Expanded abstract

Measuring financial vulnerability in social and solidarity economy organizations: the case of chilean universities

Within the social and solidarity economy system (SSE), universities (HEIs) play a fundamental role, both in providing non-profit higher education services and as centers for the generation and transfer of knowledge related to the paradigms of the SSE.

The economic and financial stability of HEIs has become a central issue in Chilean society over the past two decades, considering those entities that have closed their operations after facing financial difficulties. Likewise, the closure of certain HEIs has resulted in the relocation of students among various institutions, in order to ensure the continuity of students in their respective study programs.

Considering the social implications of the financial deterioration of a university institution, the purpose of this study has focused on applying a statistical model to a set of financial indicators of Chilean HEIs, with the aim of constructing a unique metric that allows quantifying the levels of financial vulnerability (FV) for these entities.

The objectives of this study include: (1) presenting the current panorama of the FV of Chilean HEIs and its evolution over time, and (2) contributing to university administrators as well as the regulatory bodies of the Chilean tertiary education system, who could consider the methodology of this work as an early warning system through which situations of FV in HEIs could be explained and predicted.

The methodology of the study is quantitative with a descriptive approach, and the methodological approach is based on the collection of secondary data published by HEIs and public regulatory entities of the Chilean higher education system. Descriptive and inferential statistical techniques were applied to the collected data. Specifically, a database was constructed from the financial information published by the Higher Education Information System (SIES) under the Ministry of Education of Chile (MINEDUC), as well as from the financial information published by the Superintendency of Higher Education (SES) of the same country. With the data, it was possible to form a strongly balanced panel, with annual financial information from 53 HEIs, for the period between 2014 and 2021.

To measure the levels of FV in HEIs, the Trussel model (2002) is applied, which proposes a “Logit” regression model where the dependent variable represents the probability of an entity facing a situation of financial vulnerability (PFV). PFV allows distinguishing between financially vulnerable entities (FV) and those that would not be financially vulnerable (NFV). PFV is explained by four financial ratios: (1) operational margin, (2) revenue concentration, (3) entity size, and (4) indebtedness.

Regarding the variables mentioned in the previous paragraph, descriptive statistics are applied. Then, to verify the hypothesis of equality of medians for the variables throughout the studied period, the Friedman test is implemented. Next, the Wilcoxon signed-rank test is implemented as a post hoc test to measure the year-over-year stability of the financial indicator medians. The aforementioned non-parametric statistical tests are applied, considering that none of the analyzed financial indicators meet the normality assumption.

The study results indicate that in 2014, 42% of the HEIs were classified as FV, while by 2021, the proportion of FV entities decreased to 36%. Additionally, in 2014, of the 22 institutions in FV, 2 cases corresponded to private institutions with state funding, while 20 FV entities were private HEIs without state funding. It is noteworthy that in 2014, no state entity was found to be in FV.

Subsequently, in 2021, 19 HEIs (36%) were classified as FV, of which 2 were private HEIs with state funding, and again, no state HEIs were found to be in FV. In 2021, the number of private entities in FV reached 17 (32%). Thus, the decrease in FV entities could be explained by the improvement in the financial situation of a few private HEIs without state funding.

The results of the Friedman test show that the medians of the financial ratios are not stable between 2014 and 2021. Subsequently, the application of the Wilcoxon signed-rank test, as a post hoc test, made it possible to identify the year-over-year changes in the medians of the analyzed financial ratios.

The post hoc test provides evidence in favor of the stability of the median operational margins between 2014 and 2020. This stability breaks between 2020 and 2021, as in the latter period, it is observed that 64% of the HEIs increased their operational margin, considering a statistically significant difference in medians.

Regarding the revenue concentration indicator, it is evident that between 2014 and 2019, HEIs did not modify their revenue structure, as there is evidence supporting the equality of medians for this indicator. Subsequently, in 2020, 74% of the HEIs increased their revenue concentration ratio compared to 2019. Finally, in 2021 versus 2020, 64% of the entities continued to increase their revenue concentration.

Regarding the indebtedness indicators, between 2014 and 2015, 64% of the HEIs increased the ratio of liabilities to total assets. Subsequently, between 2015 and 2016, the median debt ratio remained stable, then between 2016 and 2017, 60% of the institutions reduced their indebtedness. Following this, between 2017 and 2018, debt levels remained stable again, only to see a significant increase in leverage for 62% of the HEIs from 2018 to 2019. Finally, from 2019 onwards, the indebtedness of HEIs remained stable.

In terms of the size of the HEIs, measured by the natural logarithm of total assets, the hypothesis of equality of medians is rejected for all year-over-year samples. This means that annually, HEIs significantly increase the amount of assets they manage.

Finally, statistically significant evidence is obtained in favor of the hypothesis of equality of medians for PVF, which implies that the FV of HEIs remains stable over time. The exception to this is observed in 2017, as 62% of the institutions significantly reduced their PVF compared to the previous year.

Among the practical implications of the study is shedding light on the quantitative methods applicable for measuring FV in HEIs. This is with the thought of the utility that the variables and the model employed offer, both for university administrators and for regulatory entities responsible for overseeing the financial affairs of HEIs. Furthermore, it aims to contribute to the discussion related to the degree of association between the financial sustainability of Chilean HEIs and the reforms introduced to the country's higher education system. Specifically, these reforms include the implementation of the free access system to higher education starting in 2016, as well as the enactment of laws that modify the regulatory framework of HEIs starting in 2018. It is also interesting to observe the improvement of indicators and the reduction of FV during the years of teleworking due to the Covid-19 pandemic.

The limitations of this study would be: (1) the application of the Trussel model (2002), which was developed in the context of U.S. NPOs, despite subsequent studies up to 2023 confirming its validity and application worldwide, and (2) the application of the model is limited to measuring the FV of Chilean HEIs and its evolution for descriptive purposes, and therefore it is not the implementation of a model originally generated from the historical financial indicators of the country's HEIs.

Finally, regarding the practical conclusions, it is possible to affirm the utility of both the development and application of bankruptcy or financial vulnerability models for non-profit entities, considering the public interest generated by the operational continuity of this type of organization, especially those in the educational field. Additionally, this research is considered highly original, as although FV in NPOs has been widely studied since the 1990s, such studies are rather incipient in Chile and Latin America.