direction of the economic cycle, further reinforcing the effects of the business cycle. Serial correlation implies that the future level of rating is correlated with the present level of ratings. In fact, S&P observed that in 54% of the cases throughout the last 37 years of Sovereign ratings' history, Sovereign rating downgrades were followed by subsequent downgrades in the following two years (as cited in (Bank for International Settlements, 2013).

2. *CDS-Implied PD Models*

According to Hull (2015), a CDS contract is a type of credit derivative that provides coverage against the default of a reference entity. The protection buyer typically holds the debt issued by the reference entity and pays the CDS spread (expressed as a % of the principal) to the protection seller periodically until the occurrence of some specified credit event (either a default or restructuring). In case of no credit event, the protection buyer continues to pay the spread until CDS maturity. The following diagram presents a summary of the rights and obligations underlying CDS contracts:

Figure 7.4: Payoffs for CDS Contract Buyers and Sellers



Source: Debt Burden and Perceived Sovereign Default Risk: Evidence from Credit Default Swaps (Kriz, Wang, & Issarachaiyos, 2015, p. 207)

The contract can call for either cash or physical settlement upon the occurrence of a credit event. Under the most frequent cash settlement method, the protection buyer is compensated for the difference between the original bond's face value and the market value of the cheapest deliverable bond determined via an auction process. In contrast, under the physical settlement method, the protection buyer sells the bonds at full face value to the protection seller (Hull J. C., 2015).

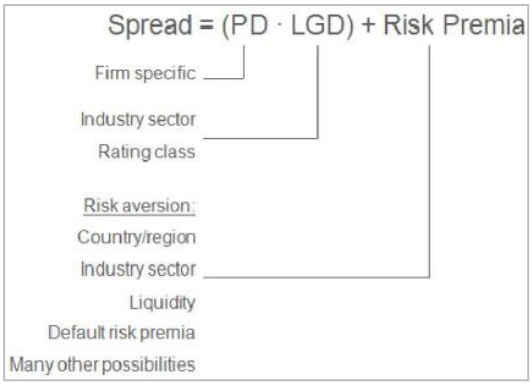
The recent surge of interest in CDS-based measures of Sovereign risk is due to fact that they are perceived as a measure of expected loss by market participants (Chan-Lau (2003) as cited in (Kriz, Wang, & Issarachaiyos, 2015)). However, some researchers solely attributed observed spreads to default risk (Remolona, Scatigna, & Wu, 2007). For instance, the traditional structural models of default that rely on the option pricing theory tested their Sovereign risk measures directly with observed market spreads. In that sense, these models did not perceive spreads to measure other than default risk (Remolona, Scatigna, & Wu, 2007), a reasonable assumption if investors were truly risk-neutral (Tempelman, 2011).

Other academics and researchers were keen to understand the composition of this new measure of default risk. Remolona et al. (2007) compared the observed market CDS spreads with their estimates of expected loss as implied by rating agencies and concluded that CDS spreads significantly exceeded the estimated expected losses from default, implying the existence of a sizeable risk premium (Remolona, Scatigna, & Wu, 2007). Similarly, many authors emphasized a serious divergence between the market assessment of Sovereign risk and the assessment of that risk as suggested by the country's economic fundamentals (Remolona, Scatigna, & Wu, 2008b). Longstaff et al. (2011) found that "on average, the risk premium represents about a third of the credit spread" (Longstaff, Pan, Pedersen, & Singleton, 2011). This documented gap is consistent with empirical observations on corporate bonds and is referred to as the "credit spread puzzle" in the finance literature (as cited in (Remolona, Scatigna, & Wu, 2007)).

In an attempt to reconcile this disagreement, academics have long researched the determinants of credit spreads. Specifically, Remolona et al. (2007, 2008) focused on emerging markets' Sovereign CDS spreads and decomposed them into their two

constituents: the expected loss from default and the pricing of that risk as perceived by market participants i.e. the risk premium. The authors conclude that the risk premium is demanded by investors because "realized loss from default may exceed the expected loss" (Remolona, Scatigna, & Wu, 2007). It also relates to other liquidity, market and country risk premia that the risk-averse investor requires compensation for, over and above the expected loss component (Tempelman, 2011). The following figure details the composition of the CDS spreads:

Figure 7.5: Composition of CDS Spreads



Source: Tempelman, US Sovereign Risk Update - Quantifying Default Probabilities from Market Signals (Tempelman, 2011).

Thus, in line with the findings of the prior researchers and specifically (Remolona, Scatigna, & Wu, 2008b), the market-assessed Sovereign credit risk can be formalized in the following simple analytical framework:

Sovereign Spread = Sovereign Risk + Price of Risk

Where:

- Sovereign Risk is the risk of default as driven by the economic fundamentals of the Sovereign and based on market expectations.

- Price of Risk is the risk premium component of spreads measuring the compensation demanded by investors for bearing default risk, the market attitude towards risk and time-varying risk aversion.
- Sovereign Spread is then the *market-assessed* financial compensation required by investors over and above the risk-free rate for bearing Sovereign risk. The level of the spread is thus a function of both fundamental analysis of Sovereign macro-economic factors and investors' level of risk aversion.

Several hypotheses have been proposed to explain the "credit spread puzzle" and understand the nature and size of the risk premium embedded in CDS and bond yield spreads. Remolona et al. (2008) found that the risk premium is mainly driven by external factors as related to global risk aversion (Remolona, Scatigna, & Wu, 2008b). Similarly, many studies indicated that Sovereign spreads in an emerging market context are increasingly correlated with each other (Mauro, Sussman and Yafeh (2002) as cited in (Remolona, Scatigna, & Wu, 2008b)) and that changes in spreads are largely driven by a common factor pertaining to international rather than local macro-economic conditions of the specific Sovereign (Westphalen (2001), McGuire and Schrijvers (2003) and Garcia-Herrero and Ortiz (2007) as cited in (Remolona, Scatigna, & Wu, 2008b)). Longstaff et al. (2011) also found commonality in the Sovereign credit spreads of their 26 sampled developed and emerging markets. The authors found that global financial market variables, including the US stock market returns and the VIX volatility risk premium, account for the most significant variation in CDS spreads across countries (Longstaff, Pan, Pedersen, & Singleton, 2011). Amidst these puzzling findings on the prominent role played by global factors in explaining variations in CDS spreads,

the study rightfully attempts to answer the question of *"How Sovereign is Sovereign Credit Risk?"* (Longstaff, Pan, Pedersen, & Singleton, 2011).

The "credit spread puzzle" phenomenon has important implications on the estimation of default probabilities implied from observed CDS spreads. Hull (2015) explains the risk neutral world as one in which investors do not require any risk premium. Under a risk-neutral valuation, the value of the CDS derivative does not depend on investors' risk preferences, which are reflected in the price of the underlying bond/instrument. Risk-neutral default measures that are implied from observed CDS spreads or bond yields will tend to overstate physical or real-world default rates due to the fact that investors are not in reality risk-neutral (Hull J. C., 2015). According to Hull, Predescu &White (2005), this result implies the presence of an excess return required by investors beyond the risk-free rate to compensate them for the cost of defaults. The authors explain that the key factors driving this risk premium mainly relate to: (i) the investors' required compensation for the relative illiquidity of bonds as an investment ("liquidity risk"), (ii) the non-diversifiable nature of default risk in the context of bonds which exhibit strong default correlation ("systematic risk") and (iii) the inability to even diversify firm-specific risk except with infinitely large portfolios ("idiosyncratic" or non-systematic risk) ((Hull, Predescu, & White, Bond Prices, Default Probabilities and Risk Premiums, 2005); (Hull J. C., 2015)).

As risk-neutral PDs overstate the actual level of risk, physical PDs shall be considered from an IFRS 9 perspective. As such, an adjustment must be performed in order to extract the default component from the CDS spread and employ the resulting component as the Sovereign PD in the calculations of ECL. For instance, Gubareva (2018) attempted to produce a pure default spread by relying on the published observed default rates by rating agencies for a particular rating grade. She then deduced the size

of the default component by comparing the default spread with the market observed CDS spread. The weight of the default spread over the total spread given a particular credit rating and time horizon was then applied on the current CDS spread of the instrument to develop a point-in-time (PiT) forward looking measure of default risk implied by CDS spreads (Gubareva, 2018).

3. *Ratings vs. CDS: A Comparison*

After exploring the different indicators of Sovereign credit risk; being CDS spreads and credit ratings, a natural question follows next: which measure is superior for determining Sovereign credit risk? The superiority of these measures can be assessed from different perspectives: measure's availability, frequency of update, default predictive power, etc. However, from an IFRS 9 perspective, the superiority of a particular measure will be evaluated through its fulfillment of the Standard's "forward-looking" mandate.

The early work of Cantor and Packer (1996) investigated the relationship between Sovereign ratings and bond spreads (Cantor & Packer, 1996). Their study found that rating announcements influence bond yields in the anticipated direction. Moreover, the authors found that ratings "provide additional information beyond that contained in the standard macroeconomic country statistics incorporated in market yields" (Cantor & Packer, 1996, p. 44). In fact, ratings explained around 92% of the change in credit spreads as compared to only 86% explained by macro-economic Sovereign risk indicators used to set ratings (Cantor & Packer, 1996).Their findings suggest that ratings provide useful information for market participants who factor in the updated information beyond that found in publicly available data, leading to an updated pricing of Sovereign risk (Cantor & Packer, 1996). Similarly, Micu et al. (2006) found

that “corporate credit default swap spreads react significantly to announcements by credit rating agencies” (as cited in (Remolona, Scatigna, & Wu, 2007)). This suggests that ratings provide new information that is not already incorporated in market prices, which reduces “information discovery” by investors (Bank for International Settlements, 2013). Research by Ismailescu and Kazemi (2010) within a Sovereign emerging market context, found an “asymmetric reaction of CDS markets to credit rating events” (Ismailescu & Kazemi, 2010). Specifically, they found that CDS markets are immediately affected by positive rating announcements whereas they are unreactive to negative rating announcements. The authors suggest that rating upgrades provide markets with new unanticipated information, whereas negative rating announcements are more likely to be anticipated through time by investors, leading to the observed limited responsiveness of CDS spreads (Ismailescu & Kazemi, 2010). Similarly, it was observed that rating changes involving single notch changes within investment grade do not result in substantial price movements as opposed to more drastic rating changes to below investment grade (Bank for International Settlements, 2013).

According to Borio and Packer (2004), credit ratings have the following advantages (as cited in (Remolona, Scatigna, & Wu, 2007)):

- Rating criteria are published and the rating methodology is explained by the external rating agencies.
- Ratings are frequently reviewed by the external rating agencies as new material information warrants new assessment of obligor credit quality.

However, Lanotte et al. (2016) consider that ratings’ accuracy is compromised, in the case of Sovereign portfolios, due to the rare default instances which limit the effectiveness of extrapolation (Lanotte, Manzelli, Rinaldi, Taboga, & Tommasino, 2016). Moreover, Eijffinger (2012) considers that the dependence of the financial

markets on rating assessments is problematic mainly due to the existing industry concentration which limits the ratings' quality and the existing "issuer-pays" model which increases the potential for conflicts of interest and biased outcomes (Eijffinger, 2012). Additionally and within the context of the Sovereign debt market, the author considers that these rating agencies do not provide the required level of transparency for their Sovereign ratings. Although the general rating approach and an overview of the basic criteria are provided, the weighting scheme and quantitative derivation of the score remain opaque (Eijffinger, 2012). Moreover, Lanotte et al. (2016) indicate that political factors also impact the final Sovereign rating (Lanotte, Manzelli, Rinaldi, Taboga, & Tommasino, 2016). As such, an existing concern for regulators is to minimize the present pervasiveness of credit ratings since the outbreak of the financial crisis. For instance, the updated Eurozone regulation of credit rating agencies aimed to address the ratings' transparency concern and to limit the over-reliance on the credit rating agencies in the present regulatory framework (refer to (Council of the European Union & European Parliament, 2013)).

Rodriguez et al. (2018) found that "the variation in average sovereign ratings in a given year can be explained by average credit default swap (CDS) spreads over the previous three years" (Rodriguez, Dandapani, & Lawrence, 2018). In addition, they found that "spread changes can predict sovereign events, while rating changes cannot" (Rodriguez, Dandapani, & Lawrence, 2018). Similarly, Eijffinger (2012) found that rating changes for countries like Greece, Italy, Spain and others during the Eurozone Sovereign debt crisis did not anticipate but rather followed the trend in the underlying Sovereign bond spreads (Eijffinger, 2012). Thus, credit ratings were found not to lead the market with new information. These findings indicate that ratings are, in general, a lagging measure of risk (Eijffinger, 2012). This property of credit ratings was

highlighted by Cantor and Packer (1996) study that explained credit ratings through the use of six financial variables considered as static accounting indicators (as cited in (Rodriguez, Dandapani, & Lawrence, 2018)).

This characteristic of credit ratings is mainly attributable to the "through-the-cycle" (TTC) rating approach considered by rating agencies that accounts for only persisting credit-related factors that impact the issuer's creditworthiness over the long-term ((Altman and Rijken, 2006) as cited in (Rodriguez, Dandapani, & Lawrence, 2018)). As such, this long-term orientation of the rating methodology enables rating agencies to produce more stable ratings as aligned to their objectives ((Cantor and Mann, 2007) as cited in (Rodriguez, Dandapani, & Lawrence, 2018)). Yet, achieving rating stability might compromise the equally important objective of adequately predicting default events ((Altman and Rijken, 2006) as cited in (Rodriguez, Dandapani, & Lawrence, 2018)). However, Rodriguez et al. (2018) point out that it is important to acknowledge the broader scope of the rating agencies' assessment that does not solely aim to predict Sovereign defaults but that is also universally employed in financial regulation and policymaking (Rodriguez, Dandapani, & Lawrence, 2018).

According to the IMF (2010), the TTC rating approach used by the credit rating agencies to produce ratings produces undesired "cliff effects" i.e. significant and sudden downgrades often to below investment grade (IMF (2010) as cited in (Eijffinger, 2012)). Eijffinger (2012) explains that these effects are due to the tendency of the smoothed TTC ratings to have serious fluctuations in case of *crisis* which are not attributable to the typical business cycles. On the other hand, a point-in-time (PiT) rating approach emphasizes the current situation of the borrower, disregarding the specific business cycle within which the borrower operates. As such, PiT ratings are less

likely to experience significant deteriorations as they are continuously updated based on new borrower information (Eijffinger, 2012).

In contrast, CDS spreads represent a more dynamic measure of risk that does not suffer from the persistency observed in TTC ratings. The point-in-time CDS spread focuses on conditions of the Sovereign at a specific period, incorporating all current information and future expectations about its creditworthiness. In fact, researchers found that "changes in CDS premiums are particularly useful in estimating the probability of negative events" (Ismailescu & Kazemi, 2010) and that CDS spreads provide a "leading indicator of rating downgrades" (Rodriguez, Dandapani, & Lawrence, 2018). In addition, Rodriguez et al. (2018) suggest that "CDS spreads could be an explanatory factor for ratings" (Rodriguez, Dandapani, & Lawrence, 2018, p. 3). The authors performed a regression of credit ratings against Cantor and Packer (1996) identified factors along with CDS spreads and found that the inclusion of the CDS spread improved the explanatory power of the model for determinants of credit ratings. As such, the authors advocate the use of CDS spreads as *substitutes* for credit ratings (Rodriguez, Dandapani, & Lawrence, 2018). However, it is important to note that such a statement disregards the CDS spread composition discussed earlier and the fact that "market-based measures are impacted by various capital market frictions and near-term market conditions (including the pricing of liquidity and counterparty risk)" (Bank for International Settlements, 2018, p. 3). Moreover, Altman et al. (2011) argue that the use of market-based measures of Sovereign risk is likely to produce volatile measures of default that are highly prone to the materialization of "self-fulfilling" expectations (Altman & Rijken, 2011).

Finally, it is believed that both CDS prices and rating actions are able to provide early warning signals of a potential Sovereign debt crisis and that Sovereign

risk pricing is "both influenced by and reflected in Sovereign credit rating" (Bank for International Settlements, 2013, p. 140). Despite the increasing design and use of internal-based models of Sovereign risk assessment and quantification (e.g. Bank of Canada), many banks (e.g. Swiss National Bank) continue to consider the more traditional analysis via ratings as serving the purpose of analyzing Sovereign risk at the required level of depth (Bank for International Settlements, 2013).

B. Sovereign Loss Given Default and Recovery Rates

The Sovereign risk literature surveys Sovereign historical default cases and examines whether significant differences in the realized loss given default borne by investors exist depending on the debt's currency denomination (local or foreign currency).

The literature on Sovereign defaults posits that default events are generally not conceivable for local currency Sovereign exposures. As such, these exposures tended to receive more favorable external ratings throughout the years. According to the ESRB report, this is mainly due to the ability of the Sovereign to "monetize" its debt i.e. to print the amounts due in order to avoid outright default (European Systemic Risk Board, 2015). As such, Sovereign exposures denominated in any foreign currency can be considered riskier than similar local currency exposures, due to the lack of the Sovereign's control over the supply of the foreign currency required to repay debt its obligations (Bank for International Settlements, 2018). However, the monetization of debt comes at a direct cost through home currency devaluation both internally (i.e. inflation) and externally (i.e. exchange rate movements that affect trade competitiveness relative to other countries) (European Systemic Risk Board, 2015). This is consistent

with Basel's Committee finding on Sovereign's unwillingness to actually inflate debt in local currency (Bank for International Settlements, 2018).

According to Moody's (2010), the rating gap between local and foreign currency denominated debt has been considerably shrinking due to empirical observations that the "credit distinction between LC and FC bonds should not be exaggerated" (Moody's, 2010, p. 6). In fact, domestic defaults were numerous throughout history and a weakened debt servicing capacity tended to spill over local currency debt as much as foreign currency debt (Moody's, 2010). For instance, the recent historical defaults of Russia (1998), Venezuela (1998), Ukraine (1998), Ecuador (1999), Turkey (1999), Argentina (2001), Uruguay (2003), Cameroon (2004) and Jamaica (2010) amongst other occurred on local currency debt either separately or simultaneously with foreign currency debt (Moody's, 2010).

In its methodological publication, Moody's (2010) explains that a higher rating gap in favor of local currency debt is only justified given the following considerations (Moody's, 2010):

- **Availability of Local Currency**: The availability of unlimited local currency to service debt payments as they come due is a key repayment feature for locally denominated government debt. Through its ability to print money, the central bank usually can monetize local currency debt. However, foreign currency availability is driven by market operations and the country's balance of payments, which are not within the direct control of the Sovereign. The debt monetization ability justifies the rating gap in favor of local currency debt (Moody's, 2010).
- **"External liquidity constraints"** (Moody's, 2010): The government can engage in contractionary fiscal policies (i.e. increasing taxes or decreasing

expenditures) in order to generate enough local currency to repay its domestic debt. As for the repayment of external debt, the government can access foreign currency on the foreign exchange market whereby the government exchanges local currency resources with their counter value in foreign currency or alternatively, the government can tap into the official foreign currency reserves held by the central bank. The depth and liquidity of the foreign exchange market along with the existence and sufficiency of foreign currency reserves increase the riskiness of foreign currency debt as compared to local currency debt and justify a rating gap (Moody's, 2010).

- **Costs of Default**: A default on locally denominated debt is associated with higher political and economic costs as this debt is mostly held by residents of a country. As such, "it is harder for a sovereign to meet obligations that are denominated in a currency that is not its own, and because the costs of external defaults tend to be borne by non-residents" (Basel Committee on Banking Supervision, 2017b, p. 6). This reality justifies the rating gap in favor of local currency debt (Moody's, 2010).
- **"Limited Capital Mobility"** (Moody's, 2010): Within a financially integrated world with free capital movement, concerns about a potential default on foreign currency debt triggers a red flag for local currency debt holders who, in the absence of capital restrictions, can sell their holdings of local currency government debt, pushing interest rates upwards and further worsening the government's ability to repay its local currency debt. As such, a rating gap in favor of local currency debt is only justified in the case of limited capital mobility due to restrictions imposed by countries on the movement of capital flows and/or with the presence of a committed and

stable domestic investor base. These factors act to restrict the risk of contagion and spillovers between foreign and local currency denominated debt, which results in a higher rating gap (Moody's, 2010).

In addition, the Bank for International Settlements (2018) highlights an additional factor affecting the relative Sovereign debt riskiness (Bank for International Settlements, 2018):

- **Degree of interconnectedness between the banking sector and the Sovereign**: The higher the level of Sovereign exposure held by the banking system, the greater the interconnectedness between the Sovereign and banks and the stronger the feedback loop between banks and their Sovereign. As local banks tend to hold more local currency government debt, a Sovereign default on local debt triggers the "negative feedback loop" between banks and their Sovereign (Bank for International Settlements, 2018), further worsening Sovereign's creditworthiness. Thus, the rating gap decreases and no longer favors local currency debt. Alternatively, the Bank for International Settlements (2018) highlights an opposite hypothesis which states that Sovereign creditworthiness is likely to be enhanced the greater the banking sector's holding of Sovereign debt. This is attributable to the known degree of banking sector damage that a Sovereign default can cause, which acts as a positive reinforcement incentivizing timely debt repayment (Bank for International Settlements, 2018).

In the recent years, the power of these factors to justify a higher local currency debt rating has been diminished due to globalization, improved trade and free capital flows at emerging countries, blurred lines between currency and residency and the availability of foreign currency reserves (Moody's, 2010). Collectively, these factors

tended to diminish government's selective default on foreign currency debt in favor of local currency debt (Moody's, 2010).

Many approaches were explored in the literature to measure loss given default on Sovereign debt. For instance, Alesina and Weder (2002) adopted the "face value haircut" approach for the measurement of the associated investor losses based on examining the reduction in the outstanding value of nominal debt (as cited in (Cruces & Trebesch, 2013)). However, Cruces and Trebesch (2013) argue that despite its apparent simplicity and ease of implementation, the approach ignores the losses that could be borne by investors even when the face value of the debt does not change i.e. through maturity extension (Cruces & Trebesch, 2013). A more robust approach for measuring Sovereign LGD is through the "present value" approach as widely endorsed by academics and practitioners including central bankers and the IMF (Cruces & Trebesch, 2013). The "market haircut" measure, i.e. the share of outstanding debt that will not be repaid to the creditor, represents the true "wealth loss" to creditors within the context of a debt restructuring. The haircut is thus defined as (Cruces & Trebesch, 2013):

$$Haircut = 1 - \frac{Present\ value\ of\ new\ debt}{Face\ value\ of\ old\ debt}$$

Cruces and Trebesch (2013) report an average haircut amounting to 37% based on their analysis covering Sovereign debt restructurings between the years 1970 and 2010 (Cruces & Trebesch, 2013). Similarly and for the recent examined period extending from 1983 to 2016, Moody's (2017) reports an average Sovereign issuer-weighted recovery rate (i.e. 1 minus loss given default) of 65% implying an LGD of 35% computed as the ratio of the present value of debt received in debt exchange as compared to the original value of debt, discounted at the yield preceding default (Moody's, 2017).

Finally, it is important to note that the Sovereign LGD and/or the recovery rates are typically hard to estimate due to the ex-post effect of associated losses. The exact loss cannot be quantified with certainty as the question of default is highly linked to political and strategic issues that are clearly beyond the aforementioned economic and financial rationalization. The LGD also depends on the form of the Sovereign default i.e. whether an outright default, a debt restructuring (maturity extension, decrease in interest rate, etc.) with associated haircuts or debt retirement through buy-back. These distinct considerations are beyond the scope of this discussion.

CHAPTER VIII

PRESCRIBED IFRS 9 SOVEREIGN ECL APPROACHES – DEVELOPING AND DEVELOPED COUNTRIES

The following section surveys the application of specific approaches prescribed by various financial regulators around the world (with a special focus on the Middle East and North Africa region) to determine IFRS 9 ECL on Sovereign portfolios. The research aims to examine whether the perception of Sovereign risk differs between developing and developed countries and the impact of this perception on the regulatory approaches specified for measurement of IFRS 9 Sovereign ECL. Moreover, the provided insights into potential approaches can be a starting point to inform the continued dialogue on the election of the most suitable Sovereign ECL approach for banks in Lebanon.

The selected sample of countries has all issued guidance for the implementation of IFRS 9 impairment requirements. The research examines whether prescribed approaches are defined for the Sovereign portfolio as part of these issued local compliance requirements. It is important to note that in many cases, the Sovereign portfolio approach is not specifically addressed or documented in the regulatory guidance issued by the financial regulator in a particular country. However, the ECL approach adopted by banks as part of the accepted and established local market practice will still be highlighted[1].

Specifically, the survey of IFRS 9 implementation guidance aims to test the following hypotheses:

[1] I want to thank EY contacts for sharing industry insights in particular countries to determine the applicable market practice for IFRS 9 Sovereign portfolio approaches.

(i) H1: It is more likely that developed/advanced economies allow for more discretion in the application of Sovereign ECL approaches due to their highly perceived creditworthiness.

(ii) H2: It is more likely that developing countries are more prescriptive of particular Sovereign ECL approaches to restrict excessive risk-taking and ensure appropriate banking sector provisioning to face systemic crisis.

These hypotheses rest on the assumption that developing countries have a lower creditworthiness than advanced countries, which is the case in the elected sample of countries. Moreover, it is to be noted that the assessment of these hypotheses is performed based on qualitative data rather than through formal statistical analysis, in line with the objectives of this benchmark exercise.

The selected sample of countries that have issued particular IFRS 9 guidance are classified in accordance to the World Bank economies' classification by income level (refer to World Bank Country and Lending Groups Country Classification) and the most recent credit rating is indicated as sourced from Moody's online database as follows:

- Developing Economies: Egypt (B3), Iraq (Caa1), Jordan (B1), Kenya (B2) and Nigeria (B2).
- Developed/Advanced Economies: Bahrain (B2), Kuwait (Aa2), Oman (Baa3), Qatar (Aa3), Saudi Arabia (A1), Seychelles (Ba3), Singapore (Aaa) and the United Arab Emirates (Aa2).

Based on the conducted assessment, a total of 2 countries (Jordan and Qatar) addressed the Sovereign portfolio treatment and prescribed specific approaches for

calculating ECL on the Sovereign portfolio out of the 13 sampled countries with issued IFRS 9 implementation guidance. Appendix II includes a comprehensive listing of the consulted guidance issued by these selected countries. The results of the assessment are summarized below:

Table 8.1: Selected Countries' IFRS 9 Sovereign ECL Guidance and Market Practice

Country	**IFRS 9 Sovereign Guidance**	**Market Practice**
Developing Economies		
Egypt	No specific requirements for Sovereign portfolios	• Local currency Sovereign exposures: ECL of 0% • Foreign currency Sovereign exposures: PD of B3 rating
Iraq	No specific requirements for Sovereign portfolios	Varies
Jordan	ECL of 0% on both local and foreign currency Sovereign exposures	ECL of 0% on both local and foreign currency Sovereign exposures
Kenya	No specific requirements for Sovereign portfolios	Varies
Nigeria	No specific requirements for Sovereign portfolios	Varies
Developed Economies		
Bahrain	No specific requirements for Sovereign portfolios	ECL of 0% on both local and foreign currency Sovereign exposures
Kuwait	No specific requirements for Sovereign portfolios	ECL of 0% on both local and foreign currency Sovereign exposures
Oman	No specific requirements for Sovereign portfolios	Varies
Qatar	ECL of 0% on local currency Sovereign exposures	ECL of 0% on both local and foreign currency Sovereign exposures
Saudi Arabia	No specific requirements for Sovereign portfolios	• Local currency Sovereign exposures: ECL of 0% • Foreign currency Sovereign exposures: PD of A1 rating, LGD ranging from 10% to 45%

Seychelles	No specific requirements for Sovereign portfolios	Varies
Singapore	No specific requirements for Sovereign portfolios	Varies
United Arab Emirates	No specific requirements for Sovereign portfolios	• Local currency Sovereign exposures: ECL of 0% • Foreign currency Sovereign exposures: PD of Aa2 rating

Source: Developed based on EY contacts supplemented with research

Based on the outcome of the exercise, it can be inferred that developed countries provide banks with discretion in the election of particular Sovereign ECL approaches. In that sense, these sampled countries do not restrict banks to apply a prescribed approach. All 7 countries in the sample of developed economies did not provide specific requirements to address the ECL treatment on the Sovereign portfolio (excluding Qatar). Practically, the general established market practice is to exclude Sovereign exposures in local currency from the ECL calculation (e.g. Saudi Arabia and UAE) or to exclude both local and foreign currency Sovereign exposures from the ECL calculation (e.g. Bahrain, Kuwait and Qatar). This established practice is consistent with the high credit quality of these countries as evidenced by their external ratings. Therefore, based on the selected sample, H1 is proved.

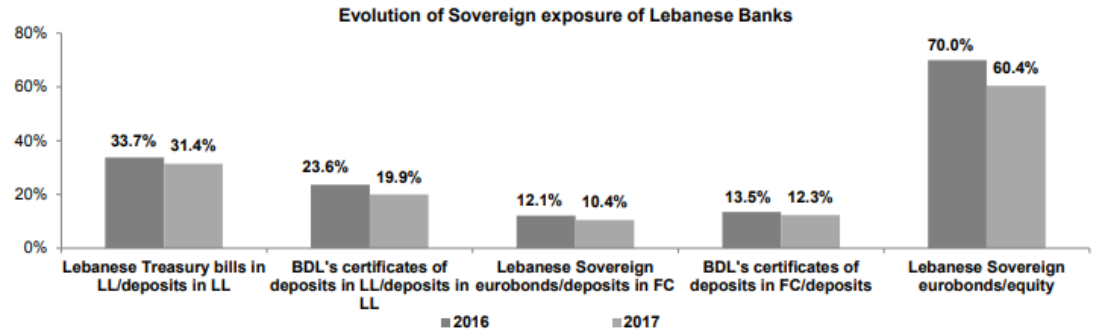
On the other hand, the outcome of the assessment for developing economies disproves H2 as all 4 sampled countries (excluding Jordan) did not provide specific IFRS 9 ECL requirements for their Sovereign portfolios, allowing for greater variability in implemented approaches. Interestingly, the exclusion of the Sovereign portfolio from the ECL calculation (in both local and foreign currency) was prescribed in Jordan despite its B1 credit rating which falls within the speculative grade range. Thus, it can be inferred that developing economies tend to maintain flexibility in the application of

IFRS 9 Sovereign approaches so as not to constrain banks in case of negative events (such as a rating downgrade) which might come at the expense of properly addressing Sovereign risk resulting in a possible conflict of interest situation.

One additional consideration that might explain the lack of particular guidance on Sovereign portfolios is the degree of concentration of banking sector assets in these investments. It can be expected that countries where banks do not hold a sizeable balance of Sovereign debt as part of their asset base, will not specifically address a non-material portfolio with issued requirements.

According to statistics published by the Central Bank of Lebanon, around 15% of the banking sector's consolidated asset base is invested in government debt as at 31 December 2017 (LBP 50,284 billion invested in government debt out of the total banking sector asset base amounting to LBP 331,432 billion) and around twice the sector's total equity (amounting to LBP 28,831 billion). The graph below visualizes the evolution of the Sovereign portfolio holdings of Lebanese banks in 2016 and 2017:

Figure 8.1: Lebanese Banking Sector Sovereign Exposure



Source: Dr. Marwan S. Barakat (2017), Banking industry 2017: an analysis of activity performance, risk profile and return indicators retrieved from http://www.bankdata.com. (Barakat, 2017)

The concentration of Sovereign exposures in developing and developed countries within the sample that did not issue any IFRS 9 Sovereign ECL guidance is as follows:

- Bahrain: Based on the Central Bank of Bahrain's statistical bulletin, 8% of the banking sector asset base is invested in government debt (2017: USD 14,770 million government exposures held by banks out of USD 187,443 million total banking sector assets).
- Oman: Based on the Central Bank of Oman's annual report for 2017, 4% of the banking sector asset base is invested in government debt (2017: OMR 1,217 million government bonds out of OMR 27,913 million total banking sector assets).

As the Sovereign portfolio holding of these developed countries is not material, the regulators did not specifically find a need to address Sovereign ECL approaches as part of their IFRS 9 issued guidance.

- Egypt: Based on the Central Bank of Egypt's financial sector statistics, 33% of the banking sector asset base is invested in government debt (2017: LE 1,601,127 million government bonds out of LE 4,813,343 million total banking sector assets).
- Iraq: Based on the Central Bank of Iraq's financial sector statistics, 12% of the banking sector asset base is invested in government debt (2018: ID 13,897,795 million government bonds out of ID 120,334,471 million total banking sector assets).

Despite the materiality of the Sovereign portfolio holdings amongst these developing countries, no specific IFRS 9 ECL approach was prescribed for this portfolio. This

finding is in line with the prior validated hypotheses and the potential conflict of interest faced by regulators in such countries.

Therefore, the survey of prescribed approaches for ECL calculation on Sovereign portfolios clarified the importance of credit rating agencies' assessment of Sovereign creditworthiness within the concept of regulation. The established risk perception as disseminated to markets by credit rating agencies affects the treatment of ECL approaches on Sovereign portfolios. Countries with higher creditworthiness have prescribed, in guidance or in practice, 0% ECL rates on Sovereign portfolios in either local currency, foreign currency or both, whereas countries with lower creditworthiness tended to maintain flexibility within their issued guidance. Moreover, it is apparent that Sovereign approaches are more likely to be indirectly conveyed to banks rather than being documented as part of formal issued guidance. Finally, the issuance of specific requirements for Sovereign portfolios is also a factor of the country's degree of banking sector exposure to the Sovereign.

CHAPTER IX

DEVELOPMENT OF IFRS 9 SOVEREIGN ECL APPROACHES

Within the Lebanese context, Sovereign exposures are the most material asset class held by commercial banks, constituting more than half of their asset base and twice the sector's capital base. As such, any proposed IFRS 9 approach shall take into account the materiality of these exposures. Based on the conducted literature review, the following section intends to develop IFRS 9 compliant ECL approaches as mainly pertaining to the Sovereign's PD and LGD. However, it is worth exploring before the rationale underlying the consideration of an ECL charge on specific types of Lebanese Sovereign exposures.

A. Rationale for Lebanese Sovereign Portfolio Provisioning

The concept of expected loss provisioning introduces the fundamental question of whether Sovereign exposures should be subject to any ECL provision. Some argue that all Lebanese Sovereign exposures, whether with the Central Bank of Lebanon or the Lebanese Government, should receive a zero ECL charge.

Advocates of this approach believe that the debate should not be centered on which specific approach is better designed to ensure the adequacy and sufficiency of the IFRS 9 Sovereign provisions but rather on whether this portfolio should be subject to any impairment provisions in the first place. Although the Standard does not explicitly exclude Sovereign portfolios, its requirements must be calibrated to individual countries through issued local guidance. In fact, the Central Bank of Lebanon issued local

guidance for capital adequacy purposes prescribing the assignment of zero regulatory ECL on *local* currency exposures to the Lebanese Sovereign.

Based on discussions that I conducted with many risk managers and risk consultants as part of my direct experience in this field, the advocates of a zero Sovereign ECL emphasize the distinct roles that should be played by capital and provisions. Fundamentally, the concept of provisioning (excluding specific provisions) is meant to provide against default events that are possible and presently not attributable to particular exposures. In the case of the highly concentrated Sovereign portfolio of Lebanese banks, the undiversified and material nature of this portfolio questions the applicability and effectiveness of the provisioning concept. As such, it is believed that provisions should not be assumed to play the role of the capital counterpart i.e. the role of loss absorption. Instead, the debate should be centered on strengthening the loss absorption capacity of capital.

Moreover, it is believed that a possible "double-counting" effect results from the implementation of expected loss provisioning, which penalizes banks beyond the capital adequacy requirement. Specifically, BDL's prescribed approach of establishing regulatory EL rates (as set out in Intermediate Circular 512) was considered by the Basel Committee as one of the many possible long-term prudential treatments of provisions as discussed in Chapter IV. However, the Committee was of the view that "it is not fully clear whether or not it should be assumed that the SA risk weights already count part of regulatory expected losses in addition to unexpected losses" (Basel Committe on Banking Supervision, 2016, p. 11). This means that under the regulatory EL framework, a bank is likely to face a double-counting effect as the risk weights used to compute RwA for determining the capital charge capture an element of EL in addition to UL. Deloitte (2013) finds that diminishing the level of capital requirements

can counter the effects of the resulting increased regulatory deductions to capital as a result of ECL provisions (Deloitte, 2013). Under BDL's prescribed long-term option for the regulatory treatment of accounting provisions, banks must compare their existing levels of ECL accounting provisions to the provisions resulting from the application of the specified regulatory EL rates and must deduct any shortage directly from the CET1 capital, while the excess in the banks' provisions over regulatory rates is not eligible for inclusion in Tier II capital. This option introduces the concept of provisioning "floors" that must be met by banks at all times irrespective of their individual provisions' calculations. However, an additional key concern is that the regulatory EL rates and the banks' own derived ECL rates are fundamentally different lacking a direct comparability due to the incorporation of macro-economic information and outlook within the banks' own estimates, which is not considered within the regulatory EL rates. Thus, the regulatory imposed EL rates lack risk-sensitivity as the same rates are applied at all stages of the economic cycle. Practically, this means that during an economic downturn, banks will not have an incentive to reflect the true anticipated view of credit risk of the Sovereign portfolio as long as they meet the minimum regulatory floor, which makes the calculation of estimated expected losses a discretionary and redundant task.

In addition, many risk managers were of the view that upon any signal of Sovereign distress, the resulting systemic impact cannot be contained by any amount of provisions. At that stage, banks will be much more concerned with ensuring the business continuity through the disaster recovery plan rather than considering whether they should have provided for additional provisions.

In the long-run, if banks were to reflect the true Sovereign risk in their IFRS 9 provisions, they will eventually resort to fundamental changes to their existing business

models. Due to the high anticipated level of provisions on this portfolio, some banks might not find it profitable to hold Sovereign exposures anymore in the frequency and amounts they used to before implementing the Standard. At that point, banks will rebalance their portfolios and cease to subscribe in many Sovereign debt issuances. Simply, the yields on such instruments will no longer justify holding them.

Whilst this approach can be deemed as intuitively appealing, a careful assessment shows some serious drawbacks. Most importantly, this approach is not in compliance with the IFRS 9 Standard's requirements. In fact, the Standard did not provide such an option nor a national discretion but rather prescribed that ECL impairment shall be computed on all in-scope portfolios, considering a range of scenarios, no matter how low the probability of default is in practice.

On the other hand, it can be argued that this approach would not yield the required protection from severe credit losses. According to ESRB (2015), "capital requirements cannot ensure true loss absorbency in the case of highly concentrated holdings" (European Systemic Risk Board, 2015, p. 44). For instance, considering a single counterparty with an exposure of 1,000 USD with a Probability of Default of 0.5% and a Loss Given Default of 45%, the applicable 8% capital requirement (80 USD) overstates actual loss in 99.5% of the times (loss is null) and is insufficient to cover losses borne by the bank in 0.5% of the times (losses amount to 450 USD) (adapted from (European Systemic Risk Board, 2015, p. 44)). As such, it can be argued that for such an undiversified and highly concentrated portfolio, setting aside provisions is more prudent to manage credit risk. By assigning a zero ECL on these exposures following a blanket approach, banks can face an increased risk of loss on this material portfolio due to insufficient provisions coupled with limited capital that is commensurate with the Sovereign risk level that is actually borne by the banks. In fact,

the present application of Basel capital adequacy requirements is not fully aligned to the prudential guidance in that banks currently apply a preferential risk weight of 50% to their *foreign* currency Sovereign exposures (as opposed to the 100% risk weight prescribed by Basel for a B- rated Sovereign). As such, it can be argued that no double-counting effect exists between Sovereign ECL and Sovereign capital requirements, which can be seen to fall short of the true level of Sovereign risk. Also, it is to be noted that unlike other types of exposures for which banks have control over pricing to reflect expected credit losses, Sovereign exposures do not allow banks to incorporate their expected credit losses through pricing (which is an exogenous factor).

Many arguments and counter-arguments can be presented by proponents of both approaches. However, for the purpose of the current research, the elaborated ideas are enough to stimulate thinking about these issues. The current research will disregard any approach that is deemed non-compliant, from a pure IFRS 9 perspective. As such and within the Lebanese context, provisions are considered to have a significant role to play for the Lebanese Sovereign portfolio. We examine next the derivation of the risk parameters in terms of PD and LGD on this portfolio.

B. Sovereign Probability of Default

The literature review presented many PD derivation techniques ranging from rating agencies' PD assessments to market-based PD models and the more formal structural default models (refer to Figure 7.1). The current section will explore the rating agencies' PD assessments and the market-based models based on CDS prices, considering specific adjustments to ensure compliance with the Standard's requirements.

1. *Understanding Rating Agencies' Assessment of Sovereign Risk*

a. Regression Analysis

In line with the existing literature on external ratings that identified specific factors considered by external rating agencies for assigning Sovereign ratings (as pertaining to fiscal, economic, monetary, institutional and external factors discussed in Chapter VII), a panel data consisting of 23 emerging economies is considered in the analysis of rating determinants for the past 22 years extending from 1997 to 2019. The research interest in emerging market sovereigns is due to the need for the selection of a comparable pool of countries with similar credit risk characteristics as Lebanon which itself is an emerging economy. The status of each country (i.e. emerging or developed) is determined based on the IMF country classifications. The historical external Sovereign ratings were sourced from Thomson Reuters Eikon database for foreign currency denominated Sovereign debt whereas the macro-economic factors were sourced from the IMF World Economic Outlook (WEO) online database. An ordinal regression is then performed on the external credit ratings that are transformed from letter grades to an ordinal equivalent numerical scale where a better rating grade is associated with a lower assigned numerical value (refer to Appendix III for the considered numerical rating scale). The dependent variable of the regression is the Sovereign credit rating and the independent variables include the below variables as defined in the IMF World Economic Outlook (WEO) database:

- Average inflation rate growth: This variable is measured using changes in the Consumer Price Index (CPI) with average, rather than end of year, prices. This variable will be referred to as "Infl".

- Gross Domestic Product (GDP) Growth: This variable represents the growth in the price GDP that is measured using constant rather than current prices. This variable will be referred to as "GDPG".
- Gross Domestic Product: This variable represents the monetary value of the nominal GDP and is modeled using a logarithmic function. This variable will be referred to as "lnGDP".
- General Government net debt as a percentage of GDP: According to the IMF WEO database, net debt is defined as gross debt deducted by gold, currency, deposits and loans amongst other financial assets. This variable will be referred to as "GovNetDebt".
- Current Account Balance as a percentage of GDP: According to the IMF WEO database, current account balance refers to transactions pertaining to goods, services and income between the Sovereign and other countries. This variable will be referred to as "CurrAcct".
- Government Gross National Savings as a percentage of GDP: According to the IMF WEO database, national savings are defined as net national disposable income (after deducting consumption). This variable will be referred to as "GovNatSav".

Thus, the modeled relationship between ratings and each of the defined macro-economic factors is in the below form, controlling for time-varying factors:

$r_t = \alpha + \sum \beta X_t + \gamma_t$ Equation (A)

Where:

r_t= Sovereign external rating at time (t) as defined by Moody's, S&P or the worst between them

α= intercept term

β= impact of macro-economic variable on credit rating

X_t= macro-economic variables that explain ratings

γ_t= term that controls for time-varying factors

Another specification of the model is also tested in the form below, controlling for both time and country effects:

$r_t = \alpha + \sum \beta X_t + \gamma_t + \sigma_n$ Equation (B)

Where:

r_t= Sovereign external rating at time (t) as defined by Moody's, S&P or the worst between them

α= intercept term

β= impact of macro-economic variable on credit rating

X_t= macro-economic variables that explain ratings

γ_t= term that controls for time-varying factors

σ_n= term that controls for fixed country-level factors

For each model specification defined in equations (A) and (B), three separate regressions were performed considering either:

- Solely Moody's credit rating as the dependent variable;
- Solely S&P credit rating as the dependent variable or;
- The worst assigned rating between Moody's and S&P as the dependent variable.

The table below provides descriptive statistics about the different variables and the countries that are included in the analysis:

Table 9.1: Descriptive Macro-Economic Factors Statistics

Country	Average of the selected macro-economic factors					
	Infl	**GDPG**	**GDP (USD mill)**	**GovNet Debt**	**Curr Acct**	**GovNat Sav**
Albania	4.52%	4.24%	8,789	64.56%	-9.05%	20.20%
Bahrain	1.86%	4.58%	20,269	N/A	2.88%	26.57%
China	1.95%	8.86%	5,039,842	N/A	3.37%	45.45%
Croatia	2.50%	2.08%	45,751	46.24%	-2.63%	21.74%
Egypt	9.30%	4.70%	171,900	65.66%	-1.13%	17.66%
India	6.57%	6.99%	1,221,382	N/A	-1.41%	30.20%
Iraq	9.72%	10.47%	N/A	N/A	-0.30%	22.40%
Jordan	3.19%	4.33%	20,683	85.23%	-5.86%	17.55%
Kenya	7.32%	4.29%	34,402	45.96%	-3.61%	14.35%
KSA	1.60%	3.12%	428,897	14.48%	10.59%	35.63%
Kuwait	2.83%	3.52%	94,318	N/A	25.15%	44.59%
Lebanon	3.02%	3.75%	31,015	146.56%	-18.95%	4.16%
Morocco	1.60%	3.91%	74,964	59.57%	-3.38%	27.26%
Nigeria	11.69%	5.54%	264,614	10.75%	4.78%	20.83%
Oman	2.01%	3.49%	44,872	-16.64%	2.32%	28.42%
Philippines	4.57%	5.05%	167,150	N/A	1.04%	22.80%
Qatar	3.68%	9.84%	90,817	N/A	12.49%	51.71%
Trinidad & Tobago	5.50%	3.63%	17,518	-1.68%	11.04%	31.84%
Tunisia	4.11%	3.51%	35,161	52.98%	-5.26%	18.50%
Turkey	24.58%	4.59%	582,221	39.04%	-3.60%	22.89%
UAE	3.55%	4.41%	236,396	N/A	9.16%	32.52%
Ukraine	13.30%	1.89%	98,649	N/A	-0.78%	19.95%
Uruguay	8.75%	2.79%	33,104	38.24%	-1.06%	16.99%

Source: IMF World Economic Outlook Database

The results of the regressions are summarized below including the regression coefficients and p-value for the different model specifications:

Table 9.2: Regression Results with Fixed-Time Effects

Equation (A): Fixed-Time Effects						
	(1) Moody's		**(2) S&P**		**(3) Worst Rating**	
Variables	Coeff	pvalue	Coeff	pvalue	Coeff	pvalue
Infl	7.48	-*	7.54	-*	7.38	-*
ln(GDP)	0.23	0.052	0.10	0.318	0.05	0.63
GDPG	-4.20	0.329	9.37	0.011*	5.39	0.114
GovNetDebt	4.20	-*	2.99	-*	3.17	-*
CurrAcct	4.25	0.107	3.75	0.089	5.76	0.005*
GovNatSav	-12.57	-*	-18.90	-*	-17.53	-*
Constant	2.70	0.437	9.70	-*	10.97	-*
Observations	198		225		225	
R^2	75.46%		78.82%		78.78%	
$Adjusted\ R^2$	71.73%		76.04%		76.00%	
F-Statistic	20.23		28.34		28.28	
p-Value	-*		-*		-*	

*The symbol indicates significance at the 95% confidence level

Table 9.3: Regression Results with Fixed-Time and Country Effects

Equation (B): Fixed-Time and Country Effects						
	(1) Moody's		**(2) S&P**		**(3)Worst Rating**	
Variables	Coeff	pvalue	Coeff	pvalue	Coeff	pvalue
Infl	3.27	0.058	3.83	-*	3.67	-*
ln(GDP)	0.45	0.557	-1.24	0.024*	-0.82	0.101
GDPG	-10.36	0.005*	2.71	0.325	-0.85	0.735
GovNetDebt	3.97	-*	3.67	-*	4.39	-*
CurrAcct	7.79	0.014*	4.37	0.061	4.46	0.037*
GovNatSav	-9.97	0.012*	-13.33	-*	-12.95	-*
Constant	-0.13	0.994	41.51	0.002*	31.27	0.011*
Observations	198		225		225	
$Overall\ R^2$	71.77%		52.96%		63.45%	
F-Statistic	4.18		8.36		10.95	
p-Value	-*		-*		-*	

*The symbol indicates significance at the 95% confidence level

The determinants of Sovereign credit ratings have been widely studied in the finance literature. In fact, the literature review in Chapter VII identified the following academic contributions, which are summarized below for convenience:

- Cantor and Packer (1996) were amongst the first to research the determinants of Sovereign credit ratings. The authors explained ratings of the year 1995 for their sample of 49 countries. The authors found a

statistically significant relationship between ratings and the following six variables: per capita income, GDP growth, inflation, external debt, economic development and default history (Cantor & Packer, 1996).

- Remolona et al. (2008a) later studied the determinants of average Moody's and S&P Sovereign credit ratings using a sample of 27 countries and 4 years of historical data from 2002 to 2005. The authors found a statistically significant relationship between average Sovereign ratings and nominal GDP, GDP per capita, inflation, external debt to GDP, original sin and currency mismatch (Remolona, Scatigna, & Wu, 2008a).
- Rodriguez et al. (2018) recently studied the determinants of Sovereign credit ratings by examining a sample of 54 countries for the years 2005 to 2016. The authors found a statistically significant relationship between Sovereign ratings and the following macro-economic factors: Gross National Income, fiscal balance, external balance, external debt and economic development (Rodriguez, Dandapani, & Lawrence, 2018).

Our present contribution informs a continued dialogue on determinants of credit ratings. Our work circumvents the data limitations encountered in Cantor and Packer (1996) study in terms of limited historical ratings data (ratings were considered as a novel measure during that period of time) and examines a longer historical period than Remolona et al. (2008a). Moreover, our focus on emerging economies provides a different perspective for the understanding of assigned Sovereign credit ratings and attempts to examine the explanatory power of the same studied macro-economic factors across the years within this specific context.

The results of the different regression specifications corroborate with earlier findings in the Sovereign risk literature whilst providing additional insights from an emerging markets' perspective. In the first specification of the model with fixed-time effects, the inflation, government net debt as a percentage of GDP and national savings as a percentage of GDP prove to be significant determinants of Moody's ratings, S&P ratings and the lower ratings between both agencies. Interpretations for each of the significant variables are listed below:

- Infl: As documented in S&P Sovereign rating methodology, "inflation in line with that of the sovereign's trading partners creates an important foundation for confidence in local currencies as a store of value, and for the development of the financial sector" (S&P, 2017b, p. 24). Thus, a lower inflation results in a higher perceived credit worthiness, which is reflected in a better Sovereign credit rating i.e. a lower rating equivalent. The positive statistically significant coefficients for inflation under the three specifications are thus justified. This finding is also aligned to the surveyed studies in the literature.
- GovNetDebt: The statistical significance of this variable provides a novel perspective on the established relationship between Sovereign credit worthiness and its debt composition in the finance literature. Findings by Kriz et al. (2015) suggest that "sovereign external debt is positively associated with the implied cumulative probability of default (CPD)" (Kriz, Wang, & Issarachaiyos, 2015). Similarly, Manasse and Roubini (2009) found that external debt to GDP, rather than total debt to GDP, is a useful predictor of Sovereign default (Manasse and Roubini (2009) as cited in (Ams, Baqir, Gelpern, & Trebesch, 2018)).

Our results extend this relationship to credit ratings which should have an inverse relationship with the cumulative probability of default. Unlike referenced studies, our results suggest that total government net debt is in fact a key determinant of the Sovereign's credit worthiness as reflected in its credit rating, within an emerging market context. In fact, S&P (2017) documents that its "key measure of a government's fiscal performance is the change in net general government debt stock expressed as a percentage of GDP" (S&P, 2017b, p. 16). The positive statistically significant coefficients for this variable under the three specifications are thus justified.

- GovNatSav: As part of its economic assessment, S&P (2017) considers that higher income levels indicate "broader potential tax and funding bases upon which to draw, which generally support creditworthiness" (S&P, 2017b, p. 3). The negative significant coefficients for this variable under the three specifications are thus justified.

It is to be noted that the GDPG and CurrAcct variables are statistically significant under (2) and (3) respectively, but are of unexpected signs. A higher economic growth and a positive current account balance i.e. a surplus should intuitively result in a better credit worthiness which is to be reflected in a higher credit rating. Provided the current model specification, no logical relationship was found in this sample between these two macro-economic factors and credit ratings.

The second model specification with both fixed-time and country effects provides additional statistically significant explanatory variables for the dependent variables (1) or (2) as detailed below:

- GDPG: In line with Cantor and Packer (1996), the GDP growth variable is statistically significant in explaining Sovereign ratings as assigned by Moody's. The intuition behind its significance was articulated by Cantor and Packer (1996) study whereby "a relatively high rate of economic growth suggests that a country's existing debt burden will become easier to service over time" (Cantor & Packer, 1996). S&P (2017) also indicates that "sovereigns with higher or lower growth rates than sovereigns in the same GDP category would generally receive a positive or negative adjustment with respect to the initial assessment" (S&P, 2017b, p. 10). The negative significant coefficient for GDP growth for explaining Moody's ratings is thus justified.
- lnGDP: In line with findings by Remolona et al. (2008), the logarithmic function of GDP is positively associated with Sovereign credit ratings (Remolona, Scatigna, & Wu, 2008a). The negative significant coefficient for this variable explaining S&P rating is thus justified, indicating that a higher absolute level of GDP results in a lower rating equivalent i.e. a higher credit worthiness.

Based on the above, Sovereign credit ratings continue to be explained by several macro-economic factors. Within an emerging market context, these macro-economic factors tend to explain Sovereign credit ratings to a lesser extent than the previous studies. In fact, the $R^2$of the regressions can be improved by the consideration of other potential explanatory variables, which will be explored in subsequent sections.

b. Model Robustness Test: Prediction of Lebanese Sovereign Rating Downgrade

In order to test the robustness of the rating model, the predictability of the recent Sovereign rating downgrade from B3 to Caa1 will be tested. As such, the year 2019 was removed from the existing dataset and new regressions were performed based on the approaches that were described earlier. The resulting models will be used in order to assign a Sovereign rating for Lebanon based on forecasted macro-economic factors for the year 2019.

The following table presents the forecasted macro-economic factors for 2019 as compared with the actual 2018 figures based on the IMF WEO indicators:

Table 9.4: Lebanon Selected Macro-Economic Factors for 2018 and 2019

Year	Infl	GDPG	GovNetDebt	CurrAcct	GovNatSav
2018	6.52%	1.00%	144.08%	-25.641%	-2.57%
2019	3.53%	1.40%	147.31%	-25.506%	-2.27%

Source: IMF World Economic Outlook Database

The following tables present the outcome of the regression with (A) fixed time effects and (B) fixed time and country effects between (1) Moody's, (2) S&P and (3) the worst rating equivalent with the macro-economic variables that were considered as explanatory variables for ratings:

Table 9.5: Robustness Test for Sovereign Rating Downgrade with Fixed-Time Effects

(A) Robustness Test with Fixed-Time Effects			
	(1) Moody's	**(2) S&P**	**(3) Worst Rating**

Variables	Coeff	pvalue	Coeff	pvalue	Coeff	pvalue
Infl	7.48	-*	7.54	-*	7.38	-*
ln(GDP)	0.23	0.05*	0.10	0.32	0.05	0.63
GDPG	-4.21	0.33	9.37	0.01*	5.39	0.11
GovNetDebt	4.20	-*	2.99	-*	3.17	-*
CurrAcct	4.25	0.11	3.75	0.09	5.76	0.01*
GovNatSav	-12.57	-*	-18.90	-*	-17.53	-*
Constant	-2.70	0.437	9.70	-*	10.97	-*

*The symbol indicates significance at the 95% confidence level

Table 9.6: Robustness Test for Sovereign Rating Downgrade with Fixed-Time and Country Effects

(B) Robustness Test with Fixed-Time and Country Effects						
	(1) Moody's		(2) S&P		(3) Worst Rating	
Variables	Coeff	pvalue	Coeff	pvalue	Coeff	pvalue
Infl	3.27	0.06	3.83	-*	3.67	-*
ln(GDP)	0.45	0.56	-1.24	0.02*	-0.82	0.10
GDPG	-10.36	0.01*	2.71	0.33	-0.85	0.74
GovNetDebt	3.97	-*	3.67	-*	4.39	-*
CurrAcct	7.79	0.01*	4.37	0.06	4.46	0.04*
GovNatSav	-9.97	0.01*	-13.33	-*	-12.95	-*
Constant	-0.13	0.99	41.51	-*	31.27	0.01*

*The symbol indicates significance at the 95% confidence level

Given the forecasted macro-economic factors for the year 2019 and the modeled relationship between ratings and macro-economic factors based on the tables above, the resulting rating equivalents for 2019 are as follows:

Using fixed-time effects (A):

- Moody's Rating Equivalent: 14.04 corresponding to a rating of B1
- S&P Rating Equivalent: 16.53 corresponding to a rating of B3
- Worst Rating Equivalent: 16.05 corresponding to a rating of B3

Using fixed-time and country effects (B):

- Moody's Rating Equivalent: 15.05 corresponding to a rating of B2
- S&P Rating Equivalent: 15.55 corresponding to a rating of B2
- Worst Rating Equivalent: 16.72 corresponding to a rating of B3

Thus, the results indicate that the predicted credit rating is either the same prevailing as at year-end 2018 i.e. B3 or up to two notches better than B3. Therefore, based on the forecasted macro-economic situation in Lebanon, the model that is solely based on the economic fundamentals of the country does not seem to justify or explain a rating downgrade from B3 to Caa1. This result can be mainly attributed to the below considerations:

- Improvement in forecasted macro-economic conditions: The rating model's inputs used for the prediction of the Sovereign credit rating during 2019 are based on the forecasted macro-economic factors as sourced from the IMF database. Examining Table 9.4, it is evident that the considered macro-economic factors (i.e. inflation, current account balance, national savings and GDP growth), except for debt indicators, are forecasted to improve

during 2019. The forecasted implementation of reforms that are consistent with the CEDRE package are reflected in a positive economic outlook for the country's macro-economic situation during 2019. Rating agencies might have conducted a sensitivity analysis on the base case forecast and have calibrated the rating outcome accordingly, which might explain the rating deterioration during 2019.

- Other explanatory factors that are not captured within the present rating model: Based on the regression output, no more than 79% of the variation in the Sovereign credit rating is explained by the changes in the macro-economic indicators that were considered in the regressions. Based on the survey of the finance literature, traditional macro-economic indicators are becoming less able to explain Sovereign rating assignments. In fact, Cantor and Packer (1996) regression of Sovereign ratings with six accounting macro-economic indicators explained more than 90% of the variation in Sovereign credit ratings (Cantor & Packer, 1996). More recently, Rodriguez et al. (2018) macro-economic model did not explain more than 78% of the variation in credit ratings (Rodriguez, Dandapani, & Lawrence, 2018). This suggests that rating agencies could be relying on more forward looking information and other information sources that are not captured in the traditional macro-economic analysis.

  Our current model's explanatory power suggests the existence of other variables not presently captured within the existing model. Although the economic assessment is one of the most critical analyses contributing to the final rating assignment, other considerations play a significant role in determining the final Sovereign rating including institutional and external

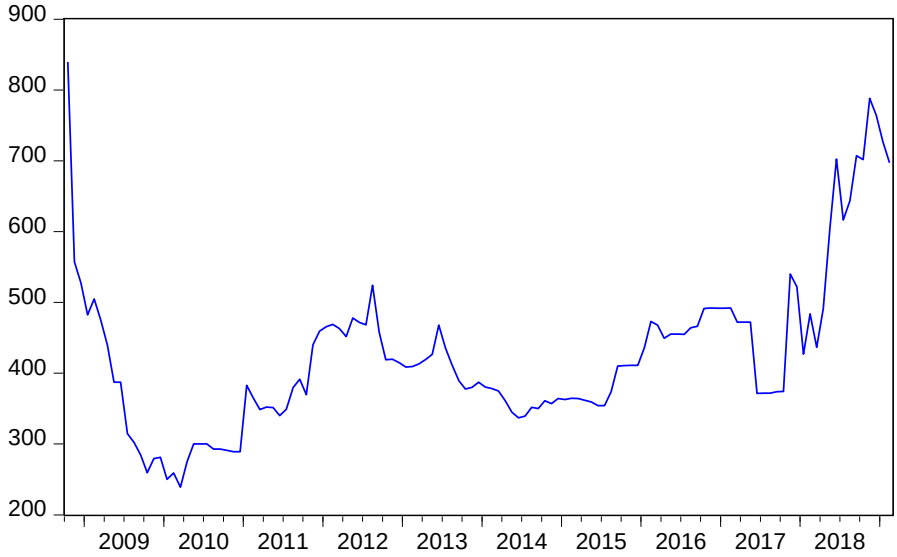
factors (refer to the discussion in Chapter VII). Moreover, Lanotte et al. (2016) suggest that political factors can also impact the final Sovereign rating by influencing the Sovereign's "willingness" rather than "ability" to pay (Lanotte, Manzelli, Rinaldi, Taboga, & Tommasino, 2016). In fact, the official rating statement on the downgrade published by Moody's in January 2019 referred to the "on-going delay in the formation of the government" (Moody's, 2019) and "high political event risk" (Moody's, 2019) as one of the main causes contributing to the re-assessment of Lebanon's credit rating.

2. *Forward-Looking Ratings: CDS as an Explanatory Variable to Ratings*

The finance literature explored the use of CDS spread as a promising and novel measure of Sovereign risk which can be used to derive the Sovereign probability of default. Yet, a major limitation that precludes its suggested use within an emerging market context is the excessive variability of this market-based measure of risk due to reasons that are not necessarily attributable to changes in the reference entity's risk of default but that are driven by numerous changes in the geopolitical environment, security risk, and other global factors.

Specifically, within the Lebanese context, the following graph displays the level of 5-year CDS spreads issued on the Lebanese Sovereign for the period extending from 2009 to 2018:

Figure 9.1: Lebanon CDS Quotes (in bps)



Source: Thomson Reuters Eikon CDS spreads (in bps) displayed on E-views

As this graph shows, the level of CDS spreads is excessively variable during the examined period. Thus, Lebanese banks will face significant fluctuations in their underlying Sovereign ECL provisions in case they elect to rely on this crude observed measure of risk as a direct means to extract the default component and measure the Sovereign PD as implied by the observed CDS spreads.

However, this limitation does not rule out the possibility to consider an alternative use for the CDS spread, due to its forward-looking and market-assessed nature, which fulfills the important Standard's requirement for a point-in-time (PiT) and forward-looking risk parameters' methodology. As such, in order to reconcile both the need for responsive forward-looking ratings that do not reflect a through the cycle rating approach and the availability of a novel Sovereign risk measure as implied by the level of CDS spreads, an alternative use for this market-based measure of default would be to examine its ability to influence and explain Sovereign credit ratings, resulting in

market-assessed Sovereign credit ratings, which will be subsequently referred to as "forward-looking ratings".

Our study relates to the below stream of studies, which we are aware of:

- Hull and White (2003) examined the corporate CDS spreads' ability to anticipate credit rating events. Their study did not consider below investment grade issuers. Specifically, they found that "in the case of a downgrade event there is a significant increase in the CDS spread well in advance of the event" (Hull, Predescu, & White, 2003). This confirms the forward-looking nature of spreads and their anticipation effect of negative rating events.

  Hull and White (2003) model examined the anticipation power of CDS markets for a rating downgrade, yet they do not derive a model to quantify the downgrade using CDS spreads. Our study differs in many respects. First, our focus is on Sovereign rather than corporate issuers within emerging markets which tend to receive below investment grade ratings. Also, we focus on developing a forward-looking rating model which relies on macro-economic indicators and CDS spreads enabling the quantification of any rating change on a timely basis.

- Ismailescu and Kazemi (2010): The authors employed an event study methodology to understand the reaction of Sovereign CDS markets to credit rating changes, testing the CDS markets' efficiency. The authors studied credit ratings and CDS spreads of 22 emerging market Sovereigns from 2001 to 2008 and found that "changes in CDS premiums can be used to estimate the probability of a negative credit event" (Ismailescu & Kazemi, 2010). Our study differs in its coverage of a longer historical

period extending from 2007 to 2019 and its objective of assigning a Sovereign credit rating based on macro-economic indicators, the absolute level of CDS spread and its volatility rather than examining the predictability power of CDS spread changes. As such, our study constitutes a model that can be continuously employed by banks to measure Sovereign credit worthiness, combining fundamental and market assessment of Sovereign risk to derive a point-in-time measure of Sovereign credit ratings, which can ultimately diverge from the rating agencies' assigned credit rating at any point in time.

- Rodriguez et al. (2018): The authors studied panel data from 2005 to 2016 for CDS and credit ratings of Sovereign issuers and found that "the variation in average sovereign ratings in a given year can be explained by average CDS spreads over the previous three years" (Rodriguez, Dandapani, & Lawrence, 2018) and that "CDS spread changes can predict sovereign events" (Rodriguez, Dandapani, & Lawrence, 2018). The authors "model ratings as a function of lagged CDS spreads" (Rodriguez, Dandapani, & Lawrence, 2018) and argue that CDS spreads should be used as substitutes to credit ratings (Rodriguez, Dandapani, & Lawrence, 2018). Our analysis does not make a similar conclusion as we still find credit ratings to be of importance within an emerging market context. As such, our analysis aims to improve on the TTC rating measure provided by credit rating agencies by including the current level of CDS spread along with its volatility to infer a PiT and forward-looking credit rating.
- "Moody's Market-Implied Ratings" (Kim, Agajanov, Munves, Hamilton, & Dwyer, 2011): Our study is also closely linked to "Moody's Market-

Implied Ratings" (Kim, Agajanov, Munves, Hamilton, & Dwyer, 2011) measure which assigns credit ratings solely based on the current level of observed CDS by comparing the current level of spreads to the median level of spreads set as a threshold for each rating grade or category. Our study combines the explanatory power of the traditional macro-economic factors with the CDS spread and relies not only on the absolute level of spreads but also the level of CDS volatility to determine credit ratings.

Overall, our study closely builds on these earlier works in that it includes the CDS spread as an explanatory variable for credit ratings due to its proven predictability power in anticipating credit rating changes in accordance to these mentioned studies.

a. Regression Analysis

The study relies on daily CDS spreads of 17 emerging market Sovereigns that were included in the prior analysis. The remaining countries were not considered due to the lack of an actively traded CDS contract over the full considered historical period. We consider 5 year CDS contracts which are typically more highly traded than other CDS contract maturities. The CDS data and credit ratings used in the analysis were sourced from Thomson Reuters Eikon database, while the macro-economic indicators were retrieved from the IMF World Economic Outlook (WEO) online database. The following presents the tested model equations using both country and time fixed effects:

$$r_t = \alpha + \sum \beta X_t + CDS_t + \sigma_{CDS_t} + \gamma_t + \delta_t \qquad \textbf{Equation (A)}$$

Where:

r_t= Sovereign external rating at time (t) as defined by Moody's, S&P or the worst between them

α= intercept term

β= impact of macro-economic variable on credit rating

X_t= macro-economic variables that explain ratings

CDS_t= CDS spread in % at time t

σ_{CDSt}= annualized volatility (i.e. standard deviation) of daily CDS spread at time t

γ_t= term that controls for time-varying factors

δ_t= term that controls for country-level factors

Given that prior mentioned studies established that CDS spreads provided a leading indicator of Sovereign rating events, another model specification will be also explored whereby the Sovereign credit ratings are regressed against lagged macro-economic factors and CDS volatility using both country and time fixed effects:

$$r_t = \alpha + \sum \beta X_{t-1} + CDS_t + \sigma_{CDS_{t-1}} + \gamma_t + \delta_t \qquad \textbf{Equation (B)}$$

It is to be noted that using Equation (B), all independent variables are lagged with the exception of the level of the CDS spread. This is mainly due to the fact that the rating is to be based on updated market information which is assumed to flow to the rating model through the level of CDS spread that is observed at the current time period (t), in compliance with the Standard's requirement for a point-in-time risk measurement methodology.

The values of the macro-economic factors and CDS spreads for the year 2018 are summarized below both with a lag of one year and with no lag respectively:

Table 9.7: Lebanon Selected 2018 Macro-Economic Factors (Lagged and Non-Lagged)

Year	Infl	GDPG	ln (GDP)	NetDebt	CurrAcct	NatSav
2018 Lag	4.48%	1.50%	24.70	140.61%	-22.83%	-0.71%

2018 No lag	6.52%	1.00%	24.71	144.08%	-25.64%	-2.57%

Source: IMF World Economic Outlook Database

Table 9.8: Lebanon 2018 CDS Spread and Volatility (Lagged and Non-Lagged)

Year	CDS Spread	Annualized CDS Volatility
2018-Lag	N/A	1.3187%
2018-No lag	7.64%	1.3194%

Source: Thomson Reuters Eikon Database and calculations

The following presents the results of the regression analysis using Equation (A):

Table 9.9: Regression Results of Ratings with CDS Spreads, Volatility and Macro-Economic Factors

Equation (A)						
	(1) Moody's		(2) S&P		(3) Worst Rating	
Variables	Coeff	pvalue	Coeff	pvalue	Coeff	pvalue
Constant	25.34	-*	19.75	-*	46.05	-*
CDS	17.18	-*	21.87	-*	22.33	-*
Volatility	22.28	-*	44.01	-*	37.77	-*
Infl	-7.46	-*	-4.77	-*	-8.35	-*
GDPG	10.61	-*	5.64	-*	4.69	-*
ln(GDP)	-0.36	-*	-0.34	-*	-1.30	-*
GovNetDebt	1.79	-*	4.87	-*	3.34	-*
CurrAcct	12.77	-*	3.38	-*	4.99	-*

GovNatSav	-22.54	-*	-10.60	-*	-14.49	-*
Observations	16,793		16,793		16,793	
$Overall\ R^2$	70.39%		80.19%		57.33%	
F-Statistic	5,088		1,720		4,568	
p-Value	-*		-*		-*	

*The symbol indicates significance at the 95% confidence level

Considering Equation (A) and the values for the independent variables, the derived forward-looking ratings are as follows:

- Moody's Rating = 17.5 i.e. equivalent to a letter grade of Caa1
- S&P Rating = 19.8 i.e. equivalent to a letter grade of Caa3
- Worst Rating Equivalent = 19.6 i.e. equivalent to a letter grade of Caa3

The following presents the results of the regression analysis using Equation (B):

Table 9.10: Regression Results of Ratings with Lagged CDS Volatility and Macro-Economic Factors

Equation (B)						
	(1) Moody's		**(2) S&P**		**(3) Worst Rating**	
Variables	Coeff	pvalue	Coeff	pvalue	Coeff	pvalue
Constant	40.35	-*	35.13	-*	61.18	-*
CDS (t)	27.44	-*	27.32	-*	26.87	-*
Volatility (t-1)	8.97	-*	21.70	-*	5.52	-*

Infl (t-1)	-10.95	-*	-8.90	-*	-11.16	-*
GDPG (t-1)	3.17	-*	4.76	-*	5.33	-*
ln(GDP) (t-1)	-1.13	-*	-1.00	-*	-1.95	-*
GovNetDebt (t-1)	1.15	-*	2.89	-*	1.38	-*
CurrAcct(t-1)	3.03	-*	-2.67	-*	-1.49	-*
GovNatSav(t-1)	-8.60	-*	-5.28	-*	-8.57	-*
Y2018	1.191	-*	0.82	-*	1.43	-*
Observations	18,484		18,484		18,484	
$Overall\ R^2$	38.72%		54.66%		32.27%	
F-Statistic	5,732		2,296		5,516	
p-Value	-*		-*		-*	

*The symbol indicates significance at the 95% confidence level

Considering Equation (B) and the values for the independent variables, the derived forward-looking ratings are as follows:

- Moody's Rating = 16.5 i.e. equivalent to a letter grade of Caa1
- S&P Rating = 18.1 i.e. equivalent to a letter grade of Caa2
- Worst Rating Equivalent = 18.5 i.e. equivalent to a letter grade of Caa2

b. Model Robustness Test: Prediction of Lebanese Sovereign Rating Downgrade

Considering both model specifications (Equation A and B) with both lagged and non-lagged CDS volatility and macro-economic factors, the recent Sovereign rating downgrade by Moody's for the Lebanese Sovereign from a rating of B3 to a rating of

Caa1 is successfully predicted by the models. In fact, using the lagged and non-lagged CDS volatility and macro-factors, a forward-looking indication of a Sovereign downgrade event existed at year-end 2018. The consideration of CDS and its volatility as additional independent variables in the rating model improved its performance as compared to the rating model that was solely based on macro-economic factors. Banks could rely on any of the proposed model specifications to obtain a forward-looking Sovereign rating as at year-end 2018.

Finally, it is important not to limit the insights generated by the model to the prediction of rating events but rather it should provide a more holistic and comprehensive use. In fact, the model represents an internal Sovereign rating model that relies on the framework proposed by rating agencies for rating Sovereign issuers and supplements it with market-based information to incorporate investors' level of risk aversion and their risk assessment. This contributes to a consistent market assessment of Sovereign risk across all banks in Lebanon, due to the model's reliance on both objective and market-observed inputs.

3. *Forward-Looking PDs: Adjustment to Rating Agencies' TTC PDs*

The Standard emphasizes an "unbiased and probability-weighted" ECL measure that relies on "information about past events, current conditions and forecasts of future economic conditions" (IASB, 2014). Specifically, this implies a "point-in-time" (PiT) measurement philosophy of the various risk parameters comprising expected credit loss. Thus, an IFRS 9 compliant PD measurement approach shall incorporate the banks' current and future expectations of the macro-economic

conditions so as to generate a "forward-looking" measure of ECL as mandated by the Standard.

As discussed in the literature review, rating agencies' assessments are carried out through the cycle whereby they "focus on the permanent credit risk component when assigning ratings" (Altman and Rijken (2006) as cited in (Kiff, Kisser, & Schumacher, 2013)). From an IFRS 9 perspective, the resulting ratings and the associated PDs cannot be directly employed to generate forward-looking ECL measures. The direct implication of the Standard's requirement is a required calibration at the level of the rating agencies' PDs to reflect the current and expected future economic conditions of the Sovereign and the particular business cycle, resulting in PiT and forward-looking measures of default risk.

As part of leveraging the existing Basel capital adequacy models, one of the most widespread market approaches that will be considered for the PiT PD calibration is the Asymptotic Single Risk Factor (ASRF) model. The model originates from Basel's IRB approach for the measurement of the capital requirement covering credit risk (Basel Committee on Banking Supervision, 2005). The model relies on the "average PDs that reflect expected default rates under normal business conditions" (Basel Committee on Banking Supervision, 2005, p. 5). These PDs "are transformed into conditional PDs using a supervisory mapping function" (Basel Committee on Banking Supervision, 2005, p. 5).

According to the handbook on credit risk published by the Centre for Central Banking Studies at the Bank of England, the model's basic intuition is as follows (Chatterjee, 2015):

First, asset returns can be modeled as:

$$X_i = Z\sqrt{\rho_i} + S\sqrt{1-\rho_i}$$

Where:

X_i : is the asset return of borrower i

ρ_i: is the asset correlation factor between obligors or between the systemic risk factor and asset returns

Z : is the systemic risk factor representing a particular set of economic conditions

S : is the idiosyncratic risk factor that is borrower-specific

According to this model and in line with Merton's (1974) original model along with Vasicek (2002) contribution, borrowers are assumed to default when their asset returns fall below a defined "default threshold" as compared to the borrowed amount (Basel Committee on Banking Supervision, 2005). Given a normality assumption, this means that the PD can be modeled as follows:

$$TTC\ PD_i = P\ (X_i < d)$$

Where d is the default threshold

Given a particular state of the economy as conveyed through the systemic risk factor Z, the conditional PiT PD is then derived as follows (Chatterjee, 2015):

$$\text{PiT PD} = \text{N}\left(\frac{\text{N}^{-1}(\text{TTC PD}) - \text{Z}\sqrt{\rho}}{\sqrt{1-\rho}}\right)$$

Thus, under the model, the average PD is conditioned on the occurrence of a particular state of the macro-economy which is modeled using the "systemic risk factor". As for the asset correlations, Basel Committee specified particular regulatory asset correlation functions depending on each portfolio type. The following presents the supervisory estimates of correlations for corporate exposures or other portfolios which typically exert high correlations with the macro-economic factors (Basel Committee on Banking Supervision, 2005):

$$\rho = 0.12 * \frac{1 - e^{-50PD}}{(1 - e^{-50})} + 0.24 * \frac{1 - (1 - e^{-50PD})}{1 - e^{-50}}$$

Using the aforementioned approach for the purpose of calibrating Moody's TTC PD of 2.75% corresponding to a B3 rating assigned to the Lebanese Sovereign as at year-end 2018, the following steps were performed:

- Selection of relevant macro-economic factors: A correlation analysis between default rates and selected macro-economic factors was conducted in order to select the relevant macro-economic factors for calibration purposes. In line with Altman et al. (2011) bottom-up approach for measuring Sovereign risk that is based on the premise that the health of the private sector can be a good proxy for the Sovereign's creditworthiness (Altman & Rijken, 2011), the banking sector's total non-performing loans (NPL) to gross performing loans ratio was selected to represent Sovereign risk in the correlation analysis. The choice of a banking sector metric is deemed reasonable within the Lebanese context, given the tremendous importance of the banking sector which represents a major economic pillar within the country. The tables below include the considered macro-economic factors and the result of the conducted correlation analysis between these selected factors and the ratio of Non-Performing Loans (NPL) to Gross Performing Loans (GPL) for the Lebanese banking sector from the year 2011 to 2017:

Table 9.11: Macro-Economic Factors for PiT PD Calibration

Macro-Factors	2011	2012	2013	2014	2015	2016	2017

NPL/GPL	3.76%	3.79%	3.97%	4.01%	4.20%	4.88%	5.67%
GDP Growth	0.92%	2.8%	2.65%	1.97%	0.24%	1.74%	1.5%
CPI	102%	109%	114%	116%	112%	111%	116%
Net Debt (% GDP)	128%	124%	127%	129%	134%	140%	141%
NatSav (% GDP)	3.06%	-0.54%	2.64%	-0.49%	4.50%	0.74%	-0.71%

Source: IMF World Economic Outlook and World Bank World Development Indicators

Table 9.12: Correlation Analysis for PiT PD Calibration

Macro-Factors	NPL/GPL	GDP Growth	CPI	Net Debt (% of GDP)	NatSav (% of GDP)
NPL/GPL	**1.00**				
GDP Growth	-0.16	**1.00**			
CPI	0.48	0.25	**1.00**		
Net Debt (% of GDP)	0.90	-0.47	0.33	**1.00**	
NatSav (% of GDP)	-0.38	-0.60	-0.39	-0.07	**1.00**

Based on the correlation analysis outcome, the net debt as a % of GDP variable is the most significantly positively correlated with the banking sector's NPL ratio followed by the CPI variable. However, for the purposes of our analysis, only the net debt variable will be included. In line with Krüger et al. (2018), the PiT PD calibration includes one variable only to avoid the undesirable property of correlation amongst the tested variables and the increased uncertainty associated with forecasting more than one variable in future periods (Krüger, Rösch, & Scheule, 2018). Thus, the net debt as a % of GDP is the elected

macro-economic factor which will represent the systemic risk factor in the calibration process.

- Generation of forecasts and scenario analysis: The next step is to generate forecasts of the net debt as a % of GDP variable under multiple scenarios. For the purpose of our analysis, three scenarios will be considered: a base case or neutral scenario, a best case and a worst case scenario. The IMF WEO database provides forecasts of the net debt as a % of GDP variable over the next 5 years. These forecasts will be considered as the base case scenario. To generate an upper and lower case scenario, the following will be assumed:

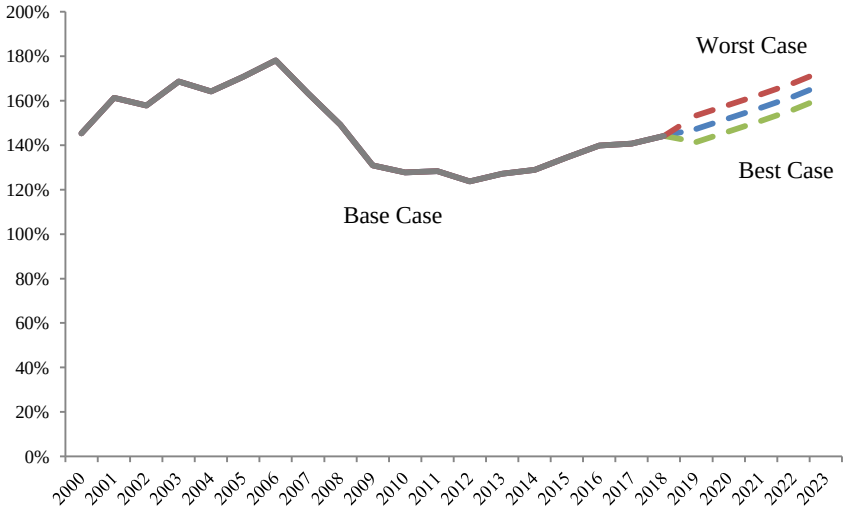
- Best Case Forecast = Base Case Forecast - 1 standard deviation of the distribution of net debt as a % of GDP in the prior five years period
- Worst Case Forecast = Base Case Forecast + 1 standard deviation of the distribution of net debt as a % of GDP in the prior five years period

The following table presents the resulting scenarios:

Table 9.13: Generation of Three Forward-Looking Scenarios

Scenario	2019	2020	2021	2022	2023
Base	147%	152%	157%	162%	168%
Best	141%	146%	151%	156%	162%
Worst	153%	158%	163%	168%	174%

Figure 9.2: Visualization of Base, Best and Worst Case Scenarios



Next, under each scenario, the normalized forecast will be computed (i.e. the z-factor) using the following formula: $z = \left(\frac{x - \mu}{\sigma}\right)$

Where:

z = the normalized net debt as a % of GDP

x = the net debt as a % of GDP under a particular forecast year and scenario

μ = the average of the observed net debt as a % of GDP over the past historical years (19 years are considered in the analysis from 2000 to 2018)

σ = the standard deviation of the observed net debt as a % of GDP over the past historical years (19 years are considered in the analysis from 2000 to 2018)

Given a historical average $\mu = 147\%$ and a standard deviation $\sigma = 17\%$, the following table summarizes the z-value calculations under the three scenarios:

Table 9.14: Z-Values of the Three Forward-Looking Scenarios

Scenario	2019	2020	2021	2022	2023	Average z-value
Base	0.046	0.320	0.596	0.885	1.227	0.615
Best	-0.298	-0.024	0.252	0.541	0.883	0.271
Worst	0.390	0.664	0.940	1.229	1.571	0.959

The average z-values calculated under each specific scenario will be the considered systemic risk factor employed in the conditional PiT PD calibration formula.

- Calculation of the asset correlation factor: By applying the asset correlation formula as defined by Basel and using the TTC PD of 2.75% associated with a B3 rating, the resulting asset correlation factor is 15.03%.
- Calculation of Conditional PiT PD: Given the TTC PD based on Moody's study, the derived z-values approximating the systemic risk factor and the defined asset correlations, the resulting conditional PiT PDs under the three separate scenarios are derived as follows:

  $$\text{Base Case PiT PD} = \mathrm{N}\left(\frac{\mathrm{N}^{-1}(2.75\%) - \sqrt{15.03\%}(-0.615)}{\sqrt{1-15.03\%}}\right) = 3.41\%$$

  Similarly, the conditional PiT PD under the best and worst case scenarios is 2.45% and 4.66% respectively. Considering an equal scenario weighting, the resulting weighted average PiT Sovereign PD under this approach is 3.51%.

C. Sovereign Loss Given Default

The literature review on Sovereign LGD sets out different considerations in order to determine whether local currency Sovereign exposures can be rightfully considered as less risky than foreign currency Sovereign exposures. In the case of Lebanon, these factors strongly indicate and justify the gap between local and foreign currency Sovereign exposures. The analysis of the various considerations is discussed below based on Moody's (2010) and the Bank for International Settlements (2018) (refer to the literature review in Chapter VII – B):

- **Availability of Local Currency**: The unique ability of the Lebanese Sovereign to monetize local currency debt in order to avoid outright default strongly acts to reinforce the Sovereign's creditworthiness pertaining to local currency debt as compared to foreign currency debt. Amidst the current economic situation of the country, some commentators might argue that the Central Bank must be unwilling to engage in monetization due to the associated inflationary costs. Despite the Central Bank's focus on inflation targeting, which weakens the willingness to monetize local currency debt, the Central Bank has a more superior objective of maintaining financial stability and stabilizing the Lebanese Pound. Moreover, it is important to note that the ability to monetize local currency debt is not negated by potential unwillingness. The sole ability to print money should be enough to discriminate between local and foreign currency debt.
- **"External liquidity constraints"** (Moody's, 2010): The foreign currency reserves are maintained at the Central Bank to support the dollar-lira peg. Had the government required hard foreign currency to repay its debt to

avoid default, it would be difficult to access the required amounts of foreign currency. This stands to maintain the existing gap in creditworthiness between local and foreign currency debt and to indicate that if a default were to occur, the Sovereign will be more inclined to engage in a selective default on foreign rather than local currency debt.

- **Costs of Default**: Examining the debt composition and the investor base of the Lebanese Sovereign debt indicates that a potential default on local currency debt is associated with higher political and economic costs. In fact, based on the Ministry of Finance figures published as at September 2018, local currency debt stood at 73,007 billion LBP (48 billion USD) and foreign currency debt at 53,393 billion LBP (35 billion USD). The Central Bank holds 50.3% of domestic debt in local currency whereas commercial banks, public institutions and investors hold 34.9%, 12.6% and 2.2% of local currency debt respectively (Republic of Lebanon Ministry of Finance, 2018). As for foreign currency debt, it is estimated that foreign investors hold around 30% while the remaining 70% is subscribed by commercial banks and the Central Bank (Bloomberg, 2018). The composition of the Lebanese Sovereign debt indicates the high concentration of local currency debt with the banking sector and a very limited subscription by an institutional foreign investor base. In contrast, a higher subscription is noted for foreign investors on foreign currency debt. Thus, a local currency default concentrates the cost of default on Lebanese residents, which acts to enhance Sovereign's creditworthiness and local currency debt repayment.
- **"Limited Capital Mobility"** (Moody's, 2010): Although there are no current restrictions on capital mobility, the Central Bank is always ready to

provide the right incentives for banks and other economic agents to continue subscribing to government debt issuances. This acts to limit capital mobility by reinforcing a sticky and stable investor base and decrease the risk of contagion from foreign currency to local currency debt in case of crisis.

- **Degree of interconnectedness between the banking sector and the Sovereign**: The excessive concentration of local currency Sovereign exposures on banks' balance sheets and close interdependencies between the banking sector and the Sovereign are likely to act as a positive reinforcement for timely local currency Sovereign debt repayment.

Given the above considerations, it can be argued that the expected LGD on local currency Sovereign debt is close to zero. As for foreign currency Sovereign exposures, external rating agencies also provide measures of historical Sovereign recovery rates on Sovereign debt issued in foreign currency. Based on Moody's (2017) default and recovery rates study, the LGD on foreign currency debt issues averaged around 35% (Moody's, 2017).

CHAPTER X

CONCLUSION AND FURTHER RESEARCH

Using panel data on 23 emerging market Sovereigns for the past 22 years extending from 1997 to 2019, we develop a dynamic Sovereign rating model that relies on rating agencies' disclosed macro-economic criteria, supplemented with the CDS spread which is considered as a market-based forward-looking measure of Sovereign risk, in line with the Standard's requirements. The model successfully predicts the recent Lebanese Sovereign downgrade, further confirming the forward-looking direction of the CDS spread and its application within an emerging market context, despite a lower liquidity and trading activity than developed markets. Alternatively, we also propose the use of the Asymptotic Single Risk Factor model employed in the IRB approach as a means to condition the TTC PDs into PiT forward-looking PDs and generate multiple scenarios considering changes in the Lebanese Sovereign net debt macro-economic variable. However, an area to be further researched is the application of the ASRF model in the case of highly concentrated holdings, given that "diversification or concentration aspects of an actual portfolio are not specifically treated within an ASRF model" (Basel Committee on Banking Supervision, 2005).

The interactions between the IFRS 9 Standard and the existing body of prudential regulation shed the light on the limitations of the Standard in terms of fully eliminating Sovereign risk. According to the ESRB report, a minority of researchers are of the view that Sovereign risk is a type of risk that cannot be managed effectively with micro-prudential tools. They propose instead fiscal and macroeconomic measures to address the risk "at its roots" (European Systemic Risk Board, 2015). As such, it is not reasonable to expect that with the application of the new impairment requirements,

banks will be able to acquire complete immunity to Sovereign risk. The application of the Standard is to be complemented with adequate policy tools as enacted by the Government and the Central Bank to further enhance the country's fiscal position, reduce debt burden and stimulate economic growth, leading eventually to a decline in systemic risk and a higher perceived Sovereign credit worthiness.

Finally, it is important to note that "effective crisis prevention requires appropriate action by regulatory agencies, accounting and other international standard setters, as well as vigilance and enhanced risk management by private creditors and market participants in general"(Joint Committee on Strengthening the Framework for Sovereign Debt Crisis Prevention and Resolution as cited in (Bank for International Settlements, 2013)).

APPENDIX I

SOVEREIGN PD SCALE

Issuer-weighted cumulative default rates
1983-2017

	Average Count	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Sovereign Issuers											
Aaa	14	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%
Aa	11	0.000%	0.000%	0.178%	0.495%	0.830%	1.004%	1.004%	1.004%	1.004%	1.004%
A	11	0.000%	0.072%	0.492%	0.800%	1.119%	1.615%	2.306%	3.032%	3.804%	4.634%
Baa	13	0.000%	0.399%	0.652%	0.923%	1.218%	1.512%	1.512%	1.512%	1.512%	1.512%
Ba	12	0.522%	1.526%	3.005%	4.303%	5.407%	6.188%	7.271%	8.659%	9.805%	10.871%
B	12	2.750%	5.664%	7.890%	9.973%	12.265%	14.536%	16.792%	18.953%	20.837%	22.437%
Caa-C	2	14.202%	23.008%	30.515%	37.996%	43.969%	47.885%	50.658%	53.688%	54.778%	54.778%
Investment-Grade	48	0.000%	0.120%	0.316%	0.521%	0.737%	0.957%	1.117%	1.285%	1.464%	1.653%
Speculative-Grade	26	2.765%	5.298%	7.607%	9.725%	11.671%	13.285%	14.957%	16.750%	18.186%	19.395%
All Rated	75	0.991%	1.957%	2.880%	3.732%	4.521%	5.197%	5.843%	6.525%	7.095%	7.594%

Source: Sovereign default and recovery rates, 1983-2017 (Moody's, 2018b, p. 14)

	--Time horizon (annualized months)--														
Rating	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
AAA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AA+	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AA-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
A+	0.00	0.00	0.00	1.39	2.82	2.82	2.82	2.82	4.62	4.62	4.62	4.62	4.62	4.62	7.80
A	0.00	0.00	0.65	1.32	2.01	3.44	4.95	6.60	7.50	9.49	11.75	13.03	14.48	16.06	16.06
A-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.41	3.02	3.02	3.02
BBB+	0.00	0.00	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20
BBB	0.00	0.79	1.63	2.51	2.51	2.51	2.51	2.51	2.51	2.51	2.51	2.51	2.51	4.46	4.46
BBB-	0.00	0.63	1.29	2.01	3.54	5.18	6.08	6.08	6.08	6.08	6.08	6.08	6.08	6.08	7.53
BB+	0.00	1.64	1.64	1.64	1.64	1.64	2.66	3.75	6.09	7.40	8.84	10.42	12.11	13.90	15.81
BB	0.00	0.67	1.37	2.10	2.10	2.90	3.76	4.69	4.69	4.69	4.69	5.95	7.31	8.91	8.91
BB-	1.20	2.46	3.81	5.26	8.52	11.27	14.26	18.55	20.91	23.59	25.12	25.12	25.12	25.12	25.12
B+	0.00	1.57	4.37	6.76	9.91	11.96	14.99	19.37	21.34	22.46	25.18	26.81	26.81	26.81	29.63
B	1.68	4.67	7.92	11.43	14.51	17.05	19.88	20.92	22.12	24.95	28.14	31.83	34.03	36.67	36.67
B-	7.63	15.25	18.42	21.97	24.66	27.56	29.10	30.75	32.52	32.52	32.52	32.52	32.52	32.52	32.52
CCC+	20.83	25.00	38.24	42.65	47.06	55.88	60.29	60.29	60.29	60.29	60.29	60.29	60.29	60.29	60.29
CCC	42.86	71.43	71.43	71.43	71.43	71.43	71.43	71.43	71.43	71.43	71.43	71.43	71.43	n/a	n/a
CCC-	100.00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

Source: S&P 2017 Annual Sovereign Default Study and Rating Transitions (S&P, 2018, p. 63)

APPENDIX II

IFRS 9 REGULATORY GUIDANCE ISSUED BY SELECTED COUNTRIES

Country	**IFRS 9 Sovereign Guidance**
Egypt	Circular dated 28 January 2018 regarding regulation related to the Implementation of IFRS 9
Iraq	Draft IFRS 9 implementation guidance volume 9/3/207 dated 24/5/2018
Jordan	Circular No. 13/2018 Guidance for the implementation of IFRS 9
Kenya	Guidance Note on Implementation of International Financial Reporting Standard (IFRS) 9 On Financial Instruments dated April 2018
Nigeria	Guidance Note to Banks and Discount Houses on the Implementation of IFRS 9 (Financial Instruments) in Nigeria dated 20 December 2016
Bahrain	Guidelines for IFRS9 ECL Implementation by Banks and Financing Companies dated 28 December 2016
Kuwait	Guidelines for local banks' implementation of IFRS 9 dated 2018
Oman	Circular BM 1149 Implementation of International Financial Reporting Standards 9 on Financial Instruments dated 13 April 2017
Qatar	Qatar Central Bank IFRS 9 Implementation Guidelines dated February 2017
Saudi Arabia	Draft guidance on implementation and application of IFRS 9 in the Kingdom of Saudi Arabia
Seychelles	Guidance on the requirements of IFRS 9- Financial Instruments dated 5 April 2018
Singapore	MAS Notice 612 dated 29 December 2017
United Arab Emirates	Guidance Note to Banks and Finance Companies on the Implementation of IFRS 9 (Financial Instruments) in the UAE dated March 2018

APPENDIX III

ORDINAL RATING SCALE

Moody's Rating	S&P Rating	Ordinal Rating Equivalent
Aaa	AAA	1
Aa1	AA+	2
Aa2	AA	3
Aa3	AA-	4
A1	A+	5
A2	A	6
A3	A-	7
Baa1	BBB+	8
Baa2	BBB	9
Baa3	BBB-	10
Ba1	BB+	11
Ba2	BB	12
Ba3	BB-	13
B1	B+	14
B2	B	15
B3	B-	16
Caa1	CCC+	17
Caa2	CCC	18
Caa3	CCC-	19
Ca	CC	20
C	C	21
D	D	22

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