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Analysis of Block's Merchant Credit Assessment Model

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Abstract. This study examines the merchant credit assessment model of Square Capital, a Block subsidiary, representing an innovative approach to small business financing in the fintech sector. Traditional credit assessment methods often fail to effectively serve small businesses due to information asymmetry and lack of collateral. Square Capital utilises real-time transaction data and advanced machine learning algorithms to provide more accessible and efficient financing solutions. The research methodology comprehensively analyses Block's annual reports, industry data, and relevant academic literature. The study explores Square Capital's unique data sources, assessment factors, and machine learning algorithms, highlighting the differences between this model and traditional lending practices. Results indicate that Square Capital's model has demonstrated excellence in loan growth, risk control, and customer satisfaction, facilitating $1 billion in loans in 2023, an 18% year-over-year increase. This paper argues that Square Capital's data-driven approach represents a significant innovation in small business financing, potentially setting new standards for the fintech industry. However, challenges remain in balancing innovation with regulatory compliance and risk management as the business scales. The study also discusses future research directions and implications for traditional financial institutions.

Keywords: FinTech; Square Capital; Small Business Financing; Alternative Credit Scoring; Payment Data Analysis.

1. Introduction

Small enterprises are an important driving force for national economic development, but they have long faced the problem of difficult financing. Traditional financial institutions have been cautious about lending to small enterprises, mainly due to asymmetric information, lack of adequate credit history, and lack of collateral, among other factors. However, access to appropriate financing for small enterprises is essential for their survival and development and is key to promoting employment, innovation, and economic growth.

In recent years, fintech companies have changed the landscape of small business financing with their innovative technologies and models. Among them, Block (formerly Square) is a typical representative. Block was founded in 2009, initially focusing on mobile payment services and then gradually expanding the scope of business. Block (formerly Square), as early as 2014, launched Square Capital, a lending department specialising in serving small and medium-sized merchants, aiming to provide more convenient and efficient financing services for small businesses [1]. Provide more convenient and efficient financing services. Even after the company changed its name to Block, the division kept the Square Capital name.

Square Capital uses a unique merchant credit assessment model that utilises big data, artificial intelligence, and other technologies to comprehensively analyse a merchant's business situation. This unique and innovative model is expected to break through the limitations of traditional credit assessment and provide financing opportunities for more small businesses [2].

This research will analyse Block's merchant credit assessment model, systematically explore its operation mechanism, innovative advantages and potential risks, and focus on how the model can break through the limitations of traditional credit assessment by using big data and artificial intelligence technology. This study is designed to provide new insights into the application of fintech in the field of small business financing and, at the same time, provide innovative ideas for traditional

financial institutions. This paper strives to build a bridge between theory and practice in order to promote the improvement of the financing environment for small businesses and the realisation of financial inclusion.

2. The Evolution of Small Business Credit Assessment

Traditional credit assessment for small businesses has relied heavily on financial statement analysis, credit scoring models, and the 5C's (character, capacity, capital, collateral, and condition). Berger and Udell note that these methods assess risk by analysing a firm's financial condition and credit history [3]. However, there are obvious limitations to these methods when applied to small businesses. A recent study published in the Journal of Financial Stability reveals the shortcomings of traditional credit assessment methods in serving small businesses, especially for start-ups or those with short credit histories [4].

The financial statements of small businesses are often less detailed and standardised than those of larger companies and sometimes lack audits. Altman et al. assessed the creditworthiness of SMEs in their study and emphasised that although traditional assessment frameworks provide a comprehensive analytical foundation, there are often challenges in real practical applications that can lead to inconsistent assessment results [5]. Di and Pattison further point out that traditional approaches may not adequately consider industry specificity, which is crucial for accurately assessing the credit risk of small businesses [6]. Their study suggests that industry expertise plays an important role in small business lending, which tends to imply that traditional standardised assessment methods may have limitations.

In addition, a study by Strahan and Weston reveals the impact of structural changes in the banking industry on small business lending [7]. The study found that as the banking industry consolidated, large banks tended to reduce their lending to small businesses, while smaller banks increased their business in this area. This finding implies that the traditional banking system may have efficiency problems in serving small businesses, especially in evaluating and processing small loan applications. This structural change may result in certain small businesses facing difficulties in accessing credit, especially those that cannot meet the standardised assessment requirements of large banks.

Research by Cornelli, Frost, Gambacorta, and Jagtiani further supports these ideas, finding that today's financial technology (FinTech) lending platforms are better able to serve small business segments that are overlooked by traditional banks through innovative credit assessment models and efficient operational processes [4]. This suggests that traditional approaches may not provide a full picture of the credit risk and growth potential of small businesses, especially in today's rapidly changing business environment.

Overall, traditional approaches to small business credit assessment face several significant limitations. These include an overreliance on historical financial data that may be incomplete or inaccurate, a tendency to ignore industry-specific factors that lead to inaccurate valuations, and challenges posed by structural changes in the banking industry that may prevent certain small businesses from obtaining traditional bank loans. In addition, standardised valuation models often do not adequately account for the uniqueness of small businesses and their respective industries. This approach also makes it difficult to effectively assess new or fast-growing businesses, as historical data or traditional metrics may not accurately reflect their current financial condition.

These challenges are driving the financial industry to seek more innovative and efficient credit assessment methods, creating more conditions for the rise of fintech companies in the small business finance space.

3. Square Capital Model Overview

Square Capital, the small business lending arm of fintech company Square (now Block), was founded in 2014 as a division that provides innovative financing solutions for micro and small businesses that

are difficult for traditional financial institutions to serve [8]. Square Capital's model leverages the unique strengths of the square ecosystem to bring new possibilities for financing to many small businesses. Square Capital's model leverages the unique strengths of the square ecosystem and opens new possibilities for many small businesses to raise capital.

3.1. Square Capital's Business Model

Square Capital's business model is built on a data-driven decision-making process, and through deep integration with Square's payment processing system, Square Capital has real-time access to up-to-the-minute data on a borrower's health, as well as information on a merchant's business volume, growth, cash flow and customer interactions. This unique data advantage enables Square Capital to assess a borrower's credit risk more accurately without relying exclusively on traditional credit scores or financial statements [2].

3.2. Credit Product Features

Square Capital, as described by Square's official website, other reliable sources, and Block, Inc.'s 2023 Annual Report, offers loan products with several distinctive features tailored to small businesses. These loans are characterised by a rapid approval process and flexible loan amounts ranging from $300 to $250,000. Instead of traditional interest rates, Square Capital implements fixed borrowing costs, making the repayment structure more straightforward for borrowers. Notably, these loans do not require collateral, which significantly lowers the financing threshold for small businesses. Additionally, Square Capital provides a flexible repayment mechanism where the repayment amount fluctuates in accordance with the borrower's sales performance, allowing for more adaptable financial management [8-10].

3.3. Differences From Traditional Small Business Loans

Square Capital's lending model distinguishes itself from traditional small business lending in several key aspects. Its evaluation methodology primarily relies on real-time transaction data and AI algorithms, departing from conventional financial statement analysis and credit scoring [9, 10]. The loan process is streamlined, offering a quick and easy online application, which starkly contrasts the complex application procedures typically encountered with traditional banks [8]. Regarding repayment, Square Capital implements a flexible system based on sales, diverging from the fixed-term repayment with equal principal and interest commonly used by traditional lenders [8, 9]. Furthermore, Square Capital's target clientele focuses on small and emerging businesses that often struggle to secure financing from traditional banks, effectively addressing a gap in the market [10]. These distinctive features collectively position Square Capital as an innovative alternative in the small business lending landscape.

Through this innovative model, Square Capital has successfully filled the gap in the small business financing market today, providing new opportunities for businesses that traditional financial institutions may have overlooked to access capital. According to Block, Inc.'s 2023 Annual Report, Square's lending business reached $1.1 billion in total loans as of the fourth quarter of 2023, a 34% increase year-over-year [3]. This demonstrates not only the success of the Square Capital model but also the huge demand for this innovative financing solution for small businesses.

4. Research Methodology

This study aims to provide an in-depth analysis of Square Capital's merchant credit assessment model and explore its operational mechanisms, strengths, and potential risks. The following research methodology was utilised in this paper to fully understand Square Capital's innovative approach and its impact on small business financing.

4.1. Data

The data for the analysis report in this article has been sourced from a variety of authoritative sources. These include Block, Inc.'s (formerly Square) official website and annual reports, which provide key information about the company directly. Additionally, FinTech industry analysis reports and relevant academic literature provide broader context and expert insights. Relevant press releases and industry commentary further complement the dataset, providing up-to-date information and different perspectives on Square Capital's operations and the fintech lending space. The combination of these sources of information in this paper ensures a comprehensive and integrated understanding of Square Capital's business model and its presence in the small business lending market.

4.2. Analytical Methods

This paper adopts a two-pronged analytical approach to gain a comprehensive understanding of Square Capital's business model. First, the paper provides an in-depth study of Square Capital's operating framework and product features and compares it to traditional lending practices through a comprehensive review and analysis of relevant literature. Second, the paper delves into Square Capital's business growth and market performance by scrutinising financial data extracted from Block's annual reports. This combination of qualitative content analysis and quantitative financial assessment is intended to provide a comprehensive view of Square Capital's position and performance in the small business lending market.

5. Analysis of Square's data-driven credit assessment models

This paper argues that Square Capital's data-driven credit assessment model could well represent a significant innovation in fintech in small business finance. By leveraging the massive amounts of real-time transactional data captured by its payment processing platform in combination with advanced machine learning algorithms, Square Capita has enabled Square Capital to assess a small business's credit risk more comprehensively and accurately. This approach not only breaks through the limitations of traditional credit assessment but also greatly improves financing efficiency and opens new financing channels for micro and small businesses that would normally struggle to access traditional bank loans. Square Capital's model demonstrates the tremendous potential of data-driven decision-making in solving small business financing challenges and provides an innovative example for the entire financial industry.

5.1. Data sources and data types

The core strength of Block's credit assessment model lies in its rich and unique data sources. According to the 2024 Annual Report, Block processed an impressive $209.6 billion in gross payment volume (GPV) in 2023, involving more than 4 million merchants, 733 million payment cards, and 271 million buyer profiles [11] (p. 5). This vast data pool comprises three main types of information: transaction data (real-time customer transaction details), customer behaviour data (spending habits and feedback), and financial data (cash flow, turnover, and profitability metrics). This comprehensive dataset forms the foundation of Block's sophisticated credit assessment capabilities.

5.2. Assessment Factors and Weights

Block's credit assessment model incorporates several key factors crucial for understanding Square's data-driven approach [11]. These include historical processing volume, transaction numbers, bounce-backs, growth trends, and client tenure with Block. Each factor contributes to the model's predictive power, enabling a nuanced evaluation of potential borrowers based on their actual business performance and history within the Block ecosystem.

5.3. Machine Learning Algorithms and Model Development

Block's credit assessment models utilise advanced machine learning algorithms to process and analyse large amounts of data collected through its ecosystem. The company's approach to algorithm selection and model development has evolved from simple heuristics to complex machine-learning algorithms that focus on operational efficiency, interpretability, accuracy, and generalizability [12]. This development has led to more accurate and automated risk and fraud detection, improving the efficiency of credit assessment. Block emphasises continuous model improvement through code refactoring, feature engineering, and implementation of different machine-learning algorithms aimed at increasing clarity, speed, and accuracy [12].

These models have real-time data processing capabilities that allow for dynamic assessment of merchant performance, which is especially beneficial for small businesses. Brock reported a 40% reduction in manual work associated with risk assessment over a six-month period, indicating a significant increase in automation and decision-making efficiency [12]. While primarily focused on credit assessment, this paper appears to show that Block's machine-learning infrastructure spans multiple business domains and has the potential to provide additional data inputs and insights that can enhance the credit assessment process [12].

This paper argues that by employing this sophisticated machine learning approach, Block has developed a credit assessment model that is both efficient and accurate. This not only improves their risk management capabilities but also allows Block to offer new financial solutions to small businesses that are underserved because of traditional financial institutions.

5.4. Regulatory Compliance

Block As a financial company, the company will face intense regulatory scrutiny and must ensure that its data-driven model is both efficient and compliant with various financial regulations. According to Block's Annual Report, the firm ensures compliance through several key measures [11] (pp. 48-49). Block implements strict data privacy and security protocols to protect customer information and transactional data, including encryption technology, access controls, and ongoing security monitoring. To meet the regulatory requirements, the company ensures that its machine learning models are sufficiently transparent and interpretable to explain the decision-making process to regulators and customers, particularly with respect to credit assessment.

In addition, Block conducts regular compliance audits and risk assessments to ensure that its business operations and data usage are in line with the latest regulatory requirements. The company also maintains active communication with regulators to ensure that its innovative practices are in line with regulators' expectations and adapts its models and processes where necessary [11] (pp. 48-49). These comprehensive compliance measures demonstrate Block's commitment to responsible and regulatory-compliant financial practices while utilising advanced data-driven technologies.

5.5. Conclusion and Impact

Using this sophisticated machine learning approach, Block has also developed a credit assessment model that combines efficiency, accuracy and compliance while adhering to strict regulatory requirements. This approach not only improves Block's risk management capabilities but also allows it to offer innovative financial solutions to small businesses that are underserved by real-life financial institutions.

Additionally, Block's commitment to data privacy, model transparency, and regular compliance audits not only meets regulatory requirements but also builds trust with customers and stakeholders, demonstrating a responsible and innovative approach to the financial industry. This paper argues that this strategy of balancing technological innovation and regulatory compliance makes Block's data-driven credit assessment model an exemplary demonstration of how technology can be used to solve the longstanding challenges of small business financing while maintaining the integrity and stability of today's financial system, well on its way to setting a new standard for other fintech companies.

6. Model Effectiveness Evaluation

As an innovative pioneer in the field of FinTech, the effectiveness of Block's financial service model has always been the focus of attention in the industry. Based on Block's 2024 Annual Report and the latest FinTech industry reports, this study will comprehensively evaluate the effectiveness of its model from various aspects.

6.1. Volume Of Loan Disbursements and Growth Trends

According to Block's 2024 Annual Report, Block's loans for sale grew significantly from $474.0 million at the end of 2022 to $775.4 million at the end of 2023. This strong growth reflects the market attractiveness of the Block loan product and the effectiveness of the model. At the same time, the report (page 106) shows that the company holds $247.6 million in net investment loans, indicating that Block is actively expanding its lending business while prudently managing risk.

And Block, Inc.'s lending business is showing strong growth. According to the company's fourth-quarter 2023 earnings report, Square's lending business facilitated $1 billion in loans during the quarter, up 18% from the same period a year earlier [13]. This paper argues that this data not only reflects Block's significant share of the lending market but also demonstrates the continued success of its model in attracting and servicing small business customers.

6.2. Credit Risk Control

Block uses a sophisticated risk assessment model to manage credit risk, and the 2024 Annual Report (page 119) notes that at the end of 2023, the company had $2.5 billion of consumer receivables rated "Pass" compared to $100 million categorised as "Classified." This figure indicates that Block's risk-control model has performed well in maintaining loan quality.

Block's innovative risk assessment model has demonstrated very significant advantages in the micro and small business lending market. According to a PYMNTS report in 2024, Square's data-driven model enables it to provide loans to small businesses that traditional banks may consider too risky, thus filling an important market gap [14]. This paper argues that this approach not only broadens Block's customer base but also highlights its advanced risk control capabilities.

6.3. Customer Experience and Market Performance

Block's Cash App became the No. 1 downloaded financial app in the US in the iOS App Store and Google Play in 2023, reflecting the high degree of user recognition of Block's products [10]. This achievement not only proves Block's advantages in user interface and function design but also shows that its financial service model meets the needs of a wide range of users.

6.4. Summarise and Outlook

Block's financial services model has demonstrated superior results in terms of loan growth, risk control and user experience. Its innovative data-driven approach not only drives rapid business growth but also ensures better asset quality. Industry reports and user feedback have further validated the efficiency and market acceptance of the Block model. However, as the business scales up, Block faces the challenge of balancing innovation and risk control. In the future, Block will need to continue to optimise its model to adapt to the changing market environment and regulatory requirements while further improving the user experience to maintain its leading position in the fintech field. Overall, this paper concludes that Block's modelling results are positive, demonstrating its strength and potential in fintech innovation. The model not only brings Block commercial success but also provides useful insights for the development of the whole financial industry.

7. Conclusion

In the end, this study analyses Block's Square Capital small business credit assessment model in depth and discusses its operation mechanism, innovative advantages, and potential risks. This study utilised real-time transaction data and advanced machine learning algorithms and shows that Square Capital has successfully provided innovative financing solutions for micro and small enterprises that are difficult to serve by traditional financial institutions. However, this study has several limitations. Because the details of Square Capital's operations and risk assessment models are trade secrets, this study was unable to obtain internal data. In addition, today's fintech industry is evolving rapidly, and the results may not fully reflect the latest market changes. As an isolated case study, Square Capital's experience may not be entirely applicable to other fintech companies or markets. But despite these limitations, this paper provides valuable insights into current fintech trends and a reference framework for exploring new financial models.

In the future, there is still room for potential improvements to Square Capital's credit model. For example, the development of more granular industry-specific models could be used to improve assessment accuracy or to further integrate external data sources to enhance risk assessment. For traditional financial institutions, Square Capital's success demonstrates the importance of data-driven decision-making and flexible credit products, which may prompt them to reevaluate their credit strategies. Overall, the role of fintech in small business financing is expected to grow in importance. With today's technological advances, more innovative financing models are likely to emerge, such as blockchain-based peer-to-peer lending and AI-driven automated credit assessment systems. This study argues that Square Capital's case provides a rare example of how fintech can solve small business financing challenges. In the future, financial institutions, regulators, and researchers need to continue to work together to ensure financial stability while continuing to promote financial innovation and create a better financing environment for small businesses.

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