

The Population Stability Index (PSI) is a measure of the degree of correspondence between two discrete probability distributions and is popular in credit risk modelling and monitoring in banks. The PSI aims to ensure consistency between the current and model development populations by monitoring the evolution of the underlying population. The current population should correspond to the one used during development. Should this not be the case then the model is at risk of misstating the outcome in question. When inconsistencies are detected, model reconstruction (for example a scorecard) might be required. Despite its widespread use, the origins and properties of the PSI are not well understood. The earliest reference to the PSI seems to be Lewis (1994) who coined the term in the textbook "Introduction to Credit Scoring". Popular texts, widely used in banking, that reference the PSI, include Thomas, Edelman and Crook (2002, page 155 ff.) and Siddiqi (2017, page 368 ff.). Both texts make use of the arbitrary constants suggested by Lewis (1994) to decide when model reconstruction is required. Practitioners and statisticians are equally aware of the defects of the PSI measure when utilised in populations with small sample sizes, since the PSI frequently signals a reconstruction of the model. This is evident in more recent research by Yurdakul and Naranjo (2020) that studied the statistical properties of the PSI and provided some recommendations on its use.

In this paper we propose an easy-to-use and novel alternative discrepancy measure based on the Pearson chi-square statistic and the non-central Chi-square distribution. The proposed test offers statistically well-founded properties. Additionally, we introduce sample-size dependent thresholds and illustrate the use thereof by simulated and real-world examples. These examples also serve to illustrate the efficacy of the test, even for small sample sizes such as those found in low default portfolios.