



JEES

Journal of Empirical Economics and Social Sciences
Uygulamalı Ekonomi ve Sosyal Bilimler Dergisi

Cilt/ Volume: 7 Sayı/ Issue:2 Eylül/ September s s . / pp. 1-11

B. Çetinav, Z. Akdoğan doi: [10.46959/jees.1700818](https://doi.org/10.46959/jees.1700818)

TÜRKİYE PAZARI İÇİN İLK EŞLER ARASI BORÇ VERME PLATFORMUNA DAİR

İŞ MODELİ ÖNERİSİ

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A BUSINESS MODEL PROPOSAL FOR THE FIRST P2P LENDING PLATFORM OF TURKEY

ABSTRACT

Peer-to-peer (P2P) lending, also known as "crowdlending," is a model of lending that allows individuals to lend money directly to other individuals or businesses without the need for a traditional financial institution. P2P lending is facilitated through online platforms that match lenders with borrowers based on their creditworthiness. This article discusses the pros and cons of P2P lending, including increased profitability for lenders and borrowers, but also higher risks due to less volatility and liquidity compared to traditional equity markets. The regulatory process for P2P lending in Turkey is also examined, with the Capital Markets Board (CMB) responsible for regulating crowdfunding activities. The article proposes a pioneering business model for the Turkish market that focuses on credit scoring algorithms as a key component of P2P lending platforms, taking into account past regulations and potential future regulations from the CMB.

Keywords: Peer-to-peer Lending, Crowdlending, Credit Scoring, Regulatory Environment, Machine Learning.

JEL Codes: G21, G23, O16, C45, G28, D14.

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Makale Geçmişi/ Article History

Başvuru Tarihi/ Date of Application : 20 Mayıs/ May 2025

Düzeltilme Tarihi/ Revision Date : 5 Ağustos/ August 2025

Kabul Tarihi/ Acceptance Date : 29 Eylül/ September 2025

Research Article

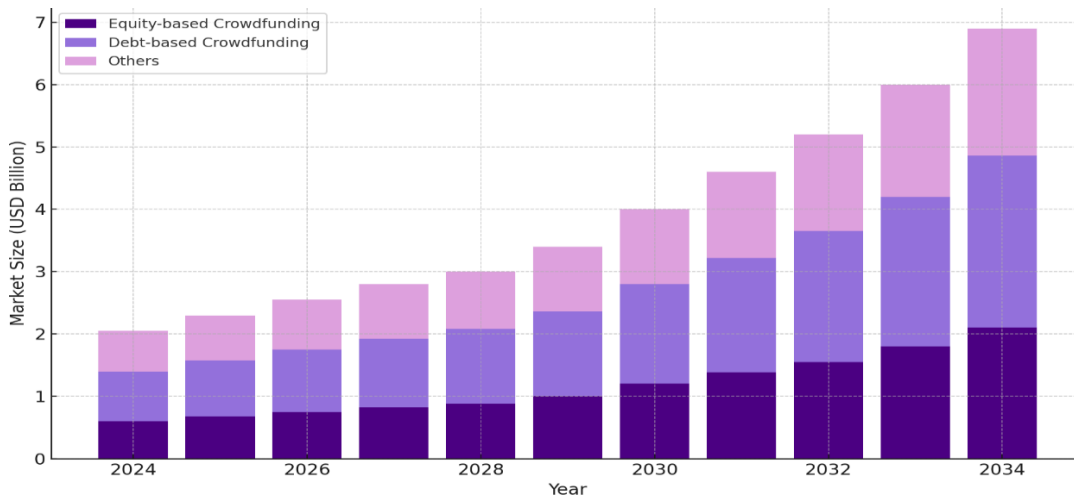
1. INTRODUCTION

Peer-to-peer (P2P) lending, a growing component of fintech, has disrupted traditional financial systems by allowing direct borrowing and lending between individuals or businesses through online platforms (Zhang et al., 2016). This innovative model offers several benefits, including faster loan approval processes, fewer intermediaries, and more flexible terms for both borrowers and lenders (John et al., 2023). For borrowers, particularly small and medium enterprises (SMEs) and the unbanked population, P2P lending can provide much-needed access to capital that may otherwise be unavailable through conventional financial institutions (Byanjankar et al., 2015). For lenders, the potential for higher returns compared to traditional investment vehicles makes P2P lending attractive, despite the inherent risks.

Globally, P2P lending platforms have grown significantly, with countries like the United Kingdom and the United States leading the way. Crowdfunding has evolved into a significant financing mechanism, supporting entrepreneurial, social, and creative initiatives across diverse

sectors. The total size of the global crowdfunding market exceeded USD 1.6 billion by the end of 2022 and is projected to grow at a compound annual growth rate (CAGR) of 16.7% through 2030 (Grand View Research, 2023, as cited in Namin et al., 2025). Reward-based crowdfunding alone reached an estimated USD 1.14 billion in transaction value in 2023, with an average funding per campaign of USD 7,750, and is expected to expand at 2.11% annually over the next four years (Liu et al., 2025).

Figure 1. Global Crowdfunding Market Size by Type 2024–2034



Source: Market.us, 'Crowdfunding Market Size, Share & Trends Analysis Report', CAGR 14.9%, Accessed 2024).

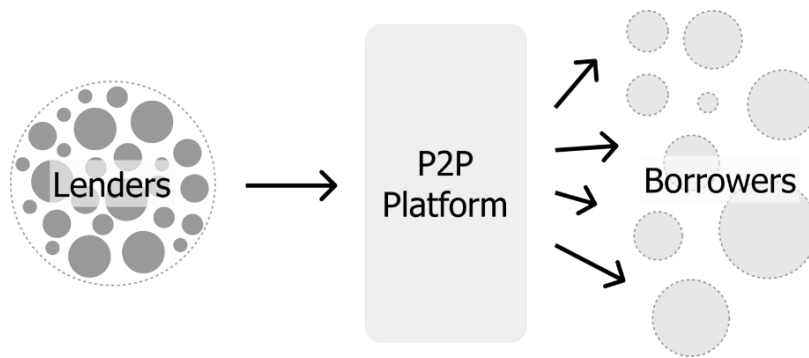
In Turkey, while the regulatory environment for P2P lending is still in development, the market shows significant potential (Dorfleitner et al., 2016). In Türkiye, the crowdfunding market remains a relatively small segment compared to the global scale but has shown rapid growth. In 2023, the Turkish market was valued at approximately USD 15.7 million and is projected to reach USD 19.4 million by 2027 (Tekeoğlu et al., 2023). In contrast, on a global scale, the total transaction volume was estimated to reach USD 1.41 billion

by the end of 2023, with projections indicating a rise to USD 3.62 billion by 2030 (Tekeoğlu et. al., 2023). The Turkish financial system, historically reliant on bank-centric models, could benefit from the introduction of P2P lending platforms, which could promote financial inclusion, especially for unbanked individuals and SMEs (Duarte, 2024). This study proposes a business model that integrates credit-scoring algorithms and anticipates future regulatory developments in Turkey, addressing the specific risks and opportunities within this emerging market.

2. THEORY/BACKGROUND

In P2P lending, the lending process is facilitated through an online platform that matches lenders with borrowers based on their respective needs and creditworthiness. The lenders can lend at different rates for different risks according to borrowers' credit scores (Figure 2).

Figure 2. P2P Platform Business Model



This application can increase the profitability of lenders and borrowers because it doesn't need a bank or other costly institution to complete all digital platform processes. This model can also enable credit for people who cannot get credit from banks.

On the other hand, P2P lending has some cons like less volatility and less liquidity according to Equity markets (Oh and Rosenkranz, 2022). It also has a total risk that is higher for both lenders and borrowers because there is no protection from a powerful institution like a bank. But P2P Platforms indemnify lenders in the case of default by the debtor, to decrease the risks to lenders. The platform also guarantees to the borrower to provide the amount settled on for a specified rate. It has global examples like LendingClub, Prosper, and Zopa (Turguttopbas and Kayral, 2023). There are worldwide examples of P2P lending, and some of them exceed \$1 billion USD valuation. They have some reasons to be in demand for both borrowers and lenders.

In the context of Turkey, the regulatory landscape for P2P lending remains nascent. The Capital Markets Board (CMB) has begun to regulate crowdfunding, but specific rules for P2P lending are still being developed (Lenz, 2016). Despite this, the potential for financial inclusion and economic growth (Ince Yenilmez & Yıldırım, 2025) is significant, particularly if platforms can incorporate robust risk mitigation strategies such as credit scoring and loan diversification. The introduction of machine learning-based credit scoring models has already proven effective in reducing default risks and improving loan performance across

several international P2P platforms (Byanjankar et al., 2015).

One of the most significant challenges in P2P lending is the inability of existing models to accurately assess credit risk, particularly for borrowers who do not fit the traditional banking profile. This challenge arises due to the reliance on conventional credit scoring mechanisms that primarily utilize financial data and banking histories, which may not be available for many P2P borrowers . In some cases, P2P platforms have experimented with big data and alternative data sources, such as social media behavior, to predict borrower default risk, but the results have been mixed (Zhang et al., 2022).

A failure to adequately assess credit risk not only exposes lenders to significant financial losses but also threatens the sustainability of the platform itself. According to Zhang et al. (2022), less than 15% of digital platforms are sustainable in the long run, with credit risk mismanagement being one of the key factors contributing to platform failure. Thus, improving credit risk scoring is critical to the success of P2P lending platforms, particularly in markets with limited access to conventional financial data, such as Turkey.

In light of these challenges, this study proposes a credit-scoring model based on traditional banking data adapted for P2P lending platforms. By leveraging historical loan data and incorporating alternative data sources, the proposed model aims to provide a more comprehensive risk assessment for P2P borrowers, thus enhancing the platform's stability and reducing default rates (John et al., 2023).

2.1. Literature Review and Research Gap

A rich body of literature has examined factors influencing P2P loan performance, repayment default, and investment profitability. Early work often employed traditional statistical techniques such as logit, probit, Cox, and OLS models to assess borrower characteristics, credit grades, and loan terms (Xu et al., 2021). More recent studies have shifted toward machine learning and ensemble methods—random forests, gradient boosting, and neural networks—due to their superior predictive performance in default classification and profitability scoring (Fitzpatrick & Mues, 2021; Chang et al., 2022). Other contributions focus on integrating alternative data sources (e.g., text descriptions, images, social media) to improve predictive accuracy, although results on their incremental value remain mixed.

Despite these advances, several gaps remain. First, much of the literature concentrates on mature markets (US, China, UK), leaving emerging markets like Türkiye underexplored, particularly regarding platform design, investor behavior, and regulatory adaptation. Second, while there is extensive research on default prediction and profitability scoring in established platforms (e.g., Lending Club, Prosper, Renrendai), few studies address how such models can be localized and adapted to the market structure, credit culture, and regulatory context of a country introducing its first P2P lending platform. Third, the integration of advanced predictive modeling with business model innovation—linking credit scoring insights to platform governance, risk-sharing mechanisms, and user acquisition strategies—remains underdeveloped (Shih et al., 2022).

3. MATERIALS AND METHODS

In Turkey, to determine the operating rules of capital markets and institutions, to ensure that companies using funds from the market make the most of it in accordance with certain rules, to protect the rights and benefits of depositors investing in the capital market, to ensure fair and effective functioning of the markets are responsibilities of Capital Markets Board (CMB). All investment platforms are subject to CMB and must rule according to CMB's regulations (Gago, and Zeytinler, 2022).

- CMB started to study P2P lending models in 2017 and published its first regulation about P2P on 5 December 2017. In this regulation, CMB determined Share-Based Crowdfunding and this regulation mostly consists of legal determinations of P2P terms (SPK, 2019).
- On 3 October 2019, CMB published second legislation about Share-Based Crowdfunding and allow to raise funds for ventures. This early model had restrictions like all investments must be returned as shares (Paya Dayalı Kitle Fonlaması Tebliği, 2019)
- On 20 February 2020, in addition to Share-Based Crowdfunding, the CMB also regulates Credit-Based Crowdfunding activities. Along with this change, regulations about alternative financing activities have also been introduced.
- On 27 October 2021, with the last published regulation, some problems were solved regarding Share-Based Crowdfunding. And in this regulation, it is determined the model of Credit-Based Crowdfunding activities (Kitle Fonlaması Tebliği, 2021)

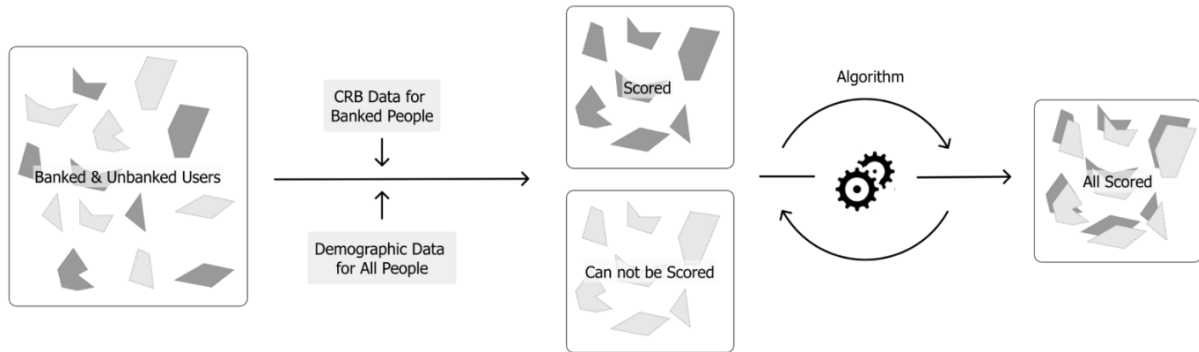
As a result, in the current regulatory environment, it is not allowed the P2P lending as individual borrowers and lenders, but restricted kinds of P2P like Share-Based Crowdfunding and Credit-Based Crowdfunding activities are regulated and allowed, in Turkey. CMB focused on protecting investors, the market, and borrowers in all legislations. Some important requirements that are determined in regulations are as follows:

- CMB license requirement: All crowdfunding platforms are required to obtain a license from the CMB to operate.
- Lending limitations: The maximum loan amount that each lender can provide on the platform is kept within a limit set by the CMB.
- Risk management: Crowdfunding lending platforms must establish risk management procedures. These procedures include processes such as evaluating loan applications, making a credit rating, and creating a risk management plan.
- Transparency: Crowdfunding lending platforms must operate in a transparent manner. Therefore, platforms should be open to information requests from lenders and borrowers.
- Investor Protection: The CMB takes measures to protect investors in Crowdfunding lending

platforms. For example, platforms must keep investors' information safe.

This study was initiated with the aim of developing a P2P lending model compliant with potential future regulatory frameworks expected to be introduced by the Capital Markets Board (SPK) in Turkey. The project's objective is to create a secure, efficient, and accessible financial service that provides both lenders and borrowers with an innovative solution. This P2P lending platform model for the Turkish market is designed to address the lack of traditional credit data for certain segments of the population, such as individuals without a formal banking history. It focuses on combining traditional credit data with alternative data to better assess credit risk for previously underserved markets.

Figure 3. Unbanked/Underbanked People Scoring Model



We know the center of the model from the benchmarks is credit scoring algorithms which is unique for the platform. Therefore, we put the scoring issues on the center. The main problem in this model with scoring is scoring unbanked/underbanked people. The model consists of an algorithm that calculates unbanked/underbanked users' scores by using demographic commons of them and a model developed using the data of banked people in HangiKredi Finansal Raporum (Yazarlari, 2023) (Figure 3).

4. DATA COLLECTION AND MODEL DEVELOPMENT

In total, the platform integrates over 11,542 user data points from “HangiKredi Finansal Raporum” (Yazarlari, 2023) database. These data points are then segmented, and users who lack traditional credit scores are clustered based on credit risk classes to build predictive credit models. In the development of our hybrid credit-scoring model, we employed a variety of machine learning models to assess their performance in credit scoring for our P2P lending platform. These models included:

HistGradientBoost: Utilizes histogram-based optimization for efficient large dataset handling.

Random Forest: An ensemble method that builds multiple decision trees to improve prediction accuracy.

LightGBM: A gradient boosting framework that is efficient and handles large data with lower memory usage.

CatBoost: Specializes in categorical variables with a gradient boosting framework aimed at improving accuracy.

XGBoost: A fast and high-performing gradient boosting framework.

SVM (Support Vector Machine): Effective in high-dimensional spaces, ideal for binary classification tasks.

KNN (K-Nearest Neighbors): A simple algorithm where the function is approximated locally, and computation is deferred until classification.

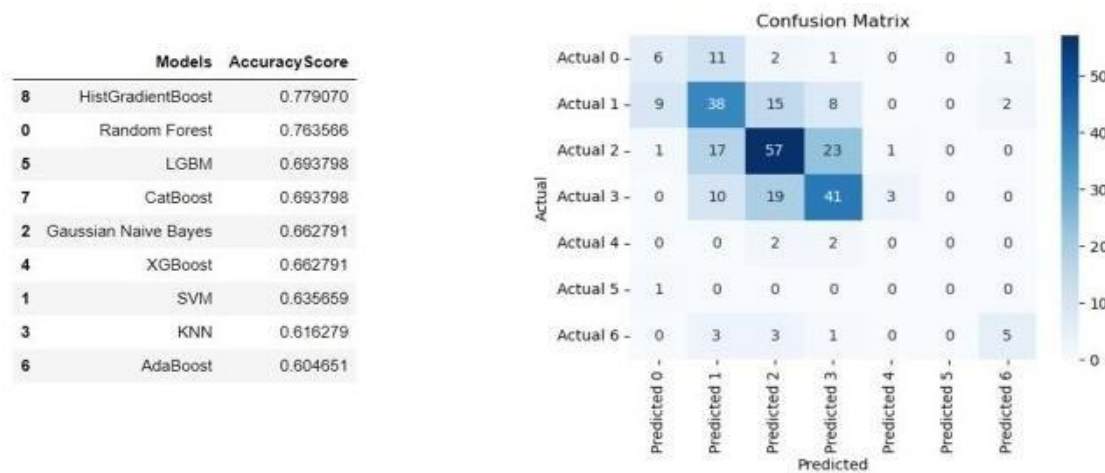
Gaussian Naive Bayes: Applies Bayes' theorem with strong independence assumptions between features.

AdaBoost: Boosts the performance of decision trees by focusing on difficult to classify instances. During the POC, banking data was intentionally excluded for a subset of users (282 users), and assumptions were made to simulate scenarios where certain critical data points (like credit scores) were absent. This was done to test the robustness of the proposed model in situations where incomplete data is common.

5. RESULTS

The results of this study focus on the development and validation of a hybrid credit-scoring model for the Turkish peer-to-peer (P2P) lending platform, integrating both traditional banking data and alternative data sources. The goal was to create a more reliable method for assessing the creditworthiness of borrowers who may lack formal credit histories, addressing the shortcomings of alternative-only credit- scoring models.

Figure 4. Hybrid Credit-Scoring Model Results



The hybrid credit-scoring model was built with 11,260 user data points, with 80% of the data used for training and 20% for testing. The users are categorized into 7 classes, ranging from 0 to 6, where class 0 represents the most risky and class 6 the least risky. The model's performance was evaluated based on its ability to predict borrower defaults (Figure 3, left). HistGradientBoost demonstrated the highest accuracy at approximately 77.9%, showcasing its effectiveness in handling the dataset even with some features removed. This model benefits from histogram-based optimization techniques that improve computational efficiency and can handle missing values gracefully. Random Forest followed closely with an accuracy of 76.4%. As an ensemble method that aggregates multiple decision trees to make decisions, Random Forest is robust against

overfitting and performs well in diverse scenarios. LightGBM and CatBoost, both achieving around 69.4% accuracy, are specialized gradient boosting models that handle categorical features effectively, which is critical in datasets with diverse attribute types. Other models like Gaussian Naive Bayes, XGBoost, SVM, KNN, and AdaBoost showed lower accuracy, ranging from about 60.4% to 66.3%. These models may struggle with the dataset's complexity or the way features are represented, especially when key banking data is missing.

The confusion matrix for 282 data points (without banking data features) provides a deeper look into the model's performance across different classes: Diagonal cells (e.g., 38 for Actual 1-Predicted 1, 57 for

Actual 2-Predicted 2) represent correct predictions. Higher values in these cells indicate better performance for respective classes. HistGradientBoost seems particularly effective in classifying classes 1, 2, and 3, where it correctly identified a majority of the instances. Off-diagonal cells indicate misclassifications. For instance, in class 1, 15 instances were misclassified as class 3, suggesting possible similarities or feature overlaps between these classes that the model misinterpreted.

6. DISCUSSION

One of the key aspects of the model's development was ensuring compliance with Turkish regulations, particularly those anticipated from the Capital Markets Board (SPK). The model's adherence to borrowing limits, transparency requirements, and credit scoring guidelines aligns with regulatory best practices, ensuring that the platform can operate within the bounds of the law while maintaining trust with both borrowers and lenders.

This focus on regulatory compliance is particularly important for P2P lending platforms in emerging markets like Turkey, where the regulatory framework is still evolving. By designing the model with compliance in mind, the platform positions itself to quickly adapt to new regulations as they are introduced, providing a secure and stable environment for all participants. This also increases investor confidence, which is critical for the platform's long-term sustainability.

The development and testing of the hybrid credit-scoring model for the Turkish P2P lending platform highlight several key findings that are relevant to both the academic literature on credit risk assessment and the practical implementation of P2P platforms. A major insight from this study is the critical role that traditional banking data plays in improving credit risk assessments. While many P2P platforms globally have adopted alternative data sources such as social media activity, e-commerce transactions, and mobile phone usage, these models often fail to provide a sufficiently reliable basis for evaluating borrower creditworthiness (Aitken, 2017). Our results demonstrated that integrating traditional banking data, such as loan repayment history and debt-to-income ratios, may enhance the accuracy of the credit-scoring model and reduce default rates. Despite the positive outcomes of this model, several limitations should be considered. First, while the model was tested using a robust proof of-concept (POC) approach, it has not yet been implemented at full scale. Real-world deployment of the model may reveal additional challenges, such as handling large-scale

data processing, managing regulatory changes, and addressing borrower default risk in more volatile economic conditions. Future research and real-world testing are necessary to refine the model and ensure its scalability.

Second, the model's performance is highly dependent on the quality and availability of data. While the integration of traditional and alternative data improves predictive accuracy, the model's effectiveness may be reduced in cases where the size of the data is limited. Additionally, the reliance on alternative data introduces potential privacy concerns, as the platform collects and processes large amounts of personal and behavioural information from users.

7. CONCLUSION

In conclusion, peer-to-peer (P2P) lending is a disruptive financial model that has gained popularity worldwide, including in Turkey. In Turkey, financial market is regulated by the Capital Markets Board (CMB), which has established licensing requirements for crowdfunding platforms, lending limitations for lenders, and risk management procedures for P2P lending platforms. Although P2P lending as individual borrowers and lenders is not currently allowed, Share-Based Crowdfunding and Credit-Based Crowdfunding activities are regulated and permitted in Turkey. The CMB's regulatory focus is on protecting investors, borrowers, and the market, and the introduction of various regulations over the years has aimed to address the challenges and risks associated with P2P lending.

As P2P lending continues to evolve and gain traction globally, it is important for borrowers, lenders, and regulators to carefully navigate the risks and opportunities of this innovative financial model. With proper regulations in place, P2P lending has the potential to provide an alternative source of credit, promote financial inclusion, and foster economic growth, while also mitigating risks for all parties involved. As the P2P lending landscape continues to evolve, it will be crucial for stakeholders to stay updated with the regulatory environment and best practices to ensure the continued growth and sustainability of this disruptive financial model.

The inclusion of machine learning-based credit scoring methods further increases the efficiency and accuracy of the risk assessment of loans. In particular, in the P2P business model, which is heavily used by unbanked individuals as well as banked individuals, ML methods are much more useful than traditional methods in reducing the risk of default. For this reason, fintech companies that have credit scoring experience with innovative methods are very advantageous in establishing platforms for P2P lending. P2P lending, facilitated through online platforms, has emerged as a viable alternative to traditional lending channels, offering benefits such as increased profitability, flexible loan criteria, and global examples of successful implementation. The incorporation of ML-based credit scoring methods has further enhanced the efficiency and accuracy of risk assessment in P2P lending.

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Hakem Değerlendirmesi: Dış bağımsız.

Çıkar Çatışması: Yazarlar çıkar çatışması bildirmemiştir.

Finansal Destek: Yazar bu çalışma için finansal destek almadığını beyan etmiştir.

Teşekkür: -

Peer-review: Externally peer-reviewed.

Conflict of Interest: The author has no conflict of interest to declare.

Grant Support: The author declared that this study has received no financial support.

Acknowledgement: -
