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The factors of the bank customer (dis)loyalty in portfolio choices

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Abstract

The aim of this study is to find statistical methods able to support and to help banks to identify their customers' characteristics that might influence their (dis)loyalty in portfolio choices. In the first step, cluster analysis is used to identify the main customer's features. In the second step, in order to pinpoint these factors, survival analysis and logit regression are used jointly, based on the dataset of "Banca Popolare di Puglia e Basilicata". Survival analysis aims to estimate, in terms of time, the desire of customers to benefit from banking services in portfolio choices. Finally, logit regression aims to describe the potential unfaithful customer.

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Keywords: MIFID questionnaire; bank; portfolio choices; survival analysis; Kaplan-Meier method; logit regression; customer loyalty; customer satisfaction; behavioral finance.

1. Customer Satisfaction vs. Customer Loyalty

The actual financial crisis is putting banks through the wringer. In USA and Europe the financial breakdown has been avoided by public interventions directed to insure deposits and bank liabilities and to safeguard the survival of banks thanks to the influx of public capital (e.g. the bank *Monte dei Paschi di Siena*, Italy, 2012). Therefore, if the financial crisis is the objective cause of reduction of bank profitability, it's also the cause of customer's distrust in banks. In a dynamic and more competitive context than in the past, it's necessary to revise the current marketing management techniques that should aim at providing a lasting and optimal relationship with old customers. In fact, if customers are satisfied with bank saving management, they will be more inclined to benefit as much as possible by what the bank offers. It can easily understand how the increase of satisfaction is directly correlated to greater customer loyalty (i.e. Customer Satisfaction ↔ Customer Loyalty). In financial services, especially regarding

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portfolio choices, investors' decisions are characterized by a marked multi-dimensionality, i.e. a set of variables related to each other, which, both individually and jointly, influence the final choices of the investors. The characteristic of the multi-dimensionality is generally amplified because investors, not knowing the final result, are subject to a risk that cannot be quantified exactly a priori, but only estimated on the basis of previous observations. In portfolio choices, stock selection is not only based on their expected returns and their volatility, but also on the risk attitude of the investors, which, unless they have a good experience in the field of trading, generally rely on a financial intermediary. Since the aim of the bank is to maximize profits, according to the *Customer Satisfaction Management* (CSM), profits depend not only on factors x_1, x_2,...,x_n but also on customer satisfaction (S_c), that is $P=f(x_1, x_2,\ldots,x_n,S_c)$. The CSM, therefore, focuses its attention on the quality of the relationship between bank and customer, and *if it is well achieved and maintained over time, it will lead to the maximization of customer satisfaction and profitability of the bank*. The CSM expects to achieve its primary purpose through a process consisting of three steps:

- *Know your customer*: the bank wants to have all information about customers according to their attitude towards risk, financial experience and knowledge of financial products;
- *Management of relationships with customers*: here there's portfolio theory, e.g. Markowitz theory or CAPM theory and continuous information to customers about the performance of stock portfolio;
- *Ex-post check*: the bank, at a specified date and always with a view to customer knowledge, analyzes all those (latent) factors, that could have influenced the relationship (alive or extinct) between itself and customers.

In this study, attention is paid on customer's knowledge and on ex-post check. The BPPB's (Banca Popolare di Puglia e Basilicata) dataset was used, concerning to customers who filled in the MIFID questionnaire.

2. Know Your Customer

First of all, the BPPB must know all the characteristics of its customers, in order to protect and to offer an optimal service in portfolio choices. That is why the financial intermediary administers a questionnaire, which must be structured according to specific provisions of the law given by the MIFID[1]. Therefore, cluster analysis was used to delineate the main customer characteristics (*Know Your Customer*). First, the hierarchical algorithms *Ward method* and *Centroid method* (see Lis and Sambin, 1977; Delvecchio, 2010, Ward, 1967) were used to pinpoint the optimal number of clusters (k=4); then the *K-means method* was applied to identify the internal characteristics of each cluster[2]. Using all polytomous variables included in BPPB's profile (*Financial experience*, *Investment aim*, *Temporal objectives*, *Financial position*, *Risk profile*), four kinds of customers were obtained: 1) *aggressive*; 2) *prudent*, 3) *dynamic*; 4) *wise*. The first kind of customer aims mainly to increase his capital, has high financial experience and risk attitude, and middle-long time objectives, while the second aims to manage his monetary liquidity, having middle (or low) financial experience, low risk attitude and short time objectives. The dynamic customer has the same investment aims and financial experience than the prudent one, but middle time objectives and middle risk attitude. The last is more similar to the aggressive customer, having middle time objectives, middle (or high) risk attitude and high financial experience, but aims to supplement his own income.

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[1] See the Directive 2004/39/EC of the European Parliament and of the Council of 21/04/2004.

[2] *K-means* is a simple unsupervised algorithm to classify a dataset through a given number *k* of clusters, providing more homogeneous partitions with respect to hierarchical methods (Forgy, 1965; MacQueen, 1967). The algorithm works recursively:

1. First, the procedure defines *k* points, named "centroids", in the *m*-dimensional space (identified through the *m* variables taken into the analysis), which represent the initial group centroids. The better choice is to place them as much as possible far away from each other;
2. Then, each object of the database is joined to the closest centroid, that is the centroid whose *m* coordinates are more similar to the values of the *m* variables of the given object. When all objects have been assigned, the procedure goes on to the next step;
3. The algorithm re-calculates *k* new centroids as barycenters of the clusters resulting from the previous step. If the new centroids are different from the previous ones, the procedure repeats the 2nd and the 3rd steps (that is, a new binding between the same data set points and the nearest new centroid, and then a further re-calculation of the centroids), else it records the cluster membership of each object and stops.