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Addendum 5 to the CRI Technical Report (Version: 2014, Update 1)

This document updates the Technical Report (Version: 2014, Update 1) and details some revisions to the treatment of firms undergoing a mergers and acquisitions (M&A) event. The changes described herein have been implemented for the probabilities of default (PD) and actuarial spreads (AS) starting from 13th of December.

1. Overview

Mergers and acquisitions (M&A), by definition, is an economic behavior of business entities to buy, sell, divide or combine certain part of their own or of other entities. The purpose of M&A varies and can be to improve an entity's supply chain, diversify its products/services, expand its market, etc. It is very common nowadays for enterprises to strive for better growth opportunities through the M&A practices. For our purpose, we consider the M&A events where a firm acquires partial or full ownership of another firm.

The long-term effect aside, the occurrence of an M&A event is interesting in its own right in the context of PD/AS evaluation. To be specific, right after an M&A event, the market reacts immediately to the restructuring of the firm by adjusting its market capitalization (MC). However, the financial information available to the public does not necessarily reflect this change in a timely fashion simply because the financial statement becomes available only on a quarterly, semi-annual or yearly basis. As a result, the two sets of information, which are essential ingredients in the RMI-CRI model, are mismatched, likely to distort the forecast of the credit risk and to convey inaccurate information to the interested parties.

As for the terminology, the firm which takes the initiative to acquire another is called the acquirer. The firm, whose part or entire stake is merged into the acquirer, is the target. Note that the RMI-CRI database currently covers public firms around the world. In the majority of the cases of our interest (which will be specified in section 2), the target company delists after being merged/acquired. Consequently, the treatment on the data mismatching is applied to the acquirers only.

2. Treatment Criteria

The data treatment is applied to important M&A deals only defined in Section III.4 of the Technical Report (Version 2014 Update 1):

a) Upon the deal's completion, the acquirer owns 20% or more of the target company.
b) The size of the deal is material to the acquirer. This is measured in terms of total assets. If α is the percentage of the target that is being acquired, the size is considered material if the product of α and the total assets of the target is greater than or equal to 20% of the total assets of the acquirer.
c) The change in the acquirer's MC is material, with the largest absolute daily MC return, within 20 days of the M&A completion day, larger than or equal to 5%.

The data needed to test the criteria above are readily available in the database. The only thing to note is that some targets stopped producing financial statements years before the M&A event. As a result, they do not have a valid value of total asset (needed for testing criterion b)) on the deal completion date. In this case, we use their last available value within 2 years before the deal completion as a substitute. If the last available value is beyond the 2-year range, we think that the data are not informative enough to reflect the financial situation upon deal completion and thus skip this particular case.

3. Methodology

As mentioned earlier, the inaccurate PD/AS arises from the mismatching between the MC and the financial statement variables. Given that the MC is the up-to-date information that reflects the market's valuation/misevaluation of the acquirer's growth opportunities, we will keep it as it is and construct hypothetical values for the financial statement variables (total asset, total liability, net income, etc.) to capture the corporate restructure. In practice, the treatment of business combinations in the financial statement is complicated and largely dependent on the situation of the related parties on a case-by-case basis. Having limited information on their individual practices, we make the simplest and most conservative treatments, which are in line with the fundamental accounting standards and should reflect the general practice accepted by both the practitioners and tax authorities. The treatment period will begin on the deal completion date and end when the first financial statement that reflects the post-M&A situation becomes available. The treatment period varies across economies and can range from 3 months to a couple of years.

We assume that the ownership level in the target dictates how the financial manager of the acquirer compiles the financial statement of the combined entity. Specifically, after identifying the important M&A deals, which must have had an ownership level of equal or more than 20%, we treat them in two different ways:

a) If the acquirer owns 20-50% (excluding 50%) of the target upon deal completion, the *Equity Method* is used to treat the financial statement variables. Under the *Equity Method*, the total asset of the acquirer will increase by a proportion of the target's equity, so will its net income. In contrast, other financial statement variables will stay the same.
b) If the acquirer owns 50-100% (including 50%) of the target upon deal completion, the *Acquisition Method* is used to adjust the financial statement variables. By using this method, we assume that the financial manager of the acquirer consolidates the financial statements of both entities. As a consequence, the financial statement variables on the balance sheet take the simple sum of the values from both entities, except the net income because it is the profit attributed to the shareholders.

The mathematical representation of the two methods is listed in Table1. The notations are as follow:

TA^{A^*}: total asset of the acquirer upon the M&A deal completion.
TA^{B}: total asset of the target upon the M&A deal completion.
TA^{A}: hypothetical total asset of the acquirer/combined entity upon the M&A deal completion.
TL^{A^*}: total liability of the acquirer upon the M&A deal completion.
TL^{B}: total liability of the target upon the M&A deal completion.
TL^{A}: hypothetical total liability of the acquirer/combined entity upon the M&A deal completion.

C^{A*}: cash and marketable securities of the acquirer upon the M&A deal completion.
C^{B}: cash and marketable securities of the target upon the M&A deal completion.
C^{A}: hypothetical cash and marketable securities of the acquirer after the M&A deal completion.
NI^{A*}: net income of the acquirer upon the M&A deal completion.
NI^{B}: net income of the target upon the M&A deal completion.
NI^{A}: hypothetical net income of the acquirer/combined entity upon the M&A deal completion.

Table 1: Accounting Treatment on the financial variables based on the ownership level

Ownership Level	Accounting treatment	Implications to Financial Statement Variables
20-50%	Equity method	$TA_t^A = TA_t^{A*} + \pi_t \left(TA_t^B - TL_t^B\right)$ $TL_t^A = TL_t^{A*}$ $C_t^A = C_t^{A*}$ $NI_t^A = NI_t^{A*} + \pi_t NI_t^B$
50-100%	Acquisition method	$TA_t^A = TA_t^{A*} + TA_t^B$ $TL_t^A = TL_t^{A*} + TL_t^B$ $C_t^A = C_t^{A*} + C_t^B$ $NI_t^A = NI_t^{A*} + \pi_t NI_t^B$

4. Implementation details

To implement the treatment, we will use the hypothetical financial statement data to compute the PD/AS wherever applicable. However, we will not let the hypothetical values enter the model's calibration process. With enough data points in the database to robustly calibrate the model parameters, we can afford to disregard a small portion of data for the M&A period during which we believe them to be mismatched. To be more specific, we assign different mapping numbers to the acquirer before and after the M&A event, respectively, and treat them as individual entities in the calibration process.
Having obtained the model parameters, we then apply the treatment to adjusting the DTD inputs and use them to re-compute the firm-specific DTD parameters. After doing this, we similarly treat other financial statement variables in the model, such as cash/total asset, and compute the PD/AS accordingly with the new DTD values.

5. Effect of the data treatment

The data treatment specified in this addendum introduces a way to adjust the financial statement variables for the M&A acquirers for a period after the corporate event. This method makes the financial information reflect the corporate restructure right away along with the instantly available market information. It consequently makes the PD/AS capture the change of the firms' credit risk in a timely manner, conveying valuable intelligence to the market participants and beyond.