
Managing NPEs Under Financial Crisis Conditions: A Synthetic Quick Approach

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Abstract:

When an economy faces a financial crisis, a secondary problem occurs regarding the management of Non-Performing Exposures. There are many ways to solve this problem.

This article contributes to the solution of the above problem by presenting a quick synthetic and modern financial methodology for dealing with the Non-Performing Exposures. Our proposal is initially based on the securitization of loans portfolios. Through the process and the structure of securitization, it is possible to derecognize portfolios under the provisions of IAS39 and to transform its residual value into capital market securities. To that end, flow charts regarding the securitization process and derecognition are provided.

Subsequently, the valuation of the capital market security through securitization depends on the collection of the total portfolio that is securitized. A model for the valuation of the residual title under certainty and uncertainty is provided.

Based on a recent transaction that has been carried out having apply most of the above features, we have found that banks can implement this solution for NPEs portfolios by transferring their management to specialized companies and thus improving all their financial ratios.

The main academic debate that has been developed deals with the determinants of NPEs creation, by examining how these factors influence the formation of NPE portfolios and the features of their structure without involving the effective management of the NPEs. Our article contributes to that challenge.

Keywords: Credit Institutions; Securitization; Financial Crisis; Non-Performing Exposures.

JEL code: G21, M41.

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1. Introduction

The Greek crisis occurred in the year 2009 with a rapid decline in the country's GDP, from €354 billion in 2008 to €192 billion in 2016, having an accumulated decline of 46% in 8 years. This also resulted in a rapid downgrade of the credit rating of the country as well as of the Greek banks. The Greek banking sector, despite its conservatism compared to other European banking sectors based on Total Assets-to-GDP ratio, was recapitalized and reorganized through a series of M&As and Share Capital Increases. Nowadays, after 3 memoranda and 8 years of restrictive economic policies, the Greek economy seems to stabilize.

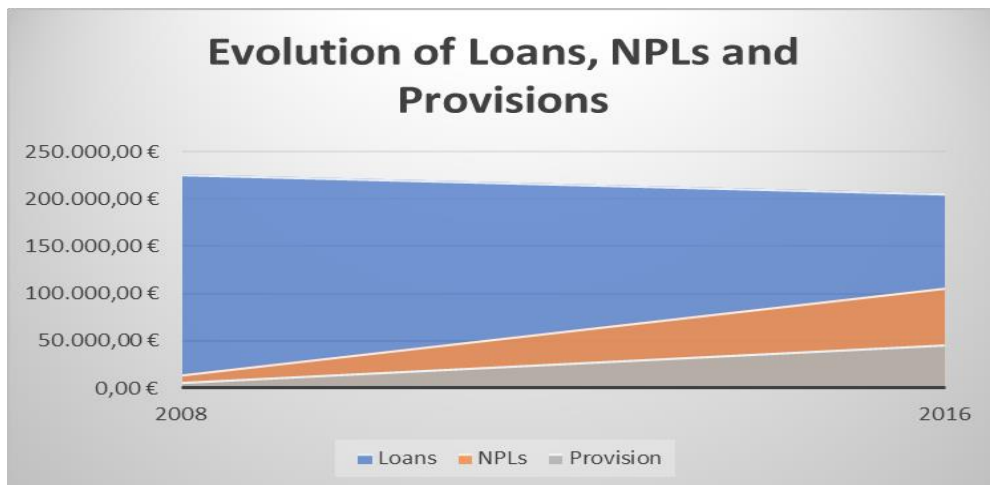
Today, after all the challenges, the country's credit sector is trapped in another problem stemming from the tight economic policy and a drastic decline in demand within the 8-year crisis: that of the growing volume of Non-Performing Exposures (NPEs). Notwithstanding Greek Banks efforts to deleverage their assets and the substantial interruption of Greek economy's funding, the problem is acute and remains so, while the economy is suffocating even more. Due to the massive outflow of deposits, the implementation of restrictions on capital flows, and the dramatic change of the ratio "deposits to lending", the problem of NPEs became a liquidity problem for the country's credit system. In the year 2015, the ratio exceeded the European countries' average and today it is close to an index value of 135%.

On the other hand, after applying Stress Tests requirements and after their recapitalization and reorganization, the NPEs of the Greek Banks were covered by adequate provisions. Today, the formed provisions for bad loans account for about 46.2 billion euros, covering about 45% of the Non-Performing Loans of the Greek Banks.

Today, the total NPE portfolio of all the Greek Banks accounts for 100,5 billion euros, posing a threat that needs to be addressed. The previous work by the academic community focuses on the determinants that create the Non-Performing Exposures, by examining how these determinants influence the creation of NPEs and the features of their structure, without involving the effective management of these portfolios.

Our purpose is to analyze a model that can contribute to the solution of the problem. We will present a quick synthetic and modern financial methodology for dealing with the Non-Performing Exposures. Our proposal is based on the securitization procedure under the derecognition of financial assets according to IAS39, creating also a model to evaluate under certainty and uncertainty the securities that are produced through the securitization process.

Figure 1. Evolution of Loans, NPLs, Provisions



Source: Author's own work.

Our research contributes to the academic discussion, since it analyzes a problem that stems from the real economy and has not significantly been addressed by the academic community, particularly from the managerial accounting point of view. This article bears expertise not only from managerial accounting (since we examine the measurement and recognition of financial assets) but also from banking (since we examine the liquidity and solvency).

The paper is organized as follows: Following the introduction we present an overview of the NPEs and the banking industry in Greece and the literature review. Then the NPEs derecognition using the securitization process is presented followed by the formulation of the securitization and the process of derecognition. Finally, before the conclusions, we present the assessing of recoverability efficiency of senior bonds.

2. NPE's and banking industry in Greece

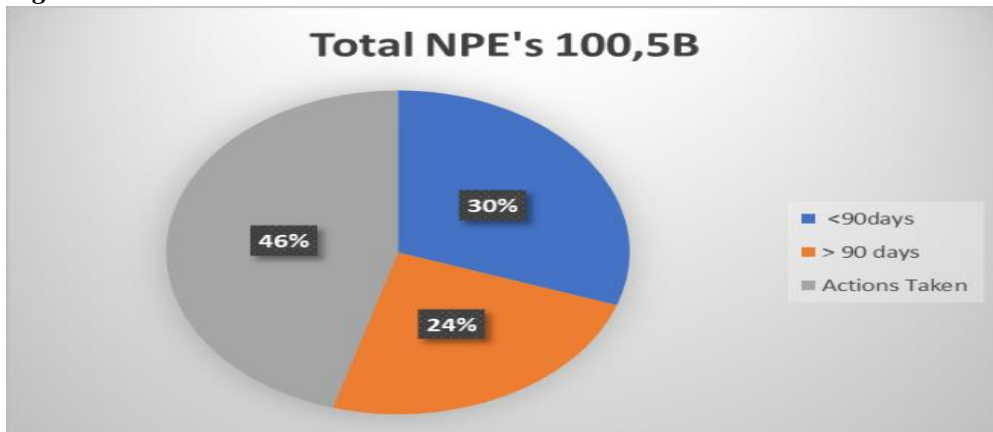
As already mentioned, the banking industry in Greece suffers from the enormous problem of the Non-Performing Exposures. According to the latest available data, e.g. January 2018, the total NPE portfolio accounts for €100.5 billion. Of particular interest is the fact that 46% of the NPE's, is already under legal actions, while 24% is more than 90days exposed and 30% less than 90 days. The following Figure 2 and Table 1 summarize the NPE's for all the different loan portfolios, and the status of these NPE's.

Table 1. NPEs in Greece

		<90days	>90 days	Actions Taken
Total NPE's	100,5	30,00%	24,00%	46,00%
Business NPE's	58,9	35,00%	21,00%	44,00%
Large+SME NPE's	40,3	40,00%	20,00%	40,00%
VSME+Freelancers NPE's	16,02	17,00%	24,00%	59,00%
Shipping NPE's	2,67	69,00%	19,00%	12,00%
Total Family NPE's	41,35	23,00%	30,00%	47,00%
Housing NPE's	27,7	24,00%	35,00%	41,00%
Retail NPE's	13,61	20,00%	20,00%	60,00%

Source: Author's own work.

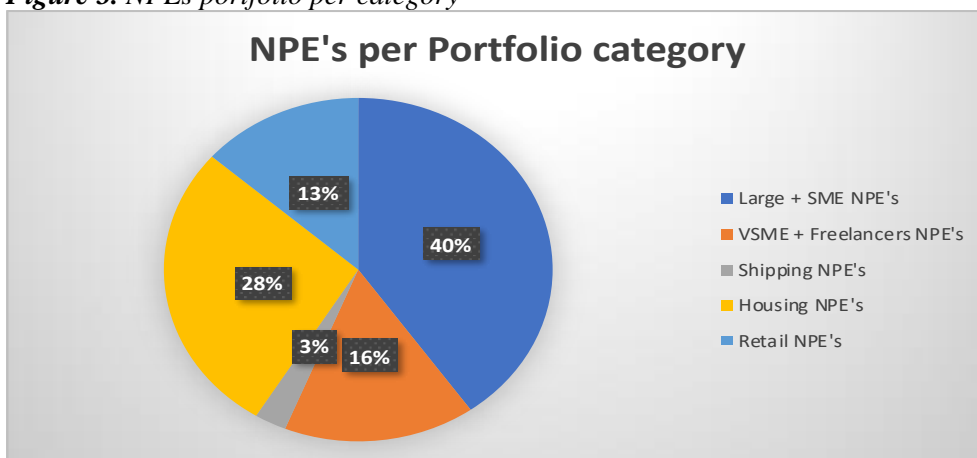
From Table 1, we can observe that the loan portfolio with the biggest exposure is the Business Portfolio and the Large and SME loan Portfolio. This is very important to understand, since the economic slowdown has led to this situation. In addition to that, part of this portfolio consists of loans of construction firms, having houses and construction sites as collaterals. A very interesting fact is that the shipping portfolio accounts only for €2.6 billion, even though the shipping industry in Greece is highly developed and leads the worldwide shipping industry.

Figure 2. Total NPEs

Source: Author's own work.

Another important fact is to investigate how the Non-Performing Exposures have developed over the last year. The following Figure 3 and Table 2 provide the percentage of each Portfolio category and the change in each different portfolio from 2016 until Q3 2017. As we can observe, all loan portfolios had a negative percentage change with the exception of housing loans. This means that the Non-Performing Exposures have decreased due to the fact that banks are required to reduce this amount and also by the fact that banks have stopped to provide new loans over the last years.

Figure 3. NPEs portfolio per category



Source: Author's own work.

Table 2. NPE percentage change

		<90days	>90 days	Actions Taken
Total NPE's	100,5	30,00%	24,00%	46,00%
Business NPE's	58,9	35,00%	21,00%	44,00%
Large + SME NPE's	40,3	40,00%	20,00%	40,00%
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Housing NPE's	27,7	24,00%	35,00%	41,00%
Retail NPE's	13,61	20,00%	20,00%	60,00%

Source: Author's own work.

Although the problem is very intense, only a limited number of portfolios have been sold. The limited number of portfolio sales so far is mainly due to the spread between the bid-ask market price of the NPE's, as it stands at the current conditions. In detail, underestimation of the servicing costs or overestimation of the recovery rate and the viability of the potential adjustment of the loan affect the ask price. On the other hand, factors such as, limited information on the exact status of the for-sale portfolios, consideration of the cost of possible adjustment, the required level of the internal rate of return of potential investors, as well as external factors such as bankruptcy law in the country, the existing judicial system, and the total time of the liquidation, form the bid price.

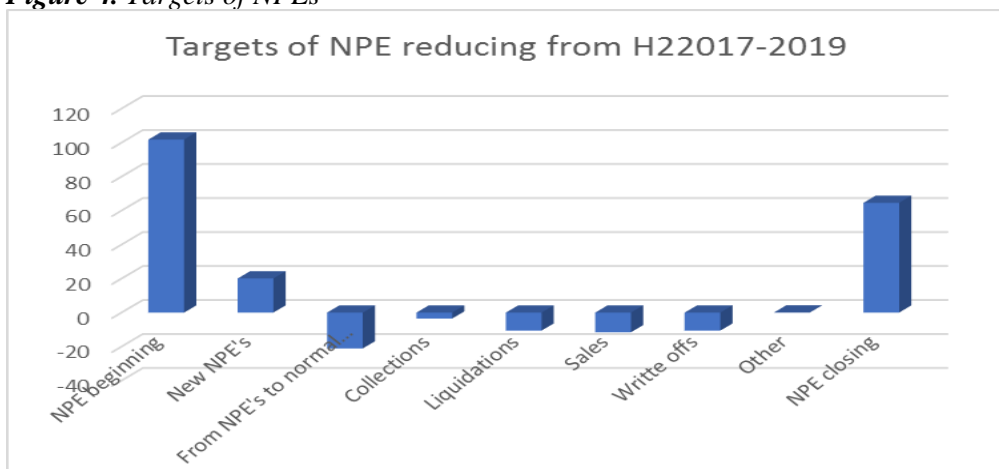
The reluctance of credit institutions to sell NPE's also stems from the net book value in which they are recognized in their financial statements, as the selling process at market values will lead to losses and, by extension to capital loss. Additionally, if we consider the impact of changes in the accounting of credit institutions exposures by applying International Financial Reporting Standard 9 (IFRS 9), the upcoming stress testing exercise and the capital needs that may arise

from the application of the Minimum Requirements Eligible Liabilities, it is understood that the reluctance of credit institutions is strengthened. Finally, the current macroeconomic environment, with the gradual improvement of the climate and the fundamentals of the economy, creates positive expectations for corresponding improvement and positive performance on the side of borrowers' behavior, effectively driving credit institutions to postpone the actions of NPE's sales.

On the other hand, financial institutions in the context of active management of non-performing exposures have set up several actions to achieve the operational targets, but also to release resources that can be channeled into restarting the credit expansion and growth in the real economy. It should be noted that sales of NPE's since the establishment of operational targets in September 2016, up to September 2017, amounted to € 1.96 billion while the target by the end of 2019 is to reach € 11.6 billion, corresponding to 11.2% of the total existing stock of NPE's.

Additionally, since goals were backloaded in the beginning of the program, mainly over the next two years, credit institutions have been urged to speed up loan portfolio selling processes in the remaining period until the end of 2019. Figure 4 below describes the defined framework of supervisory operational objectives for the reduction of NPEs.

Figure 4. *Targets of NPEs*



Source: Author's own work.

3. Literature Review

The NPE problem is something that has mainly occurred after 2008 and the onset of the financial crisis. Various studies have been focused on the determinants that affect the Non-performing loans within the European Union. These studies have

analyzed not only macroeconomic factors but also microeconomic factors. Louzis et al. (2012) analyzed the Greek Banking sector, for all loan categories. It was concluded that NPLs in the Greek banking system can be explained mainly by macroeconomic variables (GDP, unemployment, interest rates, public debt) and management quality, with non-performing mortgages being the least responsive to changes in the macroeconomic conditions. Messai and Jouini (2013) studied the NPL's Micro and Macro determinants for the Banking Sectors of Italy, Spain and Greece. This study showed that the problem loans vary negatively with the growth rate of GDP, the profitability of banks' assets and positively with the unemployment rate, the loan loss reserves to total loans and the real interest rate.

Findings of another study by Makri et al. (2014) revealed strong correlations between NPL and various macroeconomic (public debt, unemployment, annual percentage growth rate of gross domestic product) and bank-specific (capital adequacy ratio, rate of non-performing loans of the previous year and return on equity) factors.

Other studies have been focused in the South Eastern Europe, since these countries have been affected more by the financial crisis. In particular, Klein (2013) focused on CESEE countries (Central, Eastern and South-Eastern Europe), where NPLs were found to respond to macroeconomic conditions, such as GDP growth, unemployment, and inflation. The analysis also indicates that there are strong feedback effects from the banking system to the real economy, thus suggesting that the high NPLs that many CESEE countries currently face adversely affect the pace economic recovery. At the same time, Tanasković and Jandrić (2015), investigated CEEC (Central Eastern European Countries) and SEE (South Eastern Europe) countries, proving that there is a negative relationship between increases in GDP and rise of the NPL ratio. Along with GDP, foreign currency loans ratio and level of exchange rate are positively related with the increase of NPL ratio. This confirms the expectation that countries where domestic currency is not the main medium of credit placements will have larger problems with the level of NPLs, which is even more pronounced in periods of domestic currency depreciation.

Finally, a research by Skarica (2014) in selected emerging markets for seven CEEC countries, suggested that the primary cause of high levels of NPLs is the economic slowdown, which is evident from statistically significant and economically large coefficients on GDP, unemployment, and the inflation rate. On the process of the NPE management, a lot of banks have used the financial tool of securitization. This is not an innovative tool, yet it has been progressively implemented as a tool of NPE management mainly after 2010. Christina and Andre (2015) found evidence that determinants of loan securitization remarkably change when separately investigating securitization transactions during the pre-crisis and crisis period. Moreover, the research showed that determinants of loan securitizations in Europe depend on the transaction type, the underlying asset portfolio and the regulatory and institutional environment under which banks operate. Panetta et al. (2010) tried

to answer the question why banks securitize their assets. They found evidence that banks securitized their assets to contain credit risk, reduce the exposure to liquidity shocks and improve their capital ratios.

The NPE problem is even more profound in the South Europe Countries. Cardone-Riportella *et al.* (2010) investigated the Spanish Banking system, which indicates that liquidity and the search for improved performance are the decisive factors in securitization. On the other hand, Affinito and Tagliaferri (2010), investigated the Italian Banking system and concluded that banks that are less capitalized, less profitable, less liquid and burdened with troubled loans are more likely to perform securitization, for a larger amount and earlier.

Karaoglu (2004), suggested that banks use gains from loans sales and securitizations to affect both earnings and regulatory capital after controlling for other economic motivations to securitize loans such as comparative advantage, funding, and risk management. The gains can be attributed both to cherry-picking of loans whose market values exceed their book values and to overvaluation of the retained interests that are carried at fair market value after the securitizations.

A step forward regarding effective NPL management has been taken by the Greek Government. The establishment of SPE companies, which can manage or acquire Non-performing loans, took place, as stipulated by laws 4354/2015 and 4389/2015. The licensing of these companies will be granted by the Bank of Greece within 20 days of their paperwork submission and will be supervised by it. Until now, only 10 companies have managed to acquire this license. Their headquarters must be within the Greek territory or in a European Union Country with a branch in Greece, while the share capital must be at least 100,000 EUR at any occasion. A prerequisite is the detailed shareholder list combined with documents for the identity of the direct and indirect shareholders.

Within the operation framework of these companies lie the legal and accounting monitoring of debts, the collection, the negotiation with debtors, the legal action against debtors, participate in bankruptcy and debt settlement procedures, granting of new loans for the refinancing of their previous loans after the companies have received a separate license from the Bank of Greece and a license from the Bank that granted the first loan to outsource the debt collection to other companies.

For the transfer of claims, a prerequisite is that the borrower and the loan guarantor be invited by an out-of-court call within 12 months of the offer to settle their debts. No warning is required in case of litigation or claims, as well as in the case of non-cooperative borrowers. Infringement of the Law results in an administrative fine of up to 300,000 Euros, while the operation of the companies will be based on the Bank of Greece Code of Conduct. Sales of loans are exempt from any other tax and levy.

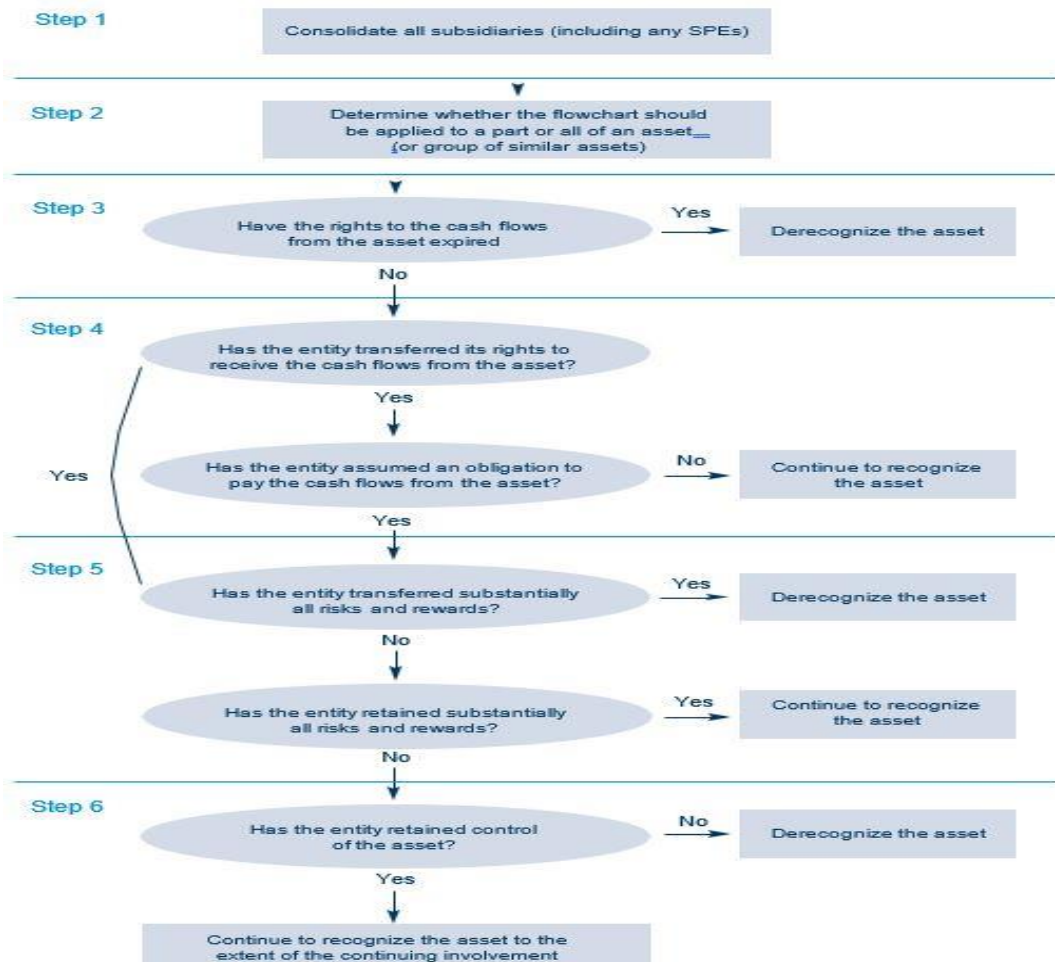
The derecognition of the financial assets is an essential variable in NPE management. A sale of an NPL portfolio cannot take place without the bank's proceeding in the derecognition of these assets. IAS 39 Ball (2015) offers the tool that the financial institutions can use to derecognize financial assets. The standard provides a flowchart that summarizes IAS 39's requirements for evaluating whether, and to what extent, a financial asset is derecognized. Every transaction should be analyzed using the strict sequence set out in the flowchart. Most importantly, there are two separate approaches to derecognition under IFRS – the 'risks and rewards' approach and the 'control' approach. The control approach is only used where the risks and rewards approach does not provide a clear answer. So, the risks and rewards approach should also be evaluated first. According to Liapis (2012), although the exact content of the IAS may not be identical to that of the US GAAP, the two systems use the same approach and degree of detail in many respects. The IAS and US GAAP are more similar than not, and the trend towards harmonization amplifies this trend.

4. NPE's derecognition

It is not often difficult to decide whether a financial instrument should be derecognized. For example, if a manufacturer receives cash in settlement of a receivable, there are no longer any rights to receive cash from the asset, and the receivable is derecognized. But many transactions are more complex; as a result, the derecognition requirements in IAS 39, 'Financial instruments: Recognition and measurement', are complex.

IAS 39 contains one set of requirements that apply to the derecognition of all financial assets, from the simple maturity of an instrument to the more complex securitization transactions. Despite the requirements having been in place for a few years, entities are still learning how to implement some aspects – in particular, the unique model of continuing involvement, which can be challenging to apply in practice. This is also an evolving area because the IFRIC is considering some key issues, and the results of its discussions could significantly affect how some transactions are accounted for. This publication aims to provide an understanding of the requirements and how to apply them in practice.

The standard provides a flowchart (below) that summarizes IAS 39's requirements for evaluating whether, and to what extent, a financial asset is derecognized. Every transaction should be analyzed using the strict sequence set out in the flowchart. Most importantly, there are two separate approaches to derecognition under IFRS – the 'risks and rewards' approach and the 'control' approach. The control approach is only used where the risks and rewards approach does not provide a clear answer. So, the risks and rewards approach should also be evaluated first. A detailed explanation of these two approaches and each step of the flow chart follows.

Figure 5: Derecognition Tree

Source: IAS 39 – Derecognition of Financial Assets.

A brief explanation of the above steps is provided:

Step 1 – Consolidate all subsidiaries, including any SPEs:

The first step is to determine the nature of the reporting entity that is considering whether to derecognize the financial asset – that is, whether it is the consolidated or the individual entity. If it is the consolidated entity, the entity should first consolidate all subsidiaries, including any special purpose entities (SPEs), in accordance with IAS 27, ‘Consolidated and separate financial statements’, and SIC 12, ‘Consolidation – Special purpose entities. It then applies the derecognition analysis to the resulting group.

Step 2 – Determine whether the item to be considered for derecognition is all or part of an asset:

The next step is to determine whether the analysis should be applied to a part of a financial asset (or part of a group of similar financial assets) or to the financial asset in its entirety (or a group of similar financial assets in their entirety). The derecognition requirements should be applied to a part of a financial asset (or part of a group of similar financial assets) only if the part being considered for derecognition meets one of the following three conditions:

- (a) The part comprises only specifically identified cash flows from a financial asset (or a group of similar financial assets). For example, if an entity enters an interest rate strip whereby the counterparty obtains the right to the interest cash flows, but not the principal cash flows from a debt instrument, the derecognition requirements are applied to only the interest cash flows.
- (b) The part comprises only a fully proportionate (pro rata) share of the cash flows from a financial asset (or a group of similar financial assets). For example, if an entity enters into an arrangement in which the counterparty obtains the rights to a 90% share of all cash flows of a debt instrument, the derecognition requirements are applied to that 90% of the cash flows. If the rights to 90% of the cash flows of an asset of C100 are transferred and only C90 is recovered, the transferee receives C81 and not C90.
- (c) The part comprises only a fully proportionate (pro rata) share of specifically identified cash flows from a financial asset (or a group of similar financial assets). For example, if an entity enters into an arrangement in which the counterparty obtains the rights to a 90% share of interest cash flows from a financial asset (the specifically identified part), the derecognition requirements are applied to that 90% of the interest cash flows.

Step 3 – Determine whether the rights to the cash flows from the asset have expired:

Once the entity has determined at what level (entity or consolidated) it is applying the derecognition requirements and to what identified asset (individual, group or component) those requirements should apply, it can start assessing whether derecognition of the asset is appropriate.

Step 3 considers whether the contractual rights to the financial asset have expired. If they have, the financial asset is derecognized. This would be the case, for example, when a loan is extinguished, in the normal course, by payment of the entire amount due, thereby discharging the debtor from any further obligation.

Step 4 – Is there a transfer?:

If the contractual rights to the cash flows from the asset still exist, the asset is transferred before derecognition is possible. IAS 39 identifies two ways in which a transfer can be achieved. An entity ‘transfers’ a financial asset only if it either:

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- (a) transfers the contractual rights to receive the cash flows of the financial asset, or
 - (b) retains the contractual rights to receive the cash flows of the financial asset but assumes a contractual obligation to pay the cash flows to one or more recipients, in what is often referred to as a ‘pass-through arrangement’ [IAS 39.18].

Step 5 – Analysis of risks and rewards:

Once an entity has established that it has transferred a financial asset either by transferring the contractual rights to receive the cash flows or under a qualifying pass-through arrangement, it carries out the risks and rewards test. This requires the entity to evaluate whether it has:

- (a) transferred substantially all the risks and rewards of ownership of the financial asset;
- (b) retained substantially all such risks and rewards; or
- (c) has neither transferred nor retained substantially all such risks and rewards. In this case, the entity moves on to assess whether it has transferred control [IAS 39.20].

An entity derecognizes an asset if it transfers substantially all the risks and rewards of ownership of the asset.

Step 6 – Control:

In the context of derecognition under IAS 39, control is based on whether the transferee has the practical ability to sell the asset. This IAS 39 notion addresses the extent that the transferor continues to be exposed to the cash flows of the particular asset that was the subject of the transfer as opposed to be exposed to risks of a more general nature, like a derivative.

IAS 39 explains that the transferee has the ‘practical ability’ to sell the transferred asset if:

- (a) The transferee can sell the asset in its entirety to an unrelated third party; and
- (b) The transferee can exercise that ability unilaterally and without imposing additional restrictions [IAS 39.23].

4.1 Accounting treatment

If there is a transfer, the accounting results can be summarized in Figure 6:

Figure 6: Accounting Treatment under IFRS9

Risks and rewards			
Transferred substantially all	Transferred some		Retained substantially all
↓	Do not control assets	Control assets	↓
Full derecognition*	Full derecognition*	Continuing involvement	No derecognition

*With recognition of any new assets or liabilities

Source: IAS 39 – Derecognition of Financial Assets.

5. A formulation of Securitization and Derecognition Process

Since in real economy the transactions do not take place under “pareto optimal” situations, where one of the two counterparties win and the other loses (win-lose situation), we also have circumstances where both counterparties win (win-win situation) resulting in that the economy in total move within the “pareto optimum” borders. This asymmetry is due to organizational structures of reducing costs (cost-advantage) that one of the two counterparties achieves in managing financial assets. Another factor that creates asymmetries is also the financing cost, especially when one of the two counterparts is active in a country that faces financial crisis. According to the above, it is possible that a financial asset which has no value for someone and, according to IFRS has no cash flow generated in the future, may actually have value for someone else. If a sale transaction takes place, it will take place on a price equal to the present value of the cash flow that the buyer can generate from the asset, using as discount rate the Weighted Average Cost of Capital (WACC). Taking the above technicalities into account, we will examine the following situation.

As Liapis and Roumeliotis (2017) describe, through public tendering, the Bank is looking for an investor with appropriate expertise in NPEs management; a choice that will result in a *win-win* solution, pursuing mutual profit for the Bank and the investor, but also for the country’s borrowers. Developed by the Bank and its Advisers, a financial transaction which is selling a big amount of its NPEs and transforming its claim from Loans to Debt Securities (Debt instruments – Senior Bond of increased collectability and junior subordinated bond of lower collectability) is issued by the new loan holder (SPE), following a securitization procedure. The Legal Entities involved in our case study are described below:

Table 3. Legal Entities involved

Legal Entities involved	
Bank	NPE Portfolio Initial Owner and Bond holder of Bond A
Securitization SPE	Owner of the NPEs portfolio and Issuer of Bonds A and B.
AMC Servicer	Servicer of the NPEs portfolio
Investor	Majority shareholder of AMC and Bond holder of Bond B
Cash Manager	An independent legal entity with a mandate to allocate the cash flows arising from NPEs Management from the Servicer, to all parties according to a predefined hierarchical order.
Trustee	Responsible for the correct implementation of all legal relations between all the above entities.

Source: Author's own work.

The entire legal contracts involved in our case study are summarized below:

Table 4. Legal Contracts

Legal Contracts	
LPPA	Loan Portfolio Purchase Agreement
NPA	Note Purchase Agreement
STA	Share Transfer Agreement
SPA	Sale + Purchase Agreement
PSLA	Primary Servicing Loan Agreement
SFSA	Short Form Servicing Agreement

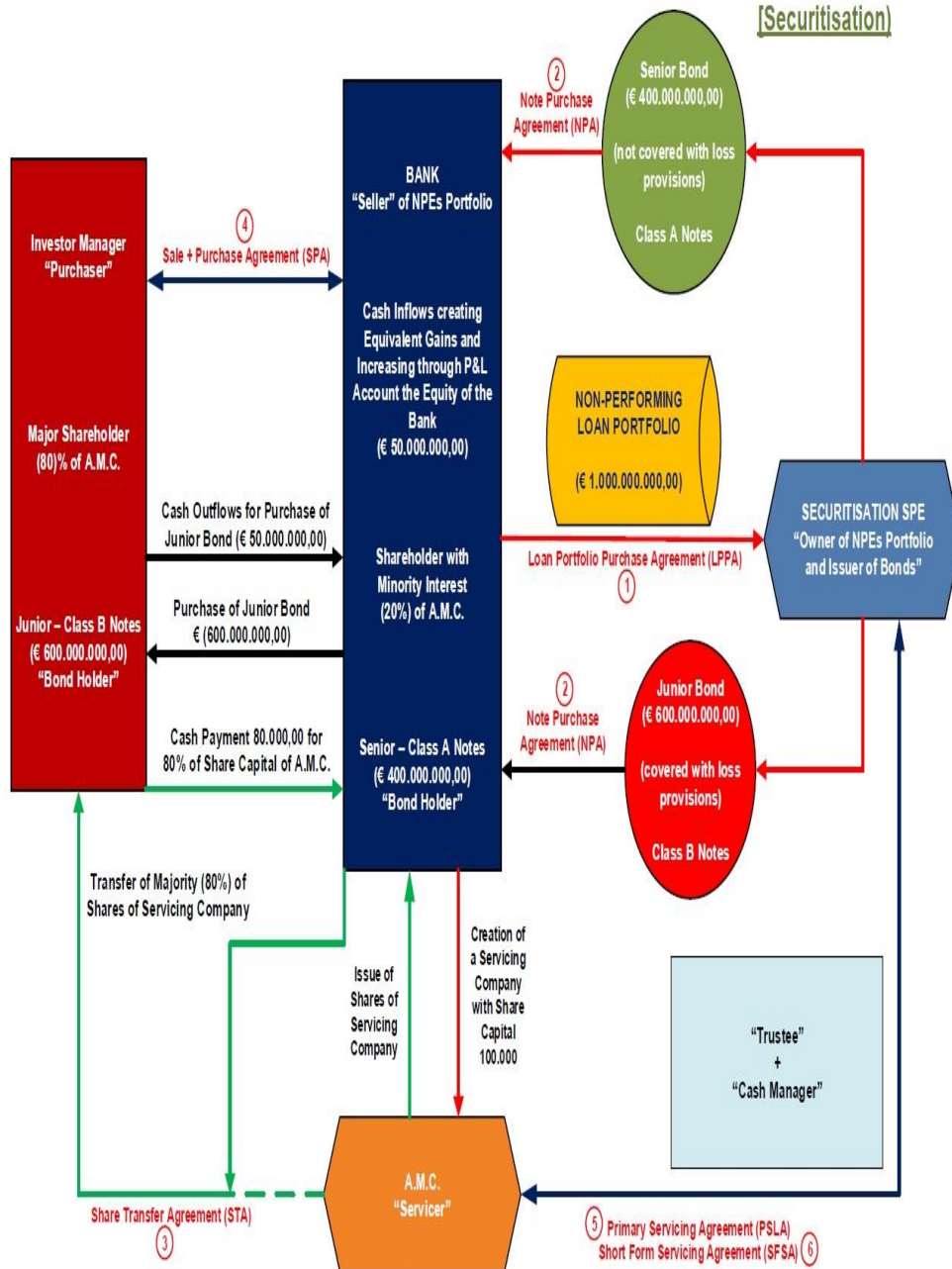
Source: Author's own work.

The whole process can be applied with a two-stage process. First, we describe the Initial Deal Structure (Securitization) and then the Final Deal Structure (Derecognition).

Figure 7. Initial Deal Structure

Key: Securitisation; Sale of Junior Class B Notes; Sale of Majority (80%) of A.M.C.; Core Management Agreements

Flowchart: Initial Deal Structure
[Securitisation]



Source: Author's own work.

1. Initial formation of the portfolio and the specific terms of the securitization

The Bank forms the portfolio of specific NPEs, determines the specific terms and conditions especially the face value the maturity of the bonds and the seniority of payments (waterfall).

2. Public Tendering for NPE management

Through a public tendering the Bank is looking for an investor with appropriate expertise in NPEs management; a choice that will result in a win-win solution, pursuing mutual profit for the Bank and the investor. The potential investor with his bid will buy for a certain amount the exclusive right to manage the portfolio of 1 billion euros taking a fixed management fee for the management and also Bond B (junior bond) to have an extra motivation to reach high collectability rates.

3. Nomination of Trustee and Cash Management services Firms

The Bank in cooperation with the Investor chooses the Financial Intermediators which will control the legal relations as described by all signed legal agreements envisaged in Trust Deed as well as the implementation of the hierarchy order of payment (as described by the waterfall) envisaged in Cash Management Agreement.

4. Establishment of a Special Purpose Entity and an Asset Management Company

The Bank establishes an SPE and a AMC to proceed with securitization procedures.

The SPE should be incorporated under U.K. Legislation as it is more investor-friendly.

In accordance with the provisions of Law 4354/2015 or any other current legislation, AMC must be licensed by the BoG, which considers the feet and proper set of criteria for the shareholder of the AMC, before giving its consent.

5. Loan Portfolio Purchase Agreement

The Bank sales the NPEs portfolio of 1 billion euros at current value to the SPE through a Loan Portfolio Purchase Agreement.

6. Issuance of two Bonds

The SPE Issues Two Bonds from the current NPEs portfolio.

- a. Bond A (Senior Bond) with a nominal – face value of 400 million euros and a maturity period of 10 years, which is not covered with loan loss provisions and has a priority of payment from the cash flows arising from NPEs management income as well a quarterly interest payment of 3% on its outstanding amount and
- b. Bond B (Junior Bond) with a nominal – face value of 600 million euros and a maturity period of 10 years, which is covered fully with loan loss provisions, is paid if there is a leftover amount, after all prior payments from cash flows arising from NPEs management income have been settled and doesn't receive any interest payment.

7. Note Purchase Agreement

The Bank buys back from the SPE the two separate Bonds at current value, through a Note Purchase Agreement.

8. Sale + Purchase Agreement

The Bank sells Bond B to the preferred investor.

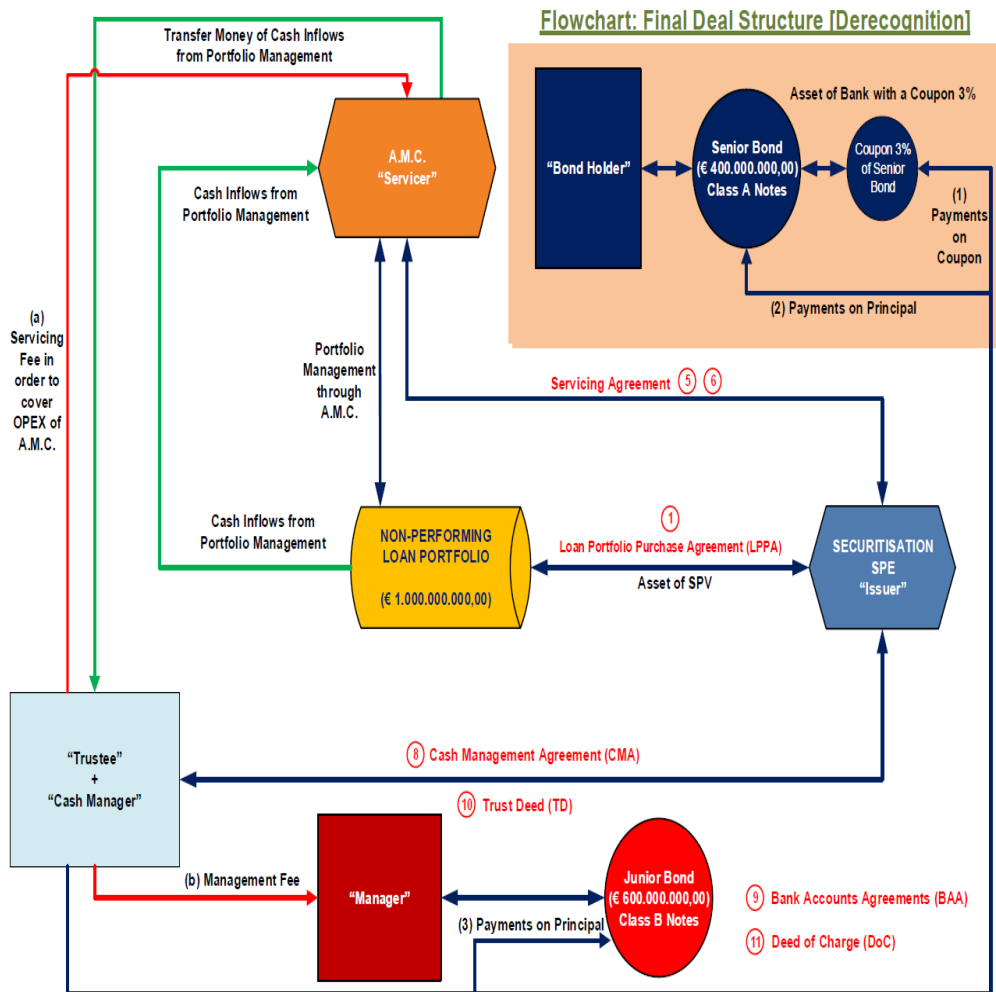
9. Share Transfer Agreement

The SPE, and NPEs Asset Management Company (AMC) shares are being transferred between the Bank and the investor in such a way to make sure that the Bank never exceeds 20% of the shareholding.

10. Primary Servicing Agreement, Sort Form Servicing Agreement

PSA and SFSA regulate the basic relations between the SPE, that is the owner of the NPEs Portfolio and the Issuer of Bond A and Bond B, and the AMC collections company, as the servicer.

Figure 8. Final Deal Structure



Key: Contracts and Structured Entities; Cash Flows; Management Internal Cash Flows: (a) and (b); Priority of External Payments through Liquidation of Portfolio: (1), (2) and (3).

Source: Author's own work.

In operational stage, NPEs Asset Management Company (AMC) as the servicer, collects payments and forwards the cash flows to Cash Manager as described in the servicing agreement PSA and SFSA. The Cash Manager distributes the amount from collection cash flows according to a predetermined seniority order (waterfall of payments) as described in the Cash Management Agreement signed between Cash Manager and the Issuer (SPE). The waterfall of payments is described as follows:

- I. A Servicing Fee is paid first to cover the Operating Expenses of the Servicer.
- II. A Variable management fee is paid to investor's entity called The Manager.
- III. The payment of interest coupon of 3% on outstanding Senior Bond amount comes third.
- IV. In fourth place, there is the payment of principal for Bond A.
- V. The retention of amount in order to form a redemption reserve of 5% of senior bond as dictated by EU Regulations comes next.
- VI. Last come the payment of principal for Bond B.

As we can see from Figure 8, the Bank has now been cut off from all the other parties and mainly from those directly and indirectly linked to the portfolio that the Bank sold. It is clear from this point that the Bank is independent from this portfolio and that de-recognition has been achieved both theoretically and practically.

Following the above steps, the Bank can fully derecognize the 1 Billion NPEs portfolio, given that, as we analyze in derecognition, all risk and rewards, management and future rights have been transferred irreversibly to the investor, with the Bank recognizing only the Senior A Bond of 400 million as a new financial instrument with specific (interest payments) and variable (principal payments) cash flows. At regulatory level, a Significant Risk Transfer report must be fulfilled and accepted by the regulator (Central Bank) in order to adjust the level of Risk Weighted Asset and CTE1 accordingly. In addition, Senior A Bond as a financial instrument can be used for liquidity purposes like REPOS or Collateral to Financial Markets.

Table 5. Derecognition process of the case study according to IFRS9

Derecognition Process according to the Derecognition Tree Figure 5		
Step 1	Consolidate all subsidiaries including any SPEs in accordance with IAS 27 in our Initial Deal Structure	
Step 2	The flowchart should be applied to the specific portfolio of NPEs we consider in this scenario, using the current values (book values of assets) and no the fair value of assets	
Step 3	The rights to the cash flows have not been expired and have been transferred to the SPE	No Derecognition
Step 4	The rights of the cash flows have been transferred	No Derecognition

Step 5	The entity still bears risk from holding the senior bond, although we can have a different answer to this question if according to the SRT procedure a significant transfer of risk is determined (shadow phase)	No Derecognition
Step 6	The entity has not control to the assets at the Final Deal Structure through the sale of Junior B bond and the transfer of AMC-servicer to the investor.	DERECOGNITION

Source: Author's own work.

By following the flowchart provided by the IFRS 9 and using the characteristics of the transaction that we examine, we conclude that the Bank at step 6 (or even from step 5), should derecognize the portfolio of NPEs.

6. Assessing the recoverability efficiency of senior bonds

In order to assess the recoverability efficiency of senior bonds under the above specific legal framework structure of securitization process, we have constructed a Business Plan model, taking the following assumptions into account: As described in Table 6, the Total amount of NPEs Portfolio to be securitized is €1 billion which consists of a Senior Bond A of €400 million face value, a 5% on Senior Bond A Retention Risk Cash Coverage (included in the amount of €400 million Senior Bond A), a Junior Bond B, which is fully covered with provision from the Bank, and a hypothetical price of JBB purchase by the investor of €50 million.

Table 6. NPEs Portfolio Characteristics

Portfolio Characteristics	amounts in million euro
Total Amount Of NPEs Portfolio (TANPESP)	<u>1.000</u>
Senior Bond A series (SBA) part A (SBAA)	380
Retention Risk SBA part B Cash Coverage (SBAB)	<u>20</u>
Senior Bond A series (SBA)	400
Junior Bond B series (Junk) (JBB)	600
Purchase Price of JBB	50

Source: Author's own work.

In Table 7, we assume that a) the collaterals provided to the specific NPEs of €1 billion, have a Fair Value of €700 million, an amount that can be estimated by an independent financial consultant. b) the rate of initial provision coverage is 60% as €600 million (Junior Bond B) has been fully covered. c) initial Collectability Rate is assumed at 40%. This practically means that at least the value of Senior Bond A will be collected, setting the minimum Collectability Rate. d) the Rate of Collateral Coverage is set to 70% arising from the Fair Value of Collaterals €700 million to the total value €1 billion of the NPEs portfolio, setting the upper limit or maximum

Collectability Rate of 70%. This allows assuming an average Collectability Range of 55%.

Table 7. NPEs Collectability Rates

Collectability Rates		amounts in million euro
Fair Value of Collaterals (FVC)	700	
Rate of Initial Provision Coverage	60,00%	
Initial Collectability Rate	<u>40,00%</u>	min
	<u>100,00%</u>	
Rate of Collateral Coverage	70,00%	max
Average Collectability Range	55,00%	

Source: Author's own work.

In Table 8, Performance Rates, we describe the order of payments from collection inflows as well as the percentage of fees per year. The Constant Servicing Fee has been agreed with the investor in order to cover the operational expenses of the AMC as the Servicer. The Variable Management Fee is also calculated upon agreement with the investor. For the purpose of this paper, we assume a CSF of 5% on the yearly collected amounts, and a VMF of 2% on the outstanding amount of NPEs Portfolio. We also assume an interest rate R 3% as an interest coupon on the outstanding amount of Senior Bond A, a final collectability rate of 60% and a 60% write offs. Finally, we exhibit the Waterfall of Payments, as described below.

Table 8. Performance Rates

Performance Rates		
Variable Management Fee (VMF)	Agreement	
Constant Servicing Fee (CSF)	BP	Per Year
Waterfall Payback Assumptions	RANK	
CSF	1	5%
VMF	2	2%
SBAA+SBAB+R	3	
JBB	4	
Performance / Discount Interest Rate	3,00%	3,00%
Write offs	60%	Servicer
	40%	Deferred
Bank's write offs	100%	Provisions - Junior Note
Final Collectability Rate (FCR)	60,00%	min<FCR<max
Loss Collectability Rate (LCR)	40,00%	LCR=1-FCR

Source: Author's own work.

As we observe in Table 9, with all the above assumptions considered, the Bank as a

bondholder of Bond A, will receive an amount of €501,42 million with a net present value of €413,52 million, making an extra profit of €13.52 million in a ten-year period. On the other hand, for the same period the investor will obtain gross revenues of €91,12 million and net revenues of €40,12 million with a 19,06% Internal Rate of Return (IRR).




Table 9. Model Outputs

Outputs		amounts in million euro	
Bank	Amounts	Gap	
Net Revenues	501,42	101,42	
NPV of revenues	413,52	13,52	
Investor	Amounts	Rates	
Gross Revenues	90,12		
Net Revenues	40,12		
NPV of Revenues	30,73		
IRR		19,06%	

Source: Author's own work.

The results are based on a business model with specific assumptions considered. At this point we will stress this model in order to draw conclusions even under uncertainty situations. This step is crucial since a potential investor wants to know all the possible outcomes that his investment may have in order to decide if he will undertake the investment. The variables that we are going to stress, are the Final Collectability Rate, the Management Fee per year and the OPEX Rate per year. The range that we considered for these variables are summarized in Figure 9.

Figure 9. Model Inputs

Model Inputs				
Name	Graph	Min	Mean	Max
Final Collectability Rate (FCR) / RANK		54,00%	60,00%	66,00%
Managemet Fee / per year		1,00%	1,50%	2,00%
OPEX Rate/ per year		3,00%	5,50%	10,00%

Source: Author's own work.

For our model we choose to apply the Monte Carlo Simulation with the Pert Distribution. We use @ Risk Software to stress the Final Collectability Rate, the

Management Fee and the OPEX Rate, with intervals of $\pm 10\%$, to identify how these parameters influence the Investor's IRR and NPV of revenues.

The definitions of Pert Distribution follow:

$$f(x) = \frac{(x - \min)^{a1-1}(\max - x)^{a2-1}}{B(a1, a2)(\max - \min)^{a1+a2-1}}$$

$$F(x) = \frac{Bz(a1, a2)}{B(a1, a2)} = Iz(a1, a2) \quad \text{with } z = \frac{x - \min}{\max - \min}$$

where, B is the Beta Function and Bz is the Incomplete Beta Function using minimum value as average and the difference between maximum and minimum values as deviation – standard error. Using all the above, Pert distribution function has a practical approach to face the volatility on a variable's prices under conditions of uncertainty. The key parameters of Pert distribution are provided below:

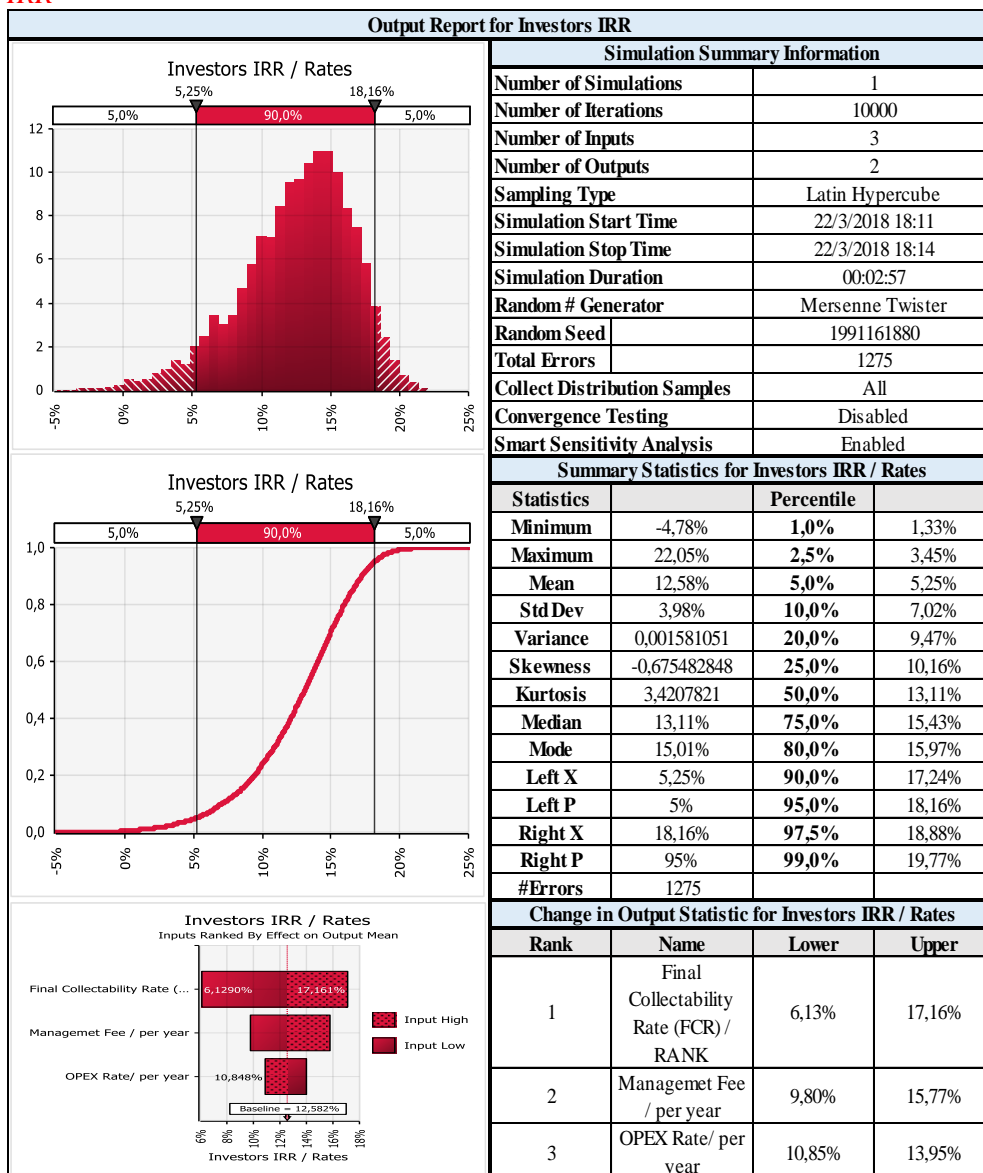
Mean	$\mu = \frac{\min + 4 * \text{mlikely} + \max}{6}$
Variance	$\frac{(\mu - \min)(\max - \mu)}{7}$
Skewness	$\frac{\min + \max - 2\mu}{4} \sqrt{\frac{7}{(\mu - \min)(\max - \mu)}}$
Kurtosis	$\frac{21}{(\alpha1 * \alpha2)}$

In a Monte Carlo simulation, a random value is selected for each of the tasks, based on the range of estimates. The model is calculated based on this random value. The result of the model is recorded, and the process is repeated. A typical Monte Carlo simulation calculates the model hundreds or thousands of times, each time using different randomly-selected values. When the simulation is complete, we have many results from the model, each based on random input values. These results are used to describe the likelihood, or probability, of reaching various results in the model.

A method which applied Monte Carlo simulation (due to the gambling aspect of the process) to business decisions under uncertainty is the most appropriate methodology. Since then, this method has been popularized by the rapid development in information technology. Nowadays, many practical and theoretical problems involving risk and uncertainty in the area of economics and management are solved using approaches which follow the same principles originating from these works.

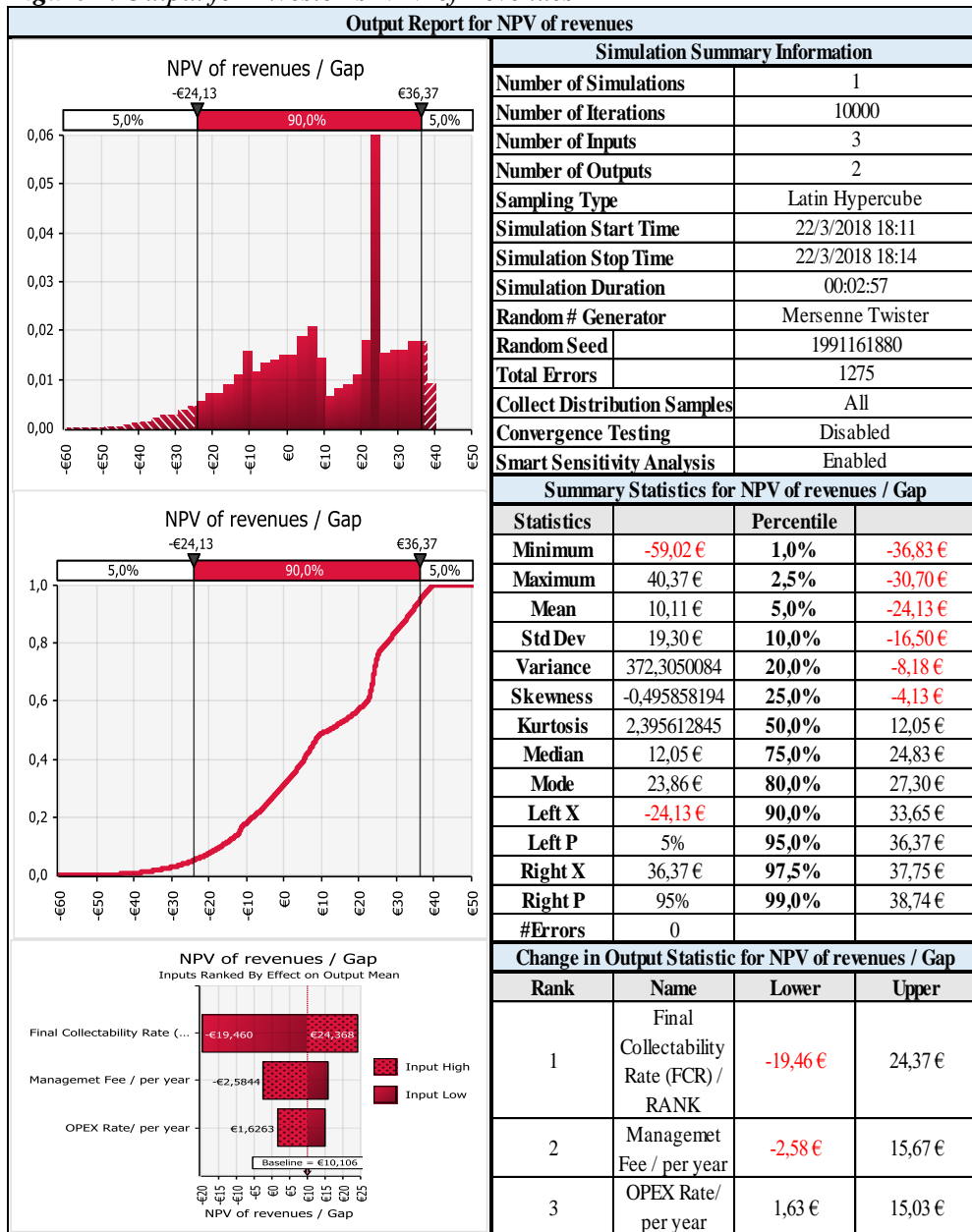
In Figure 10, there is a summary of the results of the stress test to the Investor's IRR with 10.000 Iterations and the 3 inputs incorporated (Final Collectability Rate, the Management Fee and the OPEX Rate). The investor's IRR moves between 5,25% and 18,16% with a 90% confidence interval. The greatest impact to the Investor's IRR stems from the Final Collectability Rate, then the Management Fee per year follows and then the OPEX Rate per year.

Figure 3. Output for Investor's IRR



Source: Author's own work.

Figure 4. Output for Investor's NPV of Revenues



Source: Author's own work.

If we set the Management Fee and the OPEX Rate as constant, using only the FCR as changing variable, the Investor's IRR would move between 6,13% and 17,16%. Following the same procedure and having the Management Fee as the only variable changing, the Investor's IRR would move between 9,8% and 15,77%. Finally,

having the OPEX Rate as the only variable changing, the Investor's IRR would move between 10,85% and 13,95%.

In Figure 11, there is a summary of the results of the stress test to the Investor's NPV of Revenues with 10.000 Iterations and the 3 inputs incorporated (Final Collectability Rate, the Management Fee and the OPEX Rate). The investor's NPV of Revenues is between -€24,13 and €36,37 with a 90% confidence interval. The greatest impact to the Investor's NPV of Revenues stems from the Final Collectability Rate, then the Management Fee per year follows and then the OPEX Rate per year. If we set the Management Fee and the OPEX Rate as constant, using only the FCR as changing variable, the Investor's NPV of Revenues would move between -€19,46 and €24,37. Following the same procedure and having the Management Fee as the only variable changing, the Investor's NPV of Revenues would move between -€2,58 and €15,67. Finally, having the OPEX Rate as the only variable changing, the Investor's NPV of Revenues would move between €1,63 and €15,03.

It is particularly interesting to observe the anomaly in the curve in the NPV of Revenues / GAP. This sharp reduction is due to the fact that at that point the retention ratio of 5% is due for payment. After the retention ration is fulfilled, then the NPV of revenues is skyrocketing.

7. Conclusions

A lot of conclusions can be extracted from the case study presented in this article. First of all, we analyzed how a portfolio of NPEs can be transformed into capital market securities (bonds). These securities can provide financial institutions with liquidity and improve their balance sheets. We also demonstrated a tool of measurement of performance and risk of the capital market securities that is based on the collectability of the NPEs.

Another point we provided is the discrimination or conversion of collateral through NPEs to new financial instruments that were created, with the cash flow that they will generate from the collection process that, although not considered, could be provided as collateral by the investor. We also demonstrated the way in which a deal of NPE sales may occur, one that meets the IFRS requirements of recognition or derecognition of financial assets.

The solutions to this problem are not limited but many, the best one of which is sought in the balance between the Bank, the Investor and the borrowers, although in our case we have not looked at the case of the latter. Maybe the best solution could come out following the agent theory between the 3 parties involved.

The value of the article is that it examines in detail a subject of the real economy which, in terms of managerial accounting, has not been significantly addressed by the academic community. Extensions of this survey would be variations in the decision tree and the external variables that affect the collectability and the performance of the capital market securities.

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