Democratizing access to supply chain finance for SMEs

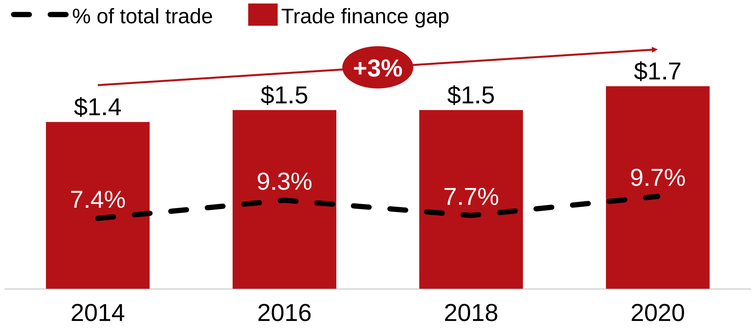
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Motivation / Background

The trade finance gap continues to grow worldwide, with COVID-19 increasing the gap. **SMEs are 2.6x times more likely to be rejected** for a loan than a multinational (Kim et al., 2019, 2021).

Global trade finance gap, $ trillion, %



Key Question / Hypothesis

Our hypothesis is that **leveraging operational supply chain data** from logistics trade operators, financial institutions can **reduce the "Know-Your-Customer (KYC)" and the trade transaction costs**.

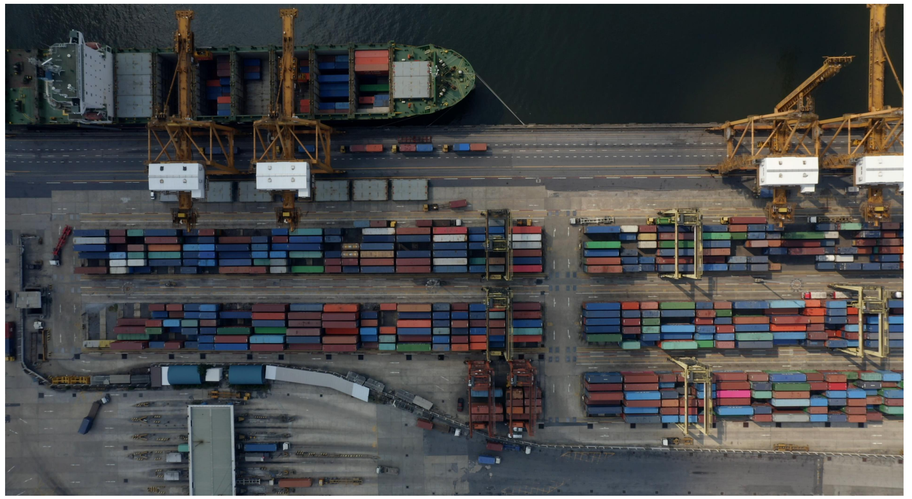
We believe that **reducing transaction costs of KYC will lead to higher access to supply chain financing for SMEs** because the main barriers to trade finance for SMEs, are "KYC" requirements (76%) and transaction costs (59%) (Kim et al., 2019, 2021).

Relevant Literature

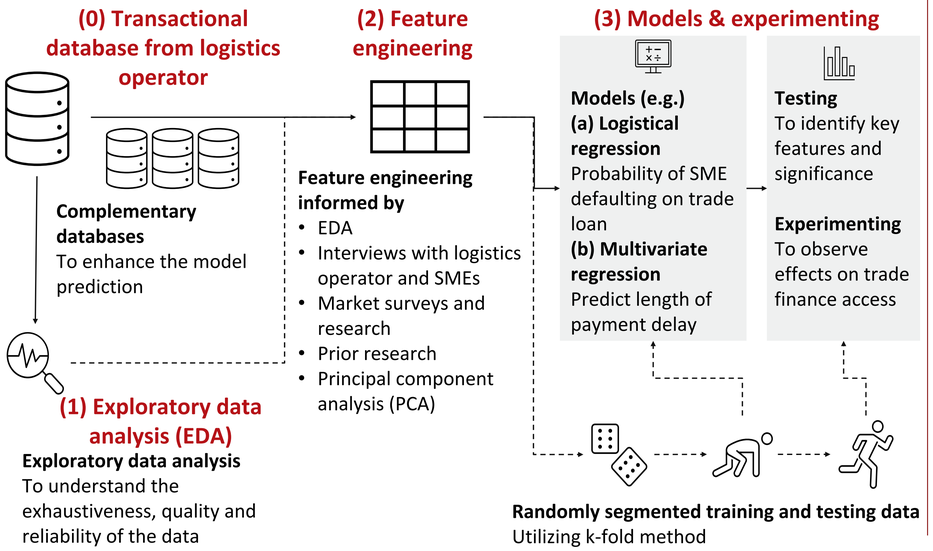
Gupta, J., Barzotto, M., & Khorasgani, A. (2018). Does size matter in predicting SMEs failure? International Journal of Finance & Economics, 23(4), 571–605.

Kim, K., Beck, S., Tayag, M. C., & Latoja, Ma. C. (2019). 2019 Trade Finance Gaps, Growth, and Jobs Survey (0 ed., ADB Briefs) [ADB Briefs]. Asian Development Bank.

Kou, G., Xu, Y., Peng, Y., Shen, F., Chen, Y., Chang, K., & Kou, S. (2021). Bankruptcy prediction for SMEs using transactional data and two-stage multiobjective feature selection. Decision Support Systems, 140, 113429.



Methodology



Proposed models

We propose five models to **assess the creditworthiness of SMEs for supply chain finance**: (a) logistic regression, (b) CART, (c) CART with weights, (d) Bayesian classifier, and (e) Logistic regression with LASSO regularization:

$$\hat{\theta} = \text{argmax}_\theta \sum_{i=1}^{m} \log P\left(y^{(i)} | x^{(i)}\right)$$

$$\hat{\theta} = \text{argmin}_\theta \sum_{i=1}^{n} (y^{(i)} - \hat{y}^{(i)})^2$$

$$\hat{\theta} = \text{argmin}_\theta \sum_{i=1}^{n} \theta_j (y^{(i)} - \hat{y}^{(i)})^2$$

$$\hat{\theta} = \text{argmax}_\theta \; P\left(y^{(i)} | x^{(i)}\right)$$

$$\hat{\theta} = \text{argmax}_\theta \sum_{i=1}^{m} \log P\left(y^{(i)} | x^{(i)}\right) - \alpha \sum_{j=1}^{m} |\theta_j|$$

Expected Contribution

We expect our research to:

- **Identify key supply chain features** from transactional databases from logistics trade operators to **improve the measurement of creditworthiness of SMEs for supply chain finance**
- Experiment to **observe the estimated increase in supply chain financing for SMEs**
- **Capture the tacit knowledge of creditworthiness assessment of SMEs processes** through interviews with logistics trade operators and SMEs

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