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QUANTITATIVE ASSESSMENT OF BORROWER BEHAVIOR: INTRODUCING ACTIVITY SCORING

The article proposes a novel quantitative tool «activity scoring» aimed at addressing challenges in group lending and microfinance. Unlike traditional credit scoring models that rely on borrower characteristics and historical loan performance, activity scoring focuses exclusively on the actions of individual borrowers. By implementing a point-based system, borrowers earn points for positive behaviors, such as timely loan repayments, while incurring penalties for negative actions, like missed payments. This approach not only incentivizes responsible borrowing but also enhances the predictive power of risk assessment by capturing a broader range of borrower activities. The article outlines the theoretical underpinnings of activity scoring, compares it to existing credit scoring methods, and highlights its potential benefits, including improved loan repayment rates, better client segmentation, and reduced reliance on subjective assessments by loan officers. Furthermore, the tool fosters transparency within microfinance institutions (MFIs) and facilitates information sharing. By emphasizing borrower engagement and performance, activity scoring offers a promising avenue for increasing the efficiency and effectiveness of microfinance operations, ultimately contributing to the sustainability of lending practices in developing economies.

Keywords: Activity scoring, microfinance, risk assessment, borrower behavior, credit scoring, loan repayment rate, quantitative tool.

Introduction

The article outlines a new quantitative tool that offers solutions to some of the problems inherent to group lending discussed above and to microfinance in general.

Prior to that, we review another recent innovation in the field of microfinance – statistical «scoring», that relies not on loan officers' intuition but quantitative calculations.

Scoring is the use of the knowledge of the performance and characteristics of past loans to predict the performance of future loans [1]. A credit-scoring model is a formula that puts appropriate weights on different characteristics of a borrower, lender, and loan. The formula is used to estimate the probability or risk that an outcome will occur. The weights in the formula are derived statistically from previous observations.

Materials and methods. Following example clarifies how credit-scoring works [2, p 107]:

«A simple scoring model might state that the base risk for very small loans to manufacturers is 0.12 (12 percent), that traders are 2 percentage points (0.02) less risky, and that each $100 disbursed increases risk by half a percentage point (0.005). Thus, a trader with a $500 loan would have a predicted risk of 12.5 percent (0.12 – 0.02 + 5 * 0.005), and a manufacturer with a $1,000 loan would have a predicted risk of 17 percent (0.12 + 0.00 + 10 * 0.005)».

Applicant's predicted risk is then used to make decisions. For example, MFI may sort out applications with predicted risk of 15 percent or worse; send the loan officer to applicant's home or business location if the risk is between 8 and 15 percent; disburse the loan to those who scored less than 8 percent of predicted risk.

What kind of risks can credit scoring predict? Prominent proponent of credit scoring Schreiner M. [2], lists six models that identify involved risks: the first model predicts the likelihood that a loan currently outstanding or currently approved for disbursement will have at least one spell of arrears of at least x days. The second type of model predicts the likelihood that a loan that is x days in arrears will eventually reach y days of arrears. The third type of model predicts the likelihood that a borrower choose not to seek a new loan after the current debt is repaid (drop-out). The fourth and fifth types of models predict the expected maturity term and the loan size of a current borrower. The final, sixth model combines information from the first five models.

The underlying idea of credit scoring is that future resembles the past, and that borrower with a set of characteristics who applies for a specific loan will perform similarly as those who have taken such loan and had similar characteristics as the applying borrower. In this model, there is no room for the personal qualities – a farmer who grows maize is expected to perform the same way as another farmer who also grows maize.

In contrast, activity scoring - as we call this new tool – considers only the actions of the borrower herself, not of other clients. It does not matter if a borrower is a farmer or a plumber, what matters is how she performed in the past.

Activity scoring works as a 'carrot and stick' principle: clients collect 'points' for good actions (e.g. in-time loan repayment) and lose these points when they violate the rules (e.g. arrears). In other words, central idea of activity scoring is 'monetizing the actions'. The tool is aimed at achieving higher loan repayment rates by making microfinance more compelling to clients with excellent credit records.

The concept of collecting points for activeness and loyalty is common in retail business and airlines. A customer gets one point for each dollar spent in the store or one mile flown by the airline. After collecting some fixed number of points, these customers are entitled for discounts, free fares, prizes, gifts, etc.

Consider following basic example: a client borrows 200 USD for six months and pays back the loan with 10 percent p.a. interest rate.

The simplest activity scoring model would first depreciate one point for one dollar leant and add one point for one dollar paid back. Thus, in baseline case, ignoring all other complications, the client in the example above earns 15 points.1 If she had one arrear, of 20 USD, then her score would go down, say, by 5 points. If she missed one group meeting, another 3 points would be charged, and so on.

Results and discussions

Analyzing the methods above, we can generate a list of five channels how activity scoring may improve MFI efficiency.

Developing and poor countries have very weak credit bureaux if they exist at all [3]. Above all, activity scoring creates (or complements existing) 'credit history'. Arrears and defaults drive the activity score to zero, in-time repayment improves the score. As illustrated by the example above, the size and maturity of a loan is embedded in the model, too. Moreover, conventional credit history conveys information only about the characteristics of a loan and its repayment; whereas activity score is affected by much larger set of actions. After all, a credit is a trust in a client, and trust accumulates from many experiences. Another advantage is in sharing the information between MFI:2 institutions are less unwilling to share how much activity points their client has, instead of how much money she owes MFI.

The activity points collected signal about the type of the client. It enables to spot a risk group in advance and take actions (e.g. reduce credit size; require more

[1]Client's score depreciates first by 200 points and then appreciates by 210 points after she pays back principal amount (200 USD) and (200 USD) * (10 percent) * (1/2 years) = 10 USD interest. In this setting, points earned equal to the interest rate paid.

[2]Inability/unwillingness to share financial information between Institutions is seen as a major obstacle for growth in microfinance industry; see [3].

frequent repayments; etc) or to encourage and retain 'good' clients (e.g. reduce interest rates, fees; offer flexible loan repayment schedule; increase loan size; etc). More importantly, in contrast to many methods used nowadays, activity scoring enables identifying a gradient of client types. Not only it shows if a borrower is good or bad, it also signals how good she is.

Like credit scoring, activity scoring makes the whole MFI system more transparent by giving more weight to objective rules instead of subjective reasoning. This reduces the cases of corruption and collusion between clients and field officers. Moreover, activity scoring reduces the reliance on a single credit officer.

Like airline points, activity scoring may become a powerful marketing tool [4, p.2]. For instance, offering extra points, gifts, discounts, etc. encourages new clients to join the MFI. After accumulating a predefined number of points, successful borrowers become Golden, Silver, etc. clients, similar to credit card business. By identifying good borrowers and offering them better loan conditions MFI may significantly lower its operational costs. Loan officers spend less time assessing the applicant, she visits her house or business location less frequently; the borrower may be allowed to make installments on a monthly basis, not every week; loan size increases, lowering the unit costs. All these changes directly improve productivity of a loan officer and efficiency of MFI.

Managers can use activity scoring as a new measure to assess and compare productivity of field officers and also junior managers within one region, or among regions.3 Since many MFI compensate employees according to their efforts, in prospect, activity scoring may be utilized in determining the employees' wage.

As noted above, loan officer is a key figure in MFI. She advises borrowers, helps to create groups, visits the borrower's business and house to assess property and risks, holds regular meetings, prepares reports for management, etc. In most cases, she is the person who decides whether a borrower may get a loan or not. Appreciating the importance of subjective assessment, we still believe, objective assessment systems – like scoring – should be implemented. Loan officers are also a source of great concern for MFI. When a loan officer leaves the job, MFI loses valuable information on hundreds of borrowers. Activity scoring partially solves this problem by effectively transferring information from a loan officer to MFI's database, where each client's activity score is stored.

Comparison of credit scoring and activity scoring reveals several implications. Many credit scoring models include membership period as a variable [5]. Our activity scoring emphasizes not the membership period per se, but activeness

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[3]For example, mean or median of 'activity points per client under management' maybe a proxy for the quality of clients.

of the borrower. A borrower who has been a member for five years but who has taken (and paid back) just one loan will have a lower score compared to a newer borrower who often borrows from MFI.4

Credit scoring is powerful if there is a very large database [6] on which it relies upon. There may be millions of farmers in the database, but a farmer who lives in village X with her Y children, grows Z in her farm, and owns W acres of land can be unique. More specific comparison would result in a more precise prediction. Predictive power of activity scoring, on other hand, improves with the number of actions that a borrower undertakes. At the early stages of membership, credit scoring is more useful, later on, activity score prevails. Thus, credit scoring and activity scoring complement each other.

Limitations. The greatest challenge in activity scoring would be determining components and their weights [7]. Adding variables to the system to improve its predictive power, should not detriment comprehensiveness of the model. Weights are assigned by carefully assessing the importance of each component. MFI may calibrate the weights over time, if required. By inspecting components that constitute activity scoring and the weights assigned to them we can make inferences about MFI's true targets, level of conservativeness. For example, MFI targeting mainly the poor may assign negative points that escalate in proportion to loan size, discouraging large loans. Very conservative MFI puts a heavy weight on arrears, and so on.

There are many other uses of activity scoring. Activity score can be used as a quick and general measure of change in client base. For instance, we can compare average score of borrowers at the beginning of the year with the year-end value. Such comparison reveals not only whether an improvement (or detriment) has happened, but also the magnitude of the change. Activity score is useful for assessment on group-level, too: if a group has the highest average points in a village, it is thus entitled to the best loan conditions.

As noted above, the whole group should be rejected even if one its member defaults. Very often, however, loan officers do not wish to lose good clients and remove only the errant borrower [8, p.407]. In line with theory, such a policy is optimal after the realization of projects and learning borrowers' (un)willingness to repay. But enforcement problem arises: borrowers anticipate ex-ante that only the errant is removed, and all the advantages of joint liability lending vanish. Activity scoring model sets lower fines for clients with higher scores. Assume a borrower has defaulted 100 USD. Her points plummet down, say, 3 times that much, or 300 points. Her peers in the same group must collectively repay the debt, or get, say,

[4]Membership period has implicit impact on scores – it takes from one month up to a year to complete every loan cycle.

100 points fine each. A borrower who has been a good client for MFI is likely to be able to 'repay' her fine with previously collected points. Others will have to pay cash or be exempted.

Take another example: a group member with good credit history may wish to promote to individual lending. Such a change is in the interest of MFI, too – because in individual lending interest rates are higher, costs per dollar leant much lower, and importantly there is collateral. But, if different loan officer deals with the individual lending, our borrower – regarded as a new individual client – has to start with lowest loan size, and with additional restrictions. Therefore, she decides to stay in a group. With activity scoring, individual lending loan officer relies on borrower's previous activity in a group and makes more informed decision. Moreover, the borrower may hop back to group lending in case her conditions dictate to do so.

Since points are not allowed to drop below zero, more recent clients are eligible for smaller loans than older, more experienced borrowers. If a client wishes to get larger loan she has to borrow points from other peer members.5 Only if members know that the client is trustworthy, do they lend her own points (screening). Even done so, they assert higher monitoring efforts, leading to more optimal solution. Another opportunity for a new client is to buy points from peers. In this case peers have less incentive to monitor; however, the new client revealed her preference to be eligible to get loans by paying for it, signaling she is a good borrower.

Another example demonstrates how activity scoring may bring flexibility into group formation [9]. Much of the benefit of MFI hinges on voluntary formation of groups. However, once a group is formed changing the membership is hardly possible. Assume a situation when a borrower wishes to leave the group, and join another. Even if two groups are from one location, and peer members do not object her decision, this task is not simple. She has to wait until every disbursed loan to the group is repaid. Because loans are staggered, other members should also wait. With activity scoring a borrower may leave her group and join another group anytime (with peers' and loan officer's consent) [10].

Conclusion

To sum up, activity scoring presents a transformative approach to risk assessment in microfinance, shifting the focus from borrower characteristics to individual actions. By implementing a point-based system, this tool enhances loan repayment rates and fosters borrower engagement while providing MFIs with a more nuanced understanding of client behavior. The integration of activity scoring

[5]We are aware that allowing peers to exchange point directly may be dangerous, due to possibility of collusions.

not only improves transparency and reduces reliance on subjective evaluations but also facilitates better decision-making and client segmentation. Ultimately, this innovative method has the potential to strengthen microfinance practices, making them more efficient and sustainable in supporting borrowers in developing economies.

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ҚАРЫЗ АЛУШЫЛАРДЫҢ МІНЕЗ-ҚҰЛЫСЫН САНДЫ БАҒАЛАУ: ҚЫЗМЕТТІҢ БАЛАЛЫҚ БАЛАЛАРЫН ЕНГІЗУ

Мақалада топтық несиелеу және микроқаржыландыру мәселелерін шешуге бағытталған «белсенділік скорингінің» жаңа сандық құралы ұсынылады. Қарыз алушының сипаттамаларына және несиенің тарихи өнімділігіне негізделген несиелік скорингтің дәстүрлі үлгілерінен айырмашылығы, белсенділік скорингі тек жеке қарыз алушылардың әрекеттеріне бағытталған. Балльдық жүйені енгізу арқылы қарыз алушылар несиені уақыты өтеу сияқты оң мінез-құлықтары үшін ұпай жинайды, сонымен бірге өткізіп алған төлемдер сияқты жағымсыз әрекеттер үшін айыппұлдар алады. Бұл тәсіл жауапты қарыз алуды ынталандырып қана қоймайды, сонымен қатар қарыз алушы қызметінің кең ауқымын қамту арқылы тәуекелді бағалаудың болжамдық күшін арттырады. Мақалада белсенділік скорингінің теориялық негіздері баяндалады, оны қолданыстағы несиелік скоринг әдістерімен салыстырады және оның әлеуметті артықшылықтары, соның ішінде несиені қайтару мөлшерлемелерін жақсарту, клиенттерді сегменттеуді жақсарту және несиелік қызметкерлердің субъективті бағалауларына тәуелділікті азайту қарастырылған. Сонымен қатар, құрал микроқаржы институттары (МҚҰ) ішінде ашықтықты қамтамасыз етеді және ақпарат алмасуды жеңілдетеді. Қарыз алушының қатысуы мен өнімділігін баса көрсете отырып, белсенділікті бағалау микроқаржылық операциялардың тиімділігі мен тиімділігін арттырудың перспективалы жолын ұсынады, сайып келгенде, дамушы экономикалардағы несие беру тәжірибесінің тұрақтылығына ықпал етеді.

Кілтті сөздер. Белсенділік скорринг і, микроқаржыландыру, тәуекелді бағалау, қарыз алушының мінез-құлқы, несиелік скоринг, несиені өтеу мөлшерлемесі, сандық құрал.

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КОЛИЧЕСТВЕННАЯ ОЦЕНКА ПОВЕДЕНИЯ ЗАЕМЩИКА: ВНЕДРЕНИЕ ОЦЕНКИ ДЕЯТЕЛЬНОСТИ

В статье предлагается новый количественный инструмент «оценка деятельности», направленный на решение проблем в групповом кредитовании и микрофинансировании. В отличие от традиционных моделей оценки кредитоспособности, которые опираются на характеристики заемщика и историческую эффективность кредитования, оценка деятельности сосредоточена исключительно на действиях отдельных заемщиков. Внедряя систему баллов, заемщики зарабатывают баллы за положительное поведение, такое как своевременное погашение кредита, и подвергаются штрафам за негативные действия, такие как пропущенные платежи. Такой подход не только стимулирует ответственное заимствование, но и повышает прогностическую силу оценки риска, охватывая более широкий спектр действий заемщика. В статье излагаются теоретические основы оценки деятельности, сравнивается с существующими методами оценки кредитоспособности и подчеркиваются ее потенциальные преимущества, включая улучшение показателей погашения кредита, лучшую сегментацию клиентов и снижение зависимости от субъективных оценок кредитных инспекторов. Кроме того, инструмент способствует прозрачности в микрофинансовых организациях (МФО) и облегчает обмен информацией. Подчеркивая вовлеченность и производительность заемщика, скоринг активности предлагает многообещающий путь для повышения эффективности и результативности микрофинансовых операций, в конечном итоге способствуя устойчивости практики кредитования в развивающихся экономиках.

Ключевые слова: Скоринг активности, микрофинансирование, оценка риска, поведение заемщика, кредитный скоринг, уровень погашения кредита, количественный инструмент.

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