

[Download](#)

[Other Working Papers](#)

Keep in mind

The series Working Papers on Economics is published by the Office for Economic Studies at the *Banco de la República* (Central Bank of *Colombia*). The works published are provisional, and their authors are fully responsible for the opinions expressed in them, as well as for possible mistakes. The opinions expressed herein are those of the authors and do not necessarily reflect the views of Banco de la República or its Board of Directors.

AUTHOR OR EDITOR

Carlos León

The series Borradores de Economía (Working Papers on Economics) contributes to the dissemination and promotion of the work by researchers from the institution. On multiple occasions, these works have been the result of collaborative work with individuals from other national or international institutions. This series is indexed at Research Papers in Economics (RePEc)

Publication Date:

Monday, 02 December 2019

The opinions contained in this document are the sole responsibility of the author and do not commit Banco de la República or its Board of Directors.

Abstract

Anomaly detection methods aim at identifying observations that deviate manifestly from what is expected. Such methods are usually run on low dimensional data, such as time series. However, the increasing importance of high dimensional payments and exposures data for financial oversight requires methods able to detect anomalous networks. To detect an anomalous network, dimensionality reduction allows measuring to what extent its main connective features (i.e. the structure) deviate from those regarded as typical or expected. The key to such measure resides in the ability of dimensionality reduction methods to reconstruct data with an error; this reconstruction error serves as a yardstick for deviation from what is expected. Principal component analysis (PCA) is used as dimensionality reduction method, and a clustering algorithm is used to classify reconstruction errors into normal and anomalous. Based on data from Colombia's large-value payments system and a set of synthetic anomalous networks created by means of intraday payments simulations, results suggest that detecting anomalous payments networks is feasible and promising for financial oversight purposes.