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PROPOSED PERSONAL CREDIT SCORING MODELS AIMED FOR KUWAITI MARKET

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Abstract

Personal loans consumes a considerable portion of any credit providing institution loan portfolio since these types of loans earn the highest interest when compared to institutional loans. Never the less, these loans are not immune from default and unlike corporate debt governments would not step up to pay these debts as did the U.S. government during the 2008 financial crisis. With the number of personal credits increasing dramatically during the last 50 years or so due to the introduction credit cards, processing this vast number of applications is both costly and time consuming. The aim of this study is to propose two models for personal credit rating, the first model is an expertise views which is based on FICO credit scoring model that is the mostly used model in the United stated where 90% of banks and other credit providing institutions use it. While FICO is the go-to system in the United States that does not necessarily mean that the model will work in other countries. In order to for the model to be more applicable for the Kuwaiti credit market variables should change by adding, omitting, or changing the weights of existent variables to make the model more applicable for the Kuwaiti market. The second model proposed is a statistical-based model that is built on Multiple Discriminant Analysis (MDA). The Multiple discriminant analysis is a statistical technique that is based on ordinary least square (OLS) method which identifies some variables that are considered the most important in influencing the value of an event which is in that case the applicant credit score, and then it is developed into a model with a view of making it easier to draw conclusions concerning the expected default risk of the applicant.

Keywords: *Personal credit rating scoring model, Kuwait, FICO, Augmented FICO model, Default, Credit rating score, Multiple Discriminant Analysis (MDA).*

1. Introduction:

Kuwait is a country that lays in the north-west side of the Arabian Gulf, it is a major player in the oil market where it currently produces 3 million barrels per day. The GDP per capita for Kuwait in 2017, based on the International Monetary Fund (IMF), was USD 69,669 making Kuwait one of the highest 10 countries in the world in that category. But

despite the high income for Kuwaiti's, Kuwait faced a number of personal default crises in early 2000. During the late 1990's and early 2000, large number of Kuwaiti borrowers recognized that banks do not share their borrower's information with other banks which gave them, the individuals, the opportunity to borrow from different banks more than the maximum amount set by the central bank of Kuwait. While the maximum personal loan limit set by the central bank was KWD 70,000, those borrowers were able to borrow more than the allowed limit from different banks. With the tip of the iceberg been seen by the banks in the late 1990's as the number of defaults started to show unprecedented increase, they gathered and established the credit information network company, Ci-net, in 2001 but the company only started operating in April 2003. Ci-net works as a database for banks and credit providing institution in regard to personal credit. With Ci-net up and going, individuals that took advantage of the lack of communication between banks and other credit providing institutions were revealed and the number of defaults sky rocketed. The problem of loan default affected a large number of Kuwaiti's and had a social impact which forced the government of Kuwait to step on to solve this crisis through establishing insolvency funds in 2008 and 2010. Unfortunately, these measures by the government were nothing but a reward to those individuals that abused the banking system and the banks that allowed such abuse to happen in the first place. The only explanation that can explain that action by the government was that Kuwaiti banks were so deep in providing such loans that it would affect their financial position greatly which in turn affect the Kuwaiti sovereign rating. In 2017, Ci-net had a 69 participant companies and a database of 7.9 million accounts.

The phenomenon of borrowing and lending has a long history associated with human behavior, it can be said that it is as old as trade and commerce as mentioned by Thomas et al. (2002). But despite its ancient history that goes back to around 2000 B.C. or earlier, the history of credit scoring is very short, beginning only about eight decades ago. Personal credit scoring is an application of financial risk forecasting to consumer lending. Credit scoring is a technique that helps organizations decide whether or not to grant credit to consumers who apply to them. In 1941, David Durand was the first to recognize that lending institutions should differentiate between good and bad loans by measurements of the applicants' characteristics. The lending institutions should divide credit applicants into "good" applicants in order to increase the revenue and reduce the default risk and reject "bad" applicants to avoid economic losses. The arrival of credit cards in the 1970s forced the banks and other credit card issuers to employ credit scoring models in order to cope with the increasing number of applicants. The usefulness of credit scoring models not only improved the forecast accuracy but also decreased default rates by 50% or more. In the 1970s, completely acceptance of credit scoring led to a significant increase in the number of professional credit scoring analysis. By the 1980s, credit scoring was applied to personal loans, home loans, small business loans and other fields.

Hand and Jacka, (1998) defined credit scoring as "the process (by credit providing institutions) of modelling creditworthiness". Gup and Kolari (2005) defined credit scoring as "the use of statistical models to determine the likelihood that a prospective

borrower will default on a loan. Credit scoring models are widely used to evaluate business, real estate, and consumer loans". Evaluating the credit worthiness for individuals is an expensive and a time-consuming process and for that West (2000) stated that the benefit of credit rating score is to reduces the cost of credit analysis, enable faster decision, and diminish the default possibility. With the fast growth of the credit industry all over the world, credit scoring is regarded as a one the most important techniques in banks, and has become a very critical tool during recent decades (Lee et al, 2002; Ong et al, 2005). Blochlinger and Leippold (2006) stated that since the individual amount of exposure to such firms is often relatively small, it is uneconomical to devote extensive resources to the credit analysis. The use of credit scoring techniques led to the reduction in credit processing cost, reduction in expected risk associated with a bad loan, enhanced credit decision, and also resulted in saving time and effort by the credit staff in the credit providing institutions.

2. Proposed Methodologies

2.1. Augmented FICO model:

Credit scoring models may be built in-house by the credit granting institutions themselves or may be acquired from a commercial scoring model vendor. Either way, credit scoring models are used by the institutions for their credit products, which usually are consumer credits or small business credits. The proposed model is based on FICO credit scoring model that was developed in 1981 by Fair Isaac Corporation in the United States. FICO model is the most widely used model in the U.S. and it is based on five categories with different weight for each of them as shown in table (1)

Table 1: FICO Credit Scoring Model Categories

Category	Weight
Payment history	35%
Amount owed	30%
Length of credit history	15%
Credit Mixture	10%
Number of credit enquiries	10%

The term one size fits all may be applicable for clothes but definitely does not apply for personal credit scoring models. According to Abdou and Pointon (2011) there is no optimal credit scoring model that would work universally, each country has its own set of rules and regulations that might make an efficient model in one country useless in another country. For that, credit rating agency in Kuwait should include, omit or modify variables that might not suite the Kuwaiti environment. The proposed model included five more criteria's over the original FICO model to better suites the Kuwaiti personal credit market. The proposed model is set to distinguish between good and bad borrowers through answering two questions;

1- How timely the borrower pays his bills?

2- What is the probability that the borrower will default in his loan?

The proposed model includes the following criteria's:

2.1.1. Payment Timing History (PTH):

Making payments on time and in full is essential to maintain a good credit score, a person that makes a partial payment on his due amount should not receive the same score as the person that pays in full that is why different weights should be set of each of them. A person that misses payments due dates is considered to be either as financially careless or in financial trouble. In order to distinguish whether the borrower is financially careless or in financial distress, the model takes into consideration both the time over the due date and the amount due. The cutting point in that category is 90 days, since after 90 days the loan will be considered as a default and the lender then would classify the loan as a non-performing asset (NPA) and legal action will be taken against the borrower. Taking this category as set by FICO does not make much sense since it does not take the amount that is overdue into consideration. For example, if a person misses in his mobile phone bill by 10 Kuwaiti dinars (1 KWD = 3.35 USD) is treated in the same way as a person that misses in KWD 1500 in his mortgage payment. For that the proposed model takes both the number of days over the due date and the amount that is overdue. The proposed equations for that category are;

If any payment is made with in or before due date then;

$$PTH\ Score = \left(\frac{Amount\ Paid}{Amount\ Due} * sub\ weight\right) * Assigned\ Points \quad (1)$$

If no payment is made on due date then;

$$PTH\ Score = \left(\frac{Number\ of\ days\ past\ the\ due\ date}{Maximum\ number\ of\ days\ in\ that\ category} * sub\ weight\right) * Assigned\ Points \quad (2)$$

2.1.2. Credit Utilization (CU):

Having a credit limit does not necessarily means that a person should utilize it in full. The main purpose of credit lines is to use them when it is necessary, utilizing large portion of the credit lines would indicate that this person is bad in managing his financials and is living in debt. High credit utilization is considered as a sign of financial difficulties, as a result the proposed model gives a higher score for those people that utilize their credit limits the least. The model is based on the ceiling of monthly installments obligations that a person can use (that is 40% of his income as set by the Central Bank of Kuwait).

$$CU\ Score = \left(\frac{Monthly\ installment\ obligations}{40\%\ of\ the\ income} * sub\ weight\right) * Assigned\ Points \quad (3)$$

2.1.3. Length of Credit History (LCH):

The length of the credit history enables credit providing institutes to better evaluate the applicants. It shows the debtor pattern in his way of payments and how committed is he in paying the installments on time. It also shows the average credit utilization which indicates how conservative the applicant is in using his available credit limits. The equation for this part of the model is as follows;

$$LCH\ Score = (Number\ of\ years\ since\ first\ credit\ provided * sub\ weight) * Assigned\ Points \quad (4)$$

2.1.4. Credit Diversification (CD):

In this part, the model examines how many types of loans the applicant had such as real estate loan, auto loan, and cash loan. This part helps the creditors to examine how well the applicant manages the financial obligations of different types of loans. The score of this sector is calculated as follows;

$$CD\ Score = (Number\ of\ different\ loans\ types * sub\ weight) * Assigned\ Points \quad (5)$$

2.1.5. Financial Lawsuits (FLS):

Having financial related lawsuits such as rental delay or unpaid debt of any type sends a strong sign of the financial distress the borrower faces. Individuals with no financial related lawsuits are more likely to be better applicant than a person with several cases. The formula for that category is as follows;

$$FLS\ Score = (Number\ of\ lawsuits * sub\ weight) * Assigned\ Points \quad (6)$$

2.1.6. Delayed and unpaid debt payments to income (UPI):

Delayed and unpaid installments are accumulated over time, and as the debtor delays his payment it becomes harder for him to pay. The assumption here is that the lower delayed payments to income ratio that would indicate that the borrower will have less probability to default in paying his debts and vice versa. This ratio is calculated as follow;

$$UPI\ Score = \left(1 - \frac{Delayed\ Payments}{Income}\right) * sub\ weight * Assigned\ Points \quad (7)$$

2.1.7. Debt obligations to income (DOI):

Unlike credit utilization, the ratio here uses the total income of the borrower rather than the 40% of his income per the Kuwaiti central bank. The assumption in this ratio is that the lower the ratio, the less chance the borrower would default in his payments. The ratio is calculated as follow;

$$DOI\ Score = (\frac{total\ debt\ obligations}{total\ income}) * sub\ weight * Assigned\ Points \quad (8)$$

2.1.8. Number of credit inquiries during the past 12 months (NCI):

The number of credit inquiries indicates the aggressiveness of the person in buying on credit, the higher the number would indicate that this person in not doing well in managing his expenses and is most likely to face financial problems in the future. For that, the number of credit inquiries score would have an inverse relation with the credit score where the score will be reduced as the number of inquiries increase.

2.1.9. Non-credit obligations to income (NOI):

Non-credit obligations are those obligations that would not appear in Ci-net records, they would include for example rent, child support, ex-wife alimony in case of divorce and so on. These obligations could increase the monthly obligations of the borrower to more than the 40% set by the central bank. In order to gather such information a link between

Ci-net and the ministry of justice should be established. Having no non-credit or a low ratio would imply a better financial position for the borrower and for that less change of defaulting. The ratio is measured as;

$$NOI\ Score = (\frac{Non-credit\ obligations}{Total\ income}) * sub\ weight * Assigned\ Points \quad (9)$$

2.1.10. Total obligations to income (TOI):

This ratio presents the total obligations the borrower has, the total obligations include both obligations that are shown in Ci-net and the obligations that are not such are rent, child support and any other obligations. These obligations can push the borrowers' obligations to more than the 40% set by the central bank. In order to avoid default or delay in payments, the lender should target borrowers that have a low ratio. This ratio is calculated as follow;

$$TOI\ Score = (\frac{Non-credit\ obligations+credit\ obligations}{Total\ income}) * sub\ weight * Assigned\ Points \quad (10)$$

These ratios were presented to 25 credit officers from Kuwaiti banks and other credit providing institutions to estimate a proper credit points and the weight for the sub category based on their experience. The result of the survey is presented in table (2)

Table 2: Assigned Points and Weights

Category (Assigned Points)	Sub Category	Weight
Payment Timing (25)	- Full within time limit	100%
	- Partial within time limit (Above 50%)	85%
	- Partial within time limit (Below 50%)	70%
	- 1-89 days delay	40%
	- 90-179 days delay	15%
	- More than 179 days delay	0%
Credit Utilization (17.5)	- Less than 25%	100%
	- 25-49.99%	75%
	- 50-74.99%	50%
	- 75-99.99%	25%
Length of Credit History (7.5)	- More than 10 years	100%
	- 10-7 years	85%
	- 7-4 years	70%
	- 4-1 years	50%
	- Less than 1 year	25%
	- No history	0%

Credit Diversification (7.5)	- More than 3 - 3 - 2 - 1 - No Credit	100% 75% 50% 25% 0%
Financial Lawsuit's (7.5)	- NO - Yes only 1 - Yes more than1	100% 50% 0%
Delayed payments to income (5)	- None - Less than 5% - 5-10% - 10–24.99% - 25-49.99% - More than 50%	100% 90% 75% 50% 25% 0%
Credit debt obligations to income (7.5)	- Less than 10% - 10-19.99% - 20-29.99% - 30-40%	100% 75% 50% 25%
Number of credit inquiries in the past 12 months (5)	- More than 10 - 7-10 - 4-6 - 2-3 - Less than 2	0% 25% 50% 75% 100%
Non-credit obligations to income (5)	- Above 50% - 50-25% - Below 25% - None	0% 50% 75% 100%
Total obligations to income (12.5)	- More than 50% - 35-49.99% - 25-34.99% - Less than 25%	0% 25% 50% 100%

The model will produce a score that ranges from 0 to 100 with 100 being the best score an applicant can get. The credit providing institution can then set their own thresholds for accepting or rejecting the applicants.

2.2. Multiple discriminant analysis (MDA) model:

Multiple discriminant analysis derives an equation as linear combination of the independent variables that will discriminate the relation with the dependent variable. The weights assigned to each independent variable are corrected for the interrelationships among all the variables. The weights are referred to as discriminant coefficients. The equation for the model is as follow;

$$CR\ Score = \alpha + \beta_1 X_1 + \beta_2 X_2 + \cdots\cdots\cdots + \beta_n X_n + \varepsilon \quad (11)$$

Where CR is the dependent variable that is the applicant's credit score, α is the intercept, β is the coefficient of the independent variable that is X, and ε is the error term of the model. The model is first set to measure the statistical significant of the effect of the independent variable on the dependent variable. Using this model, Ci-net will be able to distinguish between the variables that mostly affects the financial soundness of the applicant and the variables that do not. Incorporating the variables that have statistical significant on the creditworthiness of the applicant would result in a more reliable model. The credit score obtained from the model can be converted into a default probability by using the following equation;

$$Probability\ of\ Default = 1 - \frac{e^{CR}}{1+e^{CR}} \quad (12)$$

The credit providing institutions can then set their own thresholds in accepting or rejecting the applicant's using either the CR score or the probability of default.

3. Final Remarks

Kuwait had faced numerous personal loans default crises in the past, the government of Kuwait had to step on to solve these crises through establishing insolvency funds in 2008 and 2010. These crises were the result of the lack of cooperation between banks in exchanging the borrower's information's between them. The establishment of Ci-net, the credit information network company, in 2001 uncovered the chaos in the personal credit market in Kuwait. Prior to its inception individuals were able to borrow more than the maximum amount set by the central bank through borrowing from different banks and other credit providing institutions. Now Ci-net are attempting to develop their own personal credit rating model that is based on FICO model. FICO model works well in the United States, but that does not mean that it will work universally. Each country has its own rules and regulations that are unique and for that personal credit scoring model should be built around them. The aim of this study was to propose personal credit rating models that are tailored to the Kuwaiti personal credit market, the first model is based on experts' views and recommendations while the second is a statistically-based model that is built on Multiple Discriminant Analysis (MDA). These models is not carved in stone but they can be altered to accommodate any changes to enhance their efficiency in the future.

Reference:

1. Abdou, H. and Pointon, J. (2011) Credit scoring, statistical techniques and evaluation criteria: a review of the literature, Intelligent Systems in Accounting, Finance & Management, 18 (2-3), 59-88.
2. Blochlinger, A. and Leippold, M. (2006) Economic Benefit of Powerful Credit Scoring, Journal of Banking & Finance, 30(3), 851-873.
3. Durand, D. (1941) Risk Elements in Consumer Instatement Financing, National Bureau of Economic Research, New York, 1941
4. Gup, B. E. and Kolari, J. W. (2005) Commercial Banking: The management of risk. Alabama: John Wiley & Sons, Inc.
5. Hand, D. J. and Jacka, S. D. (1998) Statistics in Finance, Arnold Applications of Statistics: London.
6. Lee, T., Chiu, C. Lu, C. and Chen, I. (2002) Credit Scoring Using the Hybrid Neural Discriminant Technique. Expert Systems with Applications, 23 (3), 245-254.
7. Ong, C., Huang, J. and Tzeng, G. (2005) Building Credit Scoring Models Using Genetic Programming, Expert Systems with Applications, 29 (1), 41-47.
8. Thomas, L. C., Edelman, D. B. and Crook, L. N. (2002) Credit Scoring and Its Applications. Philadelphia: Society for Industrial and Applied Mathematics.
9. West, D. (2000) Neural Network Credit Scoring Models, Computers and Operations Research, 7 (11/12) 1131-1152.