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Nonprofit Financial Vulnerability: Testing Competing Models, Recommended Improvements, and Implications

Ettie Tevel · Hagai Katz · David M. Brock

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Abstract We examine the predictive validity of existing models used by researchers and by professional rating agencies of nonprofit organizations to assess financial vulnerability, on a sample of performing arts organizations. The models tested include Ohlson’s (J Account Res 18(1):31–109, 1980) “business” model, Tuckman and Chang’s “nonprofit” model (Nonprofit Volunt Sect Q 20:445–460, 1991), and a “practitioner” model based on the guidelines of two nonprofit ranking and rating agencies (Coppes and Vernon, The little blue book, NPC’s guide to analyzing charities, for charities and funders. New Philanthropy Capital, London, 2010; Midot, Midot guide for effectiveness. Midot—Analyzing and Rating NPOs. Tel Aviv, 2013). Since there is considerable criticism over the effectiveness of existing models in predicting financial distress, we propose that a new model is needed which can improve our ability to predict financial vulnerability. The findings reveal that the Tuckman and Chang model provides the best prediction of financial vulnerability; and a reduced version offers an even better prediction. Implications for financial management and particularly for revenue diversification, increased overhead costs (particularly management costs), and surplus accumulation are discussed.

Résumé Nous examinons la validité prédictive des modèles existants utilisés par les chercheurs et par les agences de notation professionnelles des organisations à but non lucratif pour évaluer la vulnérabilité financière sur un échantillon d’organisations des arts du spectacle. Les modèles testés sont le modèle des entreprises

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d'Ohlson (1980), le modèle des organisations à but non lucratif de Tuckman et de Chang (1991), et le modèle des professionnels basés sur les lignes directrices de deux agences de notation d'organisations à but non lucratif (Copps and Vernon 2010; Midot 2013). Étant donné que l'efficacité des modèles existants pour prédire les difficultés financières suscite de vives critiques, nous proposons la nécessité d'un nouveau modèle permettant d'améliorer notre capacité à prévoir la vulnérabilité financière. Les résultats révèlent que le modèle de Tuckman et de Chang fournit la meilleure prévision de la vulnérabilité financière et qu'une version réduite offre une meilleure prévision. Les conséquences pour la gestion financière et en particulier pour la diversification des revenus, l'augmentation des frais généraux (en particulier les coûts de gestion) et l'accumulation des excédents sont étudiées.

Zusammenfassung Wir untersuchen an einer Reihe von Organisationen im Bereich der darstellenden Kunst die prädiktive Aussagekraft bestehender Modelle, die von Forschern und professionellen Ratingagenturen gemeinnütziger Organisationen angewandt werden, um die finanzielle Anfälligkeit zu bewerten. Die getesteten Modelle schließen das „Geschäftsmodell“ von Ohlson (1980), das „Nonprofit-Modell“ von Tuckman und Chang (1991) und ein „Praktikermodell“ ein, das auf den Richtlinien zweier gemeinnütziger Ranking- und Ratingagenturen (Copps & Vernon 2010; Midot 2013) beruht. Da viel Kritik an der Effektivität der bestehenden Modelle dahingehend geübt wird, inwieweit sie eine Prognose zu finanziellen Schwierigkeiten erstellen können, fordern wir ein neues Modell, das uns erlaubt, die finanzielle Anfälligkeit vorauszusagen. Die Ergebnisse zeigen, dass das Modell von Tuckman und Chang die beste Prognoseerstellung für eine finanzielle Anfälligkeit erlaubt, wobei eine gekürzte Version eine noch bessere Prognose ermöglicht. Es werden die Implikationen für das Finanzmanagement und insbesondere für die Einnahmendifferenzierung, erhöhten Gemeinkosten (vor allem Managementkosten) und Überschussansammlung diskutiert.

Resumen Examinamos la validez predictiva de los modelos existentes utilizados por investigadores y por agencias profesionales de calificación de organizaciones sin ánimo de lucro para evaluar la vulnerabilidad financiera, en una muestra de organizaciones de artes escénicas. Los modelos probados incluyen el modelo de “negocio” de Ohlson (1980), el modelo de “organizaciones sin ánimo de lucro” de Tuckman y Chang y un modelo de “profesional” basado en las directrices de dos agencias de calificación y clasificación de organizaciones sin ánimo de lucro (Copps & Vernon 2010; Midot 2013). Dado que existe una considerable crítica sobre la efectividad de los modelos existentes para predecir las dificultades financieras, proponemos que se necesita un nuevo modelo que pueda mejorar nuestra capacidad para predecir la vulnerabilidad financiera. Los hallazgos revelan que el modelo de Tuckman y Chang proporciona la mejor predicción de vulnerabilidad financiera; y una versión reducida ofrece una predicción incluso mejor. Se analizan también las implicaciones para la gestión financiera y en particular para la diversificación de los ingresos, el aumento de los costes generales (en particular, los costes de gestión) y la acumulación de excedentes.

Keywords Financial vulnerability · Nonprofit · Revenue diversification · Overhead · Asset surplus

Financial vulnerability is an organization's susceptibility to financial problems. Whether or not a nonprofit organization is susceptible to financial problems is a concern of all stakeholders of the organization, because financial problems might not allow an organization to continue to meet its objectives and provide services. However, financial vulnerability of nonprofit organizations is a relatively new area of study (Greenlee and Trussel 2000; Hager 2001; Keating et al. 2005; Trussel 2002). The limitations of existing financial vulnerability models require development of new ones that combine aspects from both the literature on for-profit organizations and the literature on nonprofit organizations. In this paper, we examine the predictive validity of existing models used in the research literature and by professional ranking and rating agencies of nonprofit organizations to assess nonprofit financial vulnerability and discover the factors that affect financial vulnerability.

We tested three financial vulnerability models: two that have been prominent in the scholarly literature on nonprofit organizations and one that is based on common practices by nonprofit management experts. The first, Ohlson's (1980) model, was developed in the business sector. According to Keating, Fischer, Gordon, and Greenlee (2005), there are two prominent models for corporate financial stability in the business sector, Altman's model (1968) and Ohlson's (1980) model. However, they found that in the nonprofit context Ohlson's model has higher explanatory power than Altman's model. The second, Tuckman and Chang model (1991), is the most common model used in the nonprofit management literature (Greenlee and Trussel 2000; Hager 2001; Steinberg 1997; it is even used in business settings, e.g., Kim 2011). To these, we added a Practitioners' model based on the guidelines of two nonprofit ranking and rating agencies (Copps and Vernon 2010; Midot 2013). Since there is considerable criticism of the effectiveness of the existing models in predicting financial distress (Keating et al. 2005), this research proposes that a new model is needed that can improve on the above models.

The practical contribution is to provide policy makers and managers with an analysis of Financial Vulnerability and with managerial recommendations. Foundations, local and state agencies, and individual donors make decisions regarding what organizations to fund and what organizations to fund again, depending on their perception of the strength of the organization applying for funds. A greater understanding of the factors associated with financial vulnerability and the possibility for organizational failure may guide donors in their giving decisions. An understanding of financial vulnerability is also useful for nonprofit managers who seek to run better organizations. The more managers know about how accounting decisions affect their organization, the more they can do to adopt strategic approaches to keep their organizations afloat (Hager 2001).

Financial Vulnerability and Nonprofits

Financial distress is a common condition for many nonprofit organizations. Some organizations close as a result of financial distress, but some organizations recover. The difference between those that close and those that recover can usually be found in the unique differences of management and financial arrangement. Tuckman and Chang (1991) note that research on financial vulnerability is deficient due to a general lack of knowledge about nonprofit failure and its causes; and they identified four accounting ratios to indicate financial vulnerability: insufficient net assets (equity balance), few revenue sources, low administrative costs, and low income from operating margin. They made no attempt to see if these variables could predict *future* financial distress of these organizations.

Since then, several scholars have turned their attention to the question of nonprofit survival. Greenlee and Trussel (2000) were the first to use and expand Tuckman and Chang ratios to develop a model to predict financial distress in the nonprofit sector. Their models, also in their next article (Trussel and Greenlee 2004), are based on comparing an organization's financial profile to those organizations that are considered financially vulnerable. They found a significant relationship between financial distress and three of Tuckman and Chang variables.

Trussel (2002) used a broader dataset to predict financial vulnerability. The data included also smaller organizations but had fewer data fields. Two of the Tuckman and Chang variables could not be computed since the necessary information was not coded (equity ratio and administrative cost ratio). Trussel replaced the equity ratio with a debt ratio (total liabilities divided by net assets) and added two new indicators used to develop the financial profiles, size, and sector. Following Tinkelman (1999), size is measured as the natural log of net assets. Due to the expanded data set, nonprofit sub-sector control variables were more detailed than possible in previous studies. All the variables were statistically significant, and the predictive ability exceeded that of a simple model.

Trussel and Greenlee (2004) expanded their study in five ways. First, they included size in the model, since smaller organizations may be more vulnerable to financial distress than larger ones. Second, they controlled for nonprofit sub-sector, since different types of nonprofits may be impacted differently by changes in the economy. Third, they defined "financial distress" as a "significant" decrease in net assets over a 3-year period. Fourth, they tested the resulting models for robustness by applying them to different time periods. Finally, they developed a way to rate the financial vulnerability of nonprofits. Their composite model was robust and was, with some accuracy, able to predict financial distress. Significant relationships were found between financial distress and two Tuckman and Chang measures and between financial distress and organizational size.

Keating et al. (2005) later proposed a more comprehensive model of financial vulnerability by adding two new variables to represent reliance on commercial-type activities to generate revenues and endowment sufficiency. They found that this model performs substantially better in explaining and predicting financial vulnerability. Hence, the expanded model can be used as a guide for understanding the

drivers of financial vulnerability and for identifying more effective proxies for nonprofit sector financial distress.

Determining exactly when an organization becomes financially troubled is problematic because a decline in actual and reported financial conditions likely occurs over time. Gilbert et al. (1990) defined a financially vulnerable proprietary organization as one that had cumulative net losses over a 3-year period. Similarly, financial problems in a nonprofit organization are assumed to cause a reduction in net assets over time, which would manifest itself through a reduction in revenues or an increase in expenses. Tuckman and Chang (1991) defined an organization in financial distress as being “likely to cut back its service offerings immediately when it experiences a financial shock” (p. 445). Trussel and Greenlee (2004) define an organization as financially vulnerable if it had an overall reduction in its fund balance during a consecutive 3-year period. Trussel (2002) uses a similar definition, except that an organization must have had more than a 20 % decrease in its fund balance over 3 years to be classified as financially vulnerable. Using a significant decline in the fund balance over 3 years provides more assurance that those classified as financially vulnerable were indeed having financial difficulties.

In this study, we used a sample of performing arts organizations. Bowen et al. (1994) estimate the rate of closure among public charities from 1984 to 1992 by counting the number of entities moved from the active to the inactive part of the IRS Business Master File. They estimate the average annual failure rate for all nonprofit organizations over this time period at 2.3 %. In contrast, they observed unusually high failure rates for arts organizations, particularly for performing arts organizations, with failure rates of ballet at 25.1 %, opera at 22.7 %, dance at 22.3 %, and theater at 20.3 %. The only organizations failing at a higher rate than performing arts organizations were job training organizations, which failed at a rate of 26.5 % per year.

In other work, Hager (2000) has noted differences between the failure of nonprofit arts organizations and other nonprofits. Arts organizations in a study of Minnesota nonprofits were less likely to survive the study period than other types of nonprofits, when taking into account the age and size of the organizations. Although only seven of 37 arts organizations in that study exited the sample, these tended to be older or larger organizations than those nonprofits closing in other industries. High failure rates, coupled with the idea that arts organizations experience the liabilities of newness and small size in different ways than other nonprofits, further justify focus on nonprofit arts organizations. Hager (2001) examined the ability of the Tuckman and Chang ratios to predict the actual demise of arts organizations. He found that predictive ability varied within the sector: The Tuckman and Chang measures could be used to predict the closure of some, but not all, arts organizations.

The Models

Tuckman and Chang (1991) were the first to discuss why the vulnerability of the nonprofit sector is of interest to researchers and many studies since relied on their

measures. They explored the destabilizing role of third-party finance, considered the reasons for the lack of research on vulnerability, and presented a conceptual framework for identifying financially vulnerable nonprofits. Their model relies on four parameters:

- (1) NA/TR (-): net assets divided by total revenues, where insufficient assets cause concern over financial vulnerability;
- (2) RCI (+): revenue concentration index, ranges from $1/n$ (n = number of different funding sources) to one and rises when funding is provided by fewer revenue sources, which indicates increased financial vulnerability;
- (3) NI/TR (-): net income divided by total revenues, low net income points to limited cash flow resulting in financial vulnerability; and
- (4) AE/TR (-): administrative expenses divided by total revenues, where organizations with low administrative costs tend to be more financially vulnerable (Tuckman and Chang 1991).

Ohlson (1980) developed his influential model using financial ratios for the probabilistic prediction of bankruptcy among industrial firms. His model estimates the financial vulnerability using six parameters:

- (1) TL/NA (+): total liabilities divided by net assets, the more liabilities, the more financial vulnerability;
- (2) CL/CA (+): current liabilities divided by current assets, same like Total Liabilities but in the present;
- (3) NI/NA (-): net income divided by net assets, more income reduces the likelihood of financial vulnerability;
- (4) FFO/TL (-): pre-tax income plus depreciation and amortization divided by total liabilities; the more the income than liabilities, the less the financial vulnerability;
- (5) INTWO (+): one if Net Income was negative for the last year, zero otherwise; and
- (6) CHIN (-): the scaled change in net income from last year (calculated as $[NI_t - NI_{t-1}]/[|NI_t| + |NI_{t-1}|]$, where NI_t is the current year's net income and NI_{t-1} is the last year's net income).

Olson concluded his seminal article by stating that more predictors may be needed to improve the predictive capacity of bankruptcy beyond that of his model, but his model was used since then in thousands of studies, with or without variations, including in the context of nonprofit organizations (Keating et al. 2005; Greenlee and Tuckman 2007; among others).

Practitioners involved in the assessment and ranking of nonprofit organizations recommend a different set of financial ratios and indicators. The UK New Philanthropy Capital and the Israeli Midot are both nonprofit organizations that aspire to promote effectiveness and impact as the main criterion for social investors and for NPO leaders by rating NPOs (Copps and Vernon 2010; Lumley et al. 2005; Midot 2013). They engage in the assessment of the organizational and financial effectiveness of other nonprofits. The financial management facet of their assessment systems offers a model consisting of five ratios:

- (1) SP (–) Staying Power, measured as the number of months sustainable without new income;
- (2) CCF (–) Current Cash Flow (Current Cash Income divided by Total Revenues), examines the ability of the organization to produce cash flow from its usual activity;
- (3) ICR (–) Interest Coverage Ratio (Pre-Tax Income divided by Finance Costs), the meaning of which is how high is the profit before finance expenses, where the higher the ability to withstand financial expenses is better. In case there is no financial cost but financial income, the calculation is meaningless and the ratio is set to 0.
- (4) AD/TR (–) Assets Deficit divided by Total Revenue, where the greater the deficit is the more financially vulnerable an organization is; and
- (5) MW/TR (+) Management Wages divided by Total Revenue, assessing an organization as more financially vulnerable as the weight of the executive salaries takes up more of its expenses.

This models are based on practical knowledge and reflect but also influence the practices of organizations and accountants, who gradually are expected by donors and other stakeholders as ranking and rating agencies' systems become an industry standard.

Method

The research population includes all the Israeli organizations classified as Performing Arts Organizations. As we mentioned above, these organizations are known to be especially prone to failure compared to other nonprofits (Bowen et al. 1994). Different performing arts share similar revenues such as government support at both municipal and central levels, as well as cash income from sales of tickets. They are also similar on the expense side due to costs of maintaining a venue for performances and equipment (musical instruments, sound systems, etc.).

To generate a sample, we performed a keyword search for performing arts organizations in the fields of dance, music, and theater in the GuideStar Israel database (www.guidestar.co.il), which lists all current registered nonprofit organizations and makes information on them and their financial reports publicly available. The results reclassified, sorting the organizations according to their goals and objectives, ending with a sampling frame of 200 organizations.

To be included in the sample, each organization had to have available financial reports for three years, from 2009 to 2011. In addition, they had to meet at least one of the following three conditions: (1) government funding of at least 10 %; (2) total revenue of at least \$280 thousand (or approximately one million NIS), both to ensure that we get relatively stable organizations; and (3) be at least 6 years old, following Katz et al. (2006) who calculated this to be the 'half-life' span of Israeli nonprofit organizations. In all, 41 organizations met the criteria. The resulting sample was heterogeneous across type, age, size, and government support.

The Organizations consisted of three **types**: Music, Theater, and Dance, 37, 34, and 29 % of the sample, respectively. Seven percent were young organizations, under the **age** of 7 years. 25 % were aged 21 and under, another 25 % were between the ages of 21 and 24, an additional 25 % were between the ages of 24 and 43, and further 25 % were aged 43 and over. Mean organizational **size** in Net Assets was \$1.2 million (sd = \$2.3 million), and mean Total Revenue was \$3.2 million (sd = \$5.06 million). The smallest organization had assets worth \$12,853 and total revenues worth \$43,551. The biggest organization had \$12,893,575 in assets and \$23,767,598 of total revenue. Mean **government support** was 38 % of total revenue (sd = 15 %), ranging between 13 and 75 %. See Table 1 for basic data on the analyzed organizations by type.

Audited financial reports were collected from 'GuideStar Israel' website. The 2009, 2010, and 2011 annual reports were taken for each of the 41 organizations. Hence, the dataset included 123 financial reports of 41 Performing Arts Organizations over three years (2009–2011). The information received from the annual financial reports included balance report (assets and liabilities), activities cycle (revenues and expenses), and cash flow reports. From the financial reports, data were collected according to the indicators in Tuckman and Chang's (1991) and in Ohlson's (1980) models, as well as those used by the rating agencies as discussed above (the full list of variables collected directly from the reports and the variables calculated from the former is available in Tevel (2014), or on request from the authors). The data were digitized from PDF files to one Excel file and subsequently into an SPSS file.

Analysis

Data analysis consisted of a series of multiple logistic linear regressions, predicting 2011 financial vulnerability by 2009 financial vulnerability using each of the three models listed above. This mode of internal validation was selected for two reasons: (1) the small number of years for which detailed financial reports are available on GuideStar Israel and (2) data on closure of nonprofits in the GuideStar or even in the Nonprofit Registrar databases in Israel are extremely unreliable. As a result, using an external criterion for the validation of the indices was not possible. Ironson et al. (1989) used a similar method by administering two job satisfaction indices to a sample before and after an organizational intervention, as part of assessing the convergent and discriminant validity of their Job in General (JIG) scale. A regression analysis between the two measurements was used as evidence in support of the construct validity of the new measure (Hinkin 1995).

For this purpose, six indices were calculated, each index for one model and one year. The indices were calculated as simple averages from standardized scores (z-score) of the variables that make up the models. Thus, each of the regressions contained a predictor index using 2009 data: a Tuckman and Chang model index (tc2009), an Ohlson model index (oh2009), and a Practitioners' model index (pr2009); and a predictor index using 2011 data: a Tuckman and Chang model index (tc2011), an Ohlson model index (oh2011), and a Practitioners' model index

Table 1 Descriptive data

	Age	Total revenue ILS, 2011	Net assets ILS, 2011
Music			
Minimum	6	155,913	46,012
Maximum	78	85,088,000	46,159,000
Mean	31	11,243,336	4,786,281
Theater			
Minimum	7	837,471	207,814
Maximum	101	63,749,000	25,831,000
Mean	32	17,035,618	6,005,144
Dance			
Minimum	18	295,550	64,664
Maximum	64	17,308,963	6,191,151
Mean	24	5,193,811	1,790,575

(pr2011). The regressions were run to predict 2011 financial vulnerability by 2009 financial vulnerability, controlling for organizational size (both in assets and in revenues), organizational age, and governmental funding (both in cash values and as share of total funding). Since the size and government funding variables were skewed, they were corrected by natural log before entering them into the regression model.

Results

The results of the three regressions are shown in Table 2. We performed the regressions with and without bootstrapping, and since the results were consistent, we are showing the results without bootstrapping. The regression models were tested and found clean of multiple collinearity.

The Tuckman and Chang Model was found significant ($F_{(6,34)} = 5.205, p < .01$), explaining 47.9 % of the variance in the predicted variable. The strongest predictors are the organization's total revenue (LN_TR2011) which has a positive effect on the predicted variable and the organization's cash income from government (LN_RG2011) which affects the predicted variable negatively. The organization's net assets also have a negative effect on financial vulnerability, although not as strong. The other control variables (age and relative government funding) were not significant. The predictor variable, i.e., the Tuckman and Chang index for the 2009 financial year (tc2009) is a significant predictor of the 2011 index, at Beta level 0.381.

The Ohlson model was not found significant ($R^2 = .151, F_{(6,34)} = 1.006, p = .438$). The Practitioners' model was found significant ($F_{(6,34)} = 4.751, p < .01$), explaining 45.6 % of the variance in the predicted variable. Yet, the only significant predictor in this model is the organization's net assets

Table 2 Predicting 2011 financial vulnerability by 2009 financial vulnerability

	<i>B</i>	Std. error (<i>B</i>)	β
a. The Tuckman and Chang model			
(Constant)	-3.814	2.029	
Tuckman and Chang model index, 2009 (tc2009)	.456	.155	.381**
Revenue from government by total revenue	4.541	2.291	1.087
Net Assets 2011, logged (LN_NA2011)	-.385	.149	-1.029*
Total Revenue 2011, logged (LN_TR2011)	2.227	.777	5.096**
Revenue from Government, logged (LN_RG2011)	-1.879	.757	-4.347*
Age of organization	.006	.005	.184
b. The Practitioners' model			
(Constant)	.327	1.972	
Practitioners' model index, 2009 (pr2009)	.269	.141	.259
Revenue from government by total revenue	-3.076	2.243	-.775
Net assets 2011, logged (LN_NA2011)	-.570	.145	-1.601**
Total revenue 2011, logged (LN_TR2011)	-.259	.763	-.624
Revenue from government, logged (LN_RG2011)	.879	.749	2.141
Age of organization	.009	.005	.308

Notes *Panel a*: Dependent variable: Tuckman and Chang model index, 2009 (tc2009)

$R^2 = 0.479$, $F_{(6,34)} = 5.205$, $p < .001$, * $p < .05$, ** $p < .01$

Notes *Panel b*—Dependent variable: Practitioners' model index, 2009 (pr2009)

$R^2 = 0.456$, $F_{(6,34)} = 4.751$, $p < .001$, ** $p < .01$

(LN_NA2011) which has a negative effect on financial vulnerability. The other control variables (age, relative government funding, cash income from government, and total revenue) were not significant. More importantly, the predictor variable, i.e., the Practitioners index for the 2009 financial year (pr2009) is not a significant predictor of the 2011 index.

Optimizing the Tuckman and Chang Model

Since the results revealed that Tuckman and Chang model can be used to predict financial vulnerability, an attempt was made to increase the variance that it explains. We made two attempts: (1) to add variables from the other models (a maximalist's model), for which we incorporated all the measures of the other models in a multiple linear regression model and (2) to generate a more parsimonious Tuckman and Chang model, by way of running a Stepwise regression using only the variables originally included in the model.

The two regressions were ran to predict the 2011 Tuckman and Chang financial vulnerability index by 2009 financial ratios and variables, controlling for organizational size (only in assets because of collinearity with revenues), organizational age, and governmental funding (only as share of total funding because of collinearity with cash values of total funding). The maximalist's model

Table 3 The parsimonious Tuckman and Chang model

	Step 1			Step 2		
	<i>B</i>	Std. error (<i>B</i>)	β	<i>B</i>	Std. error (<i>B</i>)	β
(Constant)	-.001	.081		-.004	.075	
Administrative expenses divided by Total Revenue 2009	-.432	.084	-.671**	-.417	.078	-.647**
Revenue concentration index 2009				.179	.071	.307*
R^2	.451			.545		
	$F_{(1,32)} = 26.276^{**}$			$F_{(2,31)} = 18.548^{**}$		
R^2 change				.094*		

Notes Dependent variable Tuckman and Chang model index, 2011 (tc2011)

* $p < .05$, ** $p < .01$

suffered from serious problems of multiple collinearity and was thus not pursued further. The results of the “parsimonious” model are displayed in Table 3.

The attempt to develop a parsimonious model by entering Tuckman and Chang measures in a stepwise fashion into the regression resulted in a model with only two predictors. The model was found significant ($F_{(2,31)} = 18.548$, $p < .01$), explaining 54.5 % of the variance, which is considerably better than the original four-variable model which explained 47.9 % of the variance. The strongest predictor is the organization’s Administrative Expenses (AEbyTR2009) which has a negative effect on the predicted variable, i.e., organizations with higher management wages are less financially vulnerable. The organization’s Revenue Concentration Index (ZRCI2009) has a positive effect, although not as strong. This means that organizations with a highly diversified revenue portfolio are less financially vulnerable.

Discussion

The findings revealed that it is the ‘good old’ Tuckman and Chang model that provides the best prediction of financial vulnerability. Ohlson’s model came out insignificant, and it probably is not suitable for the analysis of nonprofit organizations. A comparison of the model used by practitioners with the models used by scholars of nonprofit finance has shown that the Practitioners’ models do not fit and in fact include financial ratios and variables that are not valid predictors of financial vulnerability over a three-year period.

One of the criticisms of previous studies is that Tuckman and Chang model cannot predict financial vulnerability (Hager 2001; Keating et al. 2005); rather, it can only be used as a measure. And indeed, it has been the measure of financial stability preferred in the nonprofit financial management literature (Gilbert et al. 1990; Trussel 2002; Trussel and Greenlee 2004). Tuckman and Chang identified four

accounting ratios that could be used to indicate financial vulnerability, but they made no attempt to see if these variables could actually be used to predict the *future* financial distress of these organizations. Notwithstanding, our study shows that this model can indeed predict financial vulnerability significantly over a three-year period, at least when nonprofit performing arts organizations in Israel are examined. Thus, our study increases the predictive validity of the Tuckman and Chang model.

Gilbert et al. (1990) defined a financially vulnerable proprietary organization as one that had cumulative net losses over a three-year period. Similarly, financial problems in a nonprofit organization are assumed to cause a reduction in net assets over time, which would manifest itself through a reduction in revenues or an increase in expenses. Trussel and Greenlee (2004) defined “financial distress” as a “significant” decrease in net assets over a three-year period. We treated organizational size by assets as a control variable of the organization. This is in line with Tinkelman (1999) who measured size as the natural log of total assets, due to finding multicollinearity between assets and revenues in our data. Organizational size by Net Assets appeared as a significant control variable in all the models that we tested, and it was consistently inversely correlated with financial vulnerability. That is, the more assets an organization has, the less its financial vulnerability is. Thus, net assets are an important intervening variable that must not be ignored when analyzing financial stability.

Our analysis showed that the Tuckman and Chang model explains more variance than other models based on the knowledge from a different sector or from practice, and it is the only one who is a significant predictor of financial vulnerability. It is likely that this model is still relevant today because it is anchored in empirical research of NPOs. We also found that the Tuckman and Chang model could be improved when left with just two of its four measures: revenue diversification and management costs. This is supported by Trussel and Greenlee (2004) who also found significant relationships between financial distress and two of Tuckman and Chang measures.

Implications for Nonprofit Management

Our findings support the validity of Tuckman and Chang model for the prediction of financial vulnerability. Agencies involved in rating and assessing nonprofit organizations, as well as donors, cannot rely only on what is popular in the field but have to rely more on empirically tried and tested methods that consider the quality of the measures. We strongly recommend for practitioners involved in evaluating and rating nonprofit organizations’ finances to rely on models that were empirically tested and adjusted for nonprofit organizations, and in particular the model of Tuckman and Chang, which is the only effective model as far as we can see.

The findings of our analysis support a reduced Tuckman and Chang model with two variables: revenue diversification and management costs. Another variable, consistently found to have an effect on financial vulnerability, was the organizations’ net assets. These three variables are in the heart of three of the major recent controversies in nonprofit management.

Revenue diversification is normally seen as a way to reduce volatility in funding and diminish financial risk. In the search for sustainability and stability, nonprofit researchers have long argued that for maintaining a varied portfolio of funding, organizations are able to avoid excessive dependence on any single revenue source, stabilize their financial positions, and thereby reduce the risk of financial crises or interruptions in funding. A secondary outcome of this would be an improved ability of managers to accurately predict financial margins and consequently engage in more exact strategic planning, as well as expand the length of time covered in a planning cycle. The degree of diversification appears to be a critically important predictor of expected revenue (Mayer et al. 2012). Carroll and Stater (2008) investigated whether revenue diversification leads to greater stability in the revenue structures of nonprofit organizations over time.

However, the findings on this issue are quite inconclusive, and a different view considers revenue diversification a liability due to the increased costs of managing the many different sources and their potentially conflicting rationales. Frumkin and Keating (2011) investigated whether this basic claim about the desirability of revenue diversification is both correct and complete. Against the dominant trend in the literature that focuses on the risks of revenue concentration, they found that nonprofit organizations that have highly concentrated and specialized forms of revenue actually experience some significant benefits, in the form of lower administrative and fundraising expenses. Nevertheless, these savings are associated with greater exposure to swings in an organization's financial position. Mayer and his associates (2012) investigated the relationship between revenue diversification and volatility for nonprofits. They found that the effects of diversification depend on the composition of the organization's resource portfolio and that increasing diversification does not always lower volatility. They argue that revenue stability should be addressed by balancing relatively large shares of earned income and donations while keeping the share from investment income small. Moreover, Chikoto and Neely's study (2013) actually refutes the mythology of revenue diversification. They found that revenue concentration generates a positive growth in financial capacity and in total revenue.

Our findings support the original notion of Revenue diversification, in which it is a sound risk-reducing strategic financial management measure. In the continuing debate over the impact of revenue diversification, it is our finding that organizations are well advised to increase the variability of their funding structure. Notably, we did not explore the composition of the funding portfolio in this study, and it is probably a good idea to pursue this path in a future study.

Management wages can be seen as part of the overhead debate in nonprofit management. Here, two discourses collide. The public and accountability discourses demand low overhead, as part of the prudent management of public funds and interests and to ensure that most of the organization's resources are invested in its goals rather than in itself. An example of this in Israel is the Nitzani Committee, in operation since 1997, which limits the wages of CEOs of nonprofit arts organizations funded by the state (<http://mcs.gov.il/Culture/Pages/DochNizani.aspx>).

There is research evidence that supports this notion and shows that the public responds negatively to high overhead expenses and particularly to excessive management wages. Bowman (2006) provided evidence of an inverse relationship between changes in overhead ratios, the proportion of revenue it spends on administration and fundraising, and changes in charitable giving to an organization.

However, many nonprofit management scholars and experts criticize this view arguing either that it reduces effectiveness or that it is a relatively unimportant factor. Case study results found that organizations with good or excellent infrastructure had diversified funding and unrestricted funding that they could use for overhead, but were still chronically understaffed (Rooney and Frederick 2007). They found also some evidence that these organizations purposefully pursued diversified funding strategies because of the volatility and typically temporary nature of foundation grants. The pressure to reduce overhead costs and management expenses as part as that may prove harmful to the missions of these organizations. Gregory and Howard (2009) argue that most nonprofits do not spend enough money on overhead and the results of this response to popular demands are worrisome: nonfunctioning computers and poorly trained staff, they argue, cannot make for good programs. Despite such findings, there is pressure on nonprofits to save on overhead from funders that expect them to do more with less or mistrusting regulators, pressures which create a cycle that slowly starves nonprofits (Gregory and Howard 2009). Chikoto and Neely's study (2013) too suggests that in order to support financial capacity growth, nonprofits must make positive investments in administrative and fundraising support, though not through high executive salaries. Our findings show that more expenses on overhead costs, particularly on management costs, enhance the organizations' financial stability. It may seem a sound advice, then, to suggest to nonprofit boards to reconsider their organizations' overhead costs.

Lastly, the *assets* issue is another debate between conventional views limiting nonprofits from accumulating assets (surplus), as donors, charity watchdogs, and policymakers voice concern about accumulated wealth in nonprofits. Contrastingly, the research generally supports the notion that accruing surplus increases sustainability. Booth (2012) reveals the paradox of nonprofit savings. On the one hand, prevailing views contend that nonprofit organizations should spend all of their funds on the direct pursuit of their missions. But on the other hand, assets provide a most needed financial buffer helpful in managing the contingencies of pay rises and cost increases. As early as in 1990, Chang and Tuckman already discussed the reason why managers accumulate surpluses (Chang and Tuckman 1990). According to their article, most theories of nonprofit behavior assume that nonprofit managers run surpluses only temporarily and that managers choose a budget level equal to expected revenues. In reality, equity accumulations have intrinsic value to nonprofit managers, and equity balances of nonprofits do grow over time, despite restrictions in tax laws. Using data from a national sample of nonprofits, they showed that a large majority of nonprofits earned surpluses and that the size of a nonprofit's surplus was related to its equity and asset holdings. Calabrese (2009) suggested that NPOs do seek to increase unrestricted net assets over time to hedge against fiscal shocks and that it is rational and consistent with sound business practices to do so.

However, certain subsectors, notably Arts and Higher Education, do not seem to accumulate unrestricted net assets as a response to potential risk; rather, these organizations simply retain more as they increase in size. In a later article (2011), Calabrese demonstrated that while financial reserves aid program continuity during economic downturns, but also that future contributions are negatively affected when reserves appear excessive. Thus, it is probably a wise practice not to exceed with the accumulation of reserves, and certainly not to emphasize such reserves. Nevertheless, our findings do suggest that at least some reserve assets can predict more stable finances.

In sum, along the lines of the argument that strategic management needs to be linked with financial measures in order to increase the chances of survival, the financial measures endorsed by this research provide also a concise set of financial management guidelines and practical strategic recommendations for strengthening nonprofit performing arts organizations—invest in financial management, diversify your organization’s revenue portfolio, and accrue surplus.

Limitations and Future Research

The study is based on a small sample, not a statistical sample, and it does not cover all the organizations as a result of limited availability of data. It should be stressed also that the study was performed on Israeli performing arts organizations, and as such its generalization beyond this particular group of organizations should be examined in future studies. As often happens, larger organizations were oversampled in favor of those that are smaller and younger (and perhaps temporary and short-lived) for several reasons including the fact that the latter often do not submit financial reports. In our opinion including larger samples as well as a comparative sample from different countries, where the availability of data is much better, will give us better indication of the value of financial vulnerability indices. Such studies can also allow examining the issue beyond the context of specific tax and legal systems. However, the most interesting question in our view is the relationships between financial vulnerability and strategic management and planning in nonprofit organizations. For future research, it should be examined how strategic decisions, particularly those found in our study—reserves, overhead, and revenue diversification, affect the financial viability of nonprofit organizations in the performing arts as well as in other industries.

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