Chapter 18
Deep Learning-Based Applications of the Familiarity Effect

Yasin Tosun
https://orcid.org/0000-0002-5117-9261
Siegen University, Germany

Cemre Yoldaş
Leicester University, UK

ABSTRACT

This study investigates the predictability of the familiarity effect—a cognitive bias driving investors toward familiar assets—using machine learning (ML) models. Leveraging Germany's SAVE-Study dataset enriched with behavioral variables, we employ XGBoost and deep learning (MLP) architectures to predict future savings rates. Empirical results confirm that familiarity-driven variables significantly enhance predictive accuracy demonstrating that historical financial data combined with behavioural indicators explain more variance in savings behaviour than traditional models alone. Scenario analyses reveal that reduced familiarity correlates with higher capital price volatility and unstable investment returns, aligning with behavioural theories of uncertainty avoidance. Ethical implications are addressed, emphasising algorithmic transparency to mitigate bias amplification in recommendation systems. Our framework bridges behavioural finance and ML, transforming cognitive biases into quantifiable predictors for equitable investment systems.

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1. INTRODUCTION

1.1 Rationale and Background

Investment decisions are influenced by a combination of rational evaluations and the psychological tendencies and cognitive heuristics of individuals. Behavioural finance, as a field of study, seeks to elucidate the systematic errors that investors often make and to model these tendencies (Shleifer, 2003) (Barberis & Thaler, 2003). One prevalent bias identified within this framework is the familiarity effect, which denotes the inclination of investors to favour familiar companies, sectors, or brands. While this bias may enhance the efficiency of information processing, it also tends to elevate opportunity costs and diminish portfolio diversification, thereby increasing the associated risk. The reliance on familiarity often supplants rational decision-making, particularly at the intersection where emotional trust meets cognitive ease, consequently rendering investment choices more predictable yet inherently more vulnerable.

In recent years, the integration of machine learning techniques within financial decision-making processes has witnessed significant growth. These systems enhance predictive capabilities by identifying patterns within extensive datasets, thereby facilitating an analysis of human behaviour-related risks (Gu, et al., 2020). The confluence of behavioural finance and machine learning becomes particularly salient as biases such as the familiarity effect are translated into data. Behavioural indicators—including social media content, news sentiment, and brand search volumes—serve as systematic reflections of investors' familiarity-driven orientations (Sprenger, et al., 2014). Such signals not only provide insight into investor recognition but also act as decision-support mechanisms in algorithmic models.

This study endeavours to investigate how the familiarity effect can be effectively modelled, predicted, and potentially transformed using machine learning systems. If historical datasets encapsulate investors' familiarity-based choices, machine learning models may not only mirror this behaviour but also reinforce it, particularly through recommendation systems (Cowgill, et al., 2020). This situation prompts crucial considerations regarding fairness, transparency, and the ethical design of data-driven financial systems. Algorithms do not merely generate predictions; they must also evolve into tools that can judiciously manage and elucidate behavioural signals (Mittelstadt, et al., 2017).

Ethical considerations in algorithm design should strive to transform inherent biases into conscious awareness rather than obstructing investors from acting under the sway of familiarity (Binns, 2017). This discourse aims to explore the potential of machine learning in counteracting behavioural biases, particularly in relation to the familiarity effect, while also addressing the ethical, technical, and cognitive