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Does a More Diversified Revenue Structure Lead to Greater Financial Capacity and Less Vulnerability in Nonprofit Organizations? A Bibliometric and Meta-Analysis

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Abstract This article explores how and to what extent revenue diversification and concentration strategies affect financial performance, particularly financial capacity and vulnerability, in nonprofit organizations. Using a sample collected from a systematic literature search of all major databases, we first conducted a bibliometric analysis of 86 existing studies to visualize the clusters of major topics in this area and to explore the connections between existing studies. We then employed a meta-analysis to quantitatively synthesize 258 effect sizes from 23 existing empirical studies. We found that diversification had little effect on financial vulnerability, but it had a slightly negative effect on financial capacity. The article finally uses a meta-regression to discuss some of the theoretical and practical reasons why there is inconsistency in the results across existing studies and calls for more discussion of the assumptions and effectiveness of revenue diversification among nonprofit scholars and practitioners.

Introduction

What is the best revenue strategy for a nonprofit organization to enhance its financial stability and achieve better financial performance? Scholars are split into two camps on this issue. Based on modern portfolio theory (Markowitz 1952), resource dependence theory (Pfeffer and Salanick 2003), and institutional theory (Scott 1987), one camp suggests that revenue diversification can achieve a more efficient portfolio (Grasse et al. 2016; Kingma 1993), avoid excessive dependence on any single funding source (Froelich 1999; Hodge and Piccolo 2005), enhance financial stability and capacity (Carroll and Stater 2009; Lam and McDougle 2016), and reduce the risk of financial vulnerability in the face of fiscal shocks (Chang and Tuckman 1996; Greenlee and Trussel 2000; Lin and Wang 2016; Tevel et al. 2015). Therefore, it is desirable for nonprofits to establish and maintain multiple funding streams including government contracts, individual contributions, earned income, and so on. The other camp, however, advocates for revenue concentration by emphasizing the higher transaction costs (Frumkin and Keating 2011; Grønbjerg 1993), the possible crowding-out effect (Brooks 2000), and the added administrative complexity (de Los Mozos et al. 2016). Over the past three decades, scholars from both camps have found empirical evidence to support their arguments. In short, there is no consensus position on this issue.

It is of great importance for both nonprofits and governments to find a solid answer to this question and settle this long-standing debate between these two mutually

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exclusive revenue strategies. On the nonprofit side, revenue strategy is clearly one of the top concerns of nonprofit management. Over the past few decades, nonprofit scholars have discussed such important topics as fundraising efficiency, organizational effectiveness, the crowding-in/out effect of government grants, and the government financing of nonprofit activities. All of these areas are related to revenue strategy to a greater or lesser extent. Indeed, revenue strategy shapes nonprofits' ability to generate enough revenue for organizational survival and growth. Obviously, nonprofits need a clear revenue strategy to direct their fundraising efforts and other aspects of their operations. This issue is equally important on the government side. Under governance models such as third-party government and collaborative governance, the nonprofit sector plays an increasingly critical role in providing various public goods and services such as health and social services (Bryson et al. 2006; Salamon 1995). Over time, governments have become largely dependent on nonprofits to deliver services to serve citizens and implement policies that advance public priorities. In this context, a healthy and viable nonprofit sector, which includes effective revenue strategies, is necessary to help governments achieve better performance and higher public trust (Light 2004). All put together, revenue strategy is a central and pressing issue for both public administration and nonprofit researchers.

This article does not attempt to produce additional empirical results. Instead, it aims to synthesize and assess all extant studies in order to reconcile the observed discrepancies in the literature and to find more reliable estimates of the relationship between revenue diversification and concentration and nonprofit financial performance. Our research contributes to the current literature in several important ways. First, we conducted a systematic literature search in all major databases using complementary strategies to identify as many relevant studies as possible. The resulting sample is unparalleled in the field. Second, we employed a relatively new bibliometric technology, CiteSpace, to systematically categorize existing studies and visualize the connections among these studies. Third, we performed a meta-analysis using effect sizes from a refined sample of the most relevant empirical studies and conducted a conclusive assessment of the impact of revenue diversification and concentration on nonprofit financial performance. Last, we conducted a meta-regression analysis to explore the moderators that would account for the variations of effect size estimates across the studies in our sample.

The remainder of this article is organized as follows: In Sect. 2, we summarize the existing theories and review previous empirical literature on revenue diversification and concentration strategies. In Sect. 3, we explain our bibliometric analysis and discuss the meta-analysis method we

used for this study. We then present the results of our average effect size analysis and moderator analysis in Sect. 4. In the final section, we present our conclusions and discuss the limitations of our findings.

Theoretical Framework

This section first reviews the theoretical foundations of the revenue diversification and concentration strategies, and then summarizes the empirical findings from the studies testing these theories.

Major Theories Concerning Revenue Diversification and Revenue Concentration

Originally developed by Markowitz (1952), modern portfolio theory (MPT) describes how a risk-averse investor can select an optimal investment portfolio to maximize expected returns and minimize volatility. Diversification, through the law of large numbers, can keep actual returns close to the amount of anticipated returns, and therefore reduce overall portfolio volatility for a given expected return (Markowitz 1952). Although the nonprofit sector is unique in its fundraising methods (Jegers and Verschueren 2006; Steinberg 1990), the concept of revenue diversification is "nonetheless applicable as a prudent revenue generation strategy to potentially minimize the volatility of revenue portfolios managed by nonprofits" (Carroll and Stater 2009, p. 949). The underlying rationale for the revenue diversification strategy is that, as Tuckman and Chang (1991, p. 452) argued, "a nonprofit is more vulnerable to revenue downturns if its revenue sources are limited than if they are diverse…because a shock is more likely to affect one revenue source than it is to affect all sources at once." As such, the principles set forth by MPT have been widely applied by nonprofits as part of their resource acquisition strategies (Grasse et al. 2016; Kingma 1993). Many scholars have suggested that nonprofits should have a more diversified revenue base that includes government funding, private donations, fees, and other sources in order to minimize potential instability of funding streams and to achieve superior performing revenue portfolios (e.g., Chang and Tuckman 1996; Froelich 1999; Greenlee and Trussel 2000; Trussel 2002; Tevel et al. 2015).

Resource dependence theory provides another perspective for understanding the revenue portfolio development of nonprofits. According to Pfeffer and Salanick (2003), the survival of an organization depends on its ability to acquire and maintain resources, but resources are almost always inadequate, unstable, or uncertain. Consequently, organizations are constrained by the funding environment

because of their resource needs and interdependence between themselves and others. The degree of resource dependence is determined by the importance and concentration of the resources provided by funders. Organizations relying on only a few sources for vital inputs will become more dependent on resource suppliers for survival compared to those relying on more sources. Resource suppliers, however, often exert a significant impact on nonprofit operations in areas such as service delivery and resource use. Therefore, reliance on one particular stream of revenue, whether donations, grants, or earned income, will greatly affect organizational autonomy and financial stability. As a result, nonprofits tend to have an incentive to diversify their revenue sources in order to maintain organizational autonomy by reducing dependence on their primary funding sources (Froelich 1999; Hodge and Piccolo 2005).

The third theoretical perspective is institutional theory. Unlike resource dependence theory, it is not mainly based on market-driven rational or instrumental considerations. Instead, institutional theory emphasizes the non-market-driven social and normative demands that environments impose on organizations (Scott 1987). From this perspective, organizational structures are seen as shaped by such factors as the imitation of successful organizations and the normative transmission of social prescriptions (DiMaggio and Powell 1983) as well as the need for organizational legitimacy (Meyer and Scott 1992). To imitate other successful organizations in response to uncertainty or to maintain their legitimacy, organizations will fulfill or match the expectations of the environment and engage in more activities designed to enhance their identification and alignment with legitimated aspects of their environment. According to this institutional logic, nonprofits whose funding sources are more heterogeneous are in a better position to build institutional linkages to the community and bolster their reputations and desirability as fund recipients; therefore, they are more likely to stabilize their resource flows and achieve better organizational sustainability (Bielefeld 1992; Kerlin and Pollak 2011).

On the other end of the spectrum is the transaction costs line of reasoning. Some scholars argue that revenue diversification will substantially increase transaction costs in nonprofit operations, which undermines the benefits of revenue diversification as an effective financial management tool. First, incorporating and maintaining multiple funding relationships will necessarily incur significantly greater costs, such as increased administrative monitoring, communication, and reporting costs (Frumkin and Keating 2011; Grønbjerg 1993). Second, the added complexity of managing multiple revenue streams and the uncertainty of some revenue sources might reduce financial predictability (de Los Mozos et al. 2016; Kingma 1993). All these extra costs associated with diversification could prevent nonprofits from efficiently managing any of their funding relationships. Third, diversification in the nonprofit sector often involves generating revenue from unique funding sources. The reliance of some funding sources (e.g., commercial income) may undermine some nonprofits' legitimacy and ability to carry out their missions (Tuckman and Chang 1992; Weisbrod 1998). Meanwhile, a mixture of different revenue sources may lead to a crowding-out effect between revenue sources and further undermine revenue growth (Brooks 2000; Lu 2016). For these reasons, nonprofits can probably economize on the transaction costs and increase organizational efficiency by concentrating revenue on a few sources (Chikoto and Neely 2014; Foster and Fine 2007; Frumkin and Keating 2011).

Empirical Evidence

Employing the four main theories explained above, previous empirical studies have produced mixed results, providing evidence for either a positive or a negative association between revenue diversification and nonprofit financial performance.

Many early studies found that a higher level of revenue diversification, no matter how measured, was positively associated with various indicators of better financial performance (e.g., Chang and Tuckman 1994; Trussel 2002; Greenlee and Trussel 2000; Keating et al. 2005; Carroll and Stater 2009; Tuckman and Chang 1991). For instance, Tuckman and Chang (1991) and Chang and Tuckman (1994) showed that revenue diversification was positively correlated with higher operating margins and larger net assets. By examining a sample of US arts organizations, Hager (2001) found that revenue diversification decreases the likelihood of organizational closure in the face of financial shocks. Similarly, Carroll and Stater (2009) demonstrated that revenue diversification can reduce revenue volatility and lead to better financial stability. In the non-US context, Wicker and Breuer (2014) examined a sample of German sports organizations and revealed a positive relationship between revenue diversification and organizational financial conditions. Tevel et al. (2015) also found empirical evidence that revenue diversification reduced financial vulnerability in Israeli nonprofits.

Many recent studies, however, demonstrated a negative or null association between revenue diversification and financial effectiveness (e.g., Frumkin and Keating 2011; Chikoto and Neely 2014; Mayer et al. 2014; de los Mozos et al. 2016; Lin and Wang 2016; von Schnurbein and Fritz 2017). For example, Frumkin and Keating (2011) discovered that revenue diversification lead to lower organizational efficiency. Similarly, de los Mozos et al. (2016) found a negative impact of revenue diversification on

fundraising efficiency. Moreover, Mayer et al. (2014) suggested that diversified revenue does not necessarily lower volatility for US nonprofits. Lin and Wang (2016) showed that revenue diversification might even aggravate nonprofits' fiscal stress during an economic downturn. In addition, Chikoto and Neely (2014) found that a more concentrated revenue structure can boost total revenue growth in US nonprofits. The same result was reported in von Schnurbein and Fritz's (2017) study of Swiss organizations.

Methods and Data

Given the competing theories and mixed empirical results in the literature, one might wonder what the true effect of revenue diversification on nonprofit financial performance is? In this article, we follow a two-step procedure to answer this question.

The first step is to conduct a broad bibliometric analysis of all scholarly articles on financial performance in general and revenue diversification and concentration in specific. Bibliometric methods are frequently used to provide a quantitative analysis of academic literature. The central idea is that the development of an academic field can be traced by studying its footprints in scholarly publications (Chen 2004). There are several types of bibliometric studies, including collaboration network analysis, co-word analysis, author co-citation analysis, text and geospatial visualization, and so forth. In this study, we focus on the document co-citation analysis (DCA) using a professional software called CiteSpace.[1]

DCA studies a network of co-cited reference (Small 2003). The fundamental assumption is that co-citation clusters can reveal underlying intellectual structures. CiteSpace first takes a set of bibliographic records[2] as its input and models the intellectual structure of the underlying domain in terms of a synthesized network based on time series of networks derived from each year's publications on relevant topics. The synthesized network is then divided into co-citation clusters of references. Citers to these references are considered as the research fronts associated with these clusters. Each cluster represents the intellectual base of the underlying knowledge domain. To characterize the nature of an already identified cluster,

CiteSpace next extracts noun phrases from the titles, keyword lists, or abstracts of articles that cited the particular cluster. Once the process is completed, cluster labels based on the selection algorithm (usually log-likelihood ratio) will be displayed. Additionally, CiteSpace can also highlight nodes with high betweenness centrality with purple trims.[3] The thickness of a purple betweenness centrality trim indicates how strong its betweenness centrality is. Thus, by visualizing a knowledge domain's co-citation network, the bibliometric method can identify intellectually significant articles and the major areas of research (clusters), reveal the connections between these major areas (lines linking the nodes), validate the contributions of the leading scholars in the field (size of the nodes and thickness of the trims), and pinpoint the key papers for a given area (label of the nodes).[4]

The second step of the empirical inquiry is to narrow our focus using the results of the bibliometric analysis to conduct a meta-analysis. This allows us to take stock of the most relevant empirical findings within the literature and estimate a generalized effect of revenue diversification on financial capacity and vulnerability across studies. Meta-analysis is a quantitative research synthesis method which enables researchers to statistically combine empirical results from different studies for the purpose of scientific generalization (Glass 1976). Since any single study inevitably suffers from sampling error and other artifacts, aggregating findings from multiple studies is more likely to produce estimates that are closer to the true underlying relationships and have higher levels of external validity (Schmidt and Hunter 2014). In our case, meta-analysis can help us estimate an average effect size of revenue diversification on financial capacity and vulnerability to form a generalized knowledge and explore the conditions under which we could expect different directions and magnitudes of this effect.

In sum, the bibliometric analysis lays the groundwork for the meta-analysis, while the latter condenses and quantitatively generalizes the findings of the former. The combination of the two steps will provide us with both a panoramic view of the literature developments in the field and a synthesized result of different studies.

Literature Search and Bibliometric Analysis

To develop our sample for the bibliometric analysis and the subsequent meta-analysis, we started the analysis with a

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[1] Other widely used science mapping tools include VOSViewer, HistCite, SciMAT, and Sci2. In many ways, they are similar to CiteSpace.

[2] These bibliographic records refer to standard word profiles such as title, abstract, and keywords that characterize the nature of an article. Popular databases, such as Web of Science and Scopus, are often used for collecting these bibliographic records. We will describe the details of data collection for this study in the next section.

[3] Each node represents an article. A node of high betweenness centrality is usually one that connects two or more large groups of nodes with the node itself in-between, hence the term betweenness.

[4] For more details about the bibliometric method and the CiteSpace software, one can refer to Chen (2004) and the CiteSpace Manual available from https://leanpub.com/howtousecitespace.

comprehensive literature search using several complementary strategies to identify as many relevant studies as possible (Reed and Baxter 2009). To begin with, we conducted database searches in *Web of Science* (for journal articles), *EBSCO* (for journal articles), *SCOPUS* (for journal articles), *ProQuest* (for theses and dissertations), and *SSRN* (for working papers). Afterward, we searched relevant articles in three core nonprofit journals, *Nonprofit and Voluntary Sector Quarterly*, *Nonprofit Management and Leadership*, and *Voluntas: International Journal of Voluntary and Nonprofit Organizations*. In both steps, we searched literature using the abstract search profile *(revenue diversification OR revenue concentration) AND financ**. Next, after collecting an initial set of studies, we conducted an ancestor search by examining the reference sections of the identified studies to seek other relevant studies. Lastly, we used Google Scholar to do a descendant search by reviewing later studies that cited the identified studies. We iterated the third and fourth steps until no new relevant studies were identified. The entire literature search was concluded on September 30, 2017.

The above search process resulted in a total of 86 scholarly articles, covering the period 1991–2017. Using this sample, we employed the CiteSpace 5.0 software developed by Chen (2004) to visually analyze the co-citation network of the field. The major areas ("clusters") of research, the most important articles ("nodes") in the field, as well as the links between the articles, are shown in Fig. 1. The modularity Q was .61 which is relatively high. This means that the network is reasonably divided into clearly defined co-citation clusters. Additionally, the mean silhouette score of .81 suggests that the homogeneity of these clusters on average is also very high. Therefore, the overall quality of the co-citation network is quite good.

As Fig. 1 illustrates, nonprofit scholars have plowed the field of nonprofit revenue diversification and concentration since the early 1990s, but many influential works did not appear until after the Great Recession of 2008.[5] Using the log-likelihood ratio measure to generate cluster labels, the largest (#0) and second largest (#1) clusters of literature are "Herfindahl index" and "nonprofit revenue concentration," where researchers discuss the measurement of nonprofit revenue diversification or concentration and how either is related to nonprofit financial stability and growth. It should be noted that there is considerable overlap between these two clusters, indicating that the two clusters are closely related to each other. The third largest (#2) cluster is related to how nonprofits can improve their revenue strategies in order to better weather the negative impacts of a major fiscal downturn such as the Great

Recession of 2008. The fourth (#3) and fifth (#4) clusters include such topics as program ratio management, resource dependence, the impact of overhead costs on financial capacity, and other accountability issues in nonprofit organizations. The last (#5) cluster consists of broader financial issues that are related to nonprofit organizational effectiveness, but it is only loosely linked to the other five clusters.

Literature Refinement and Meta-Analysis

The bibliometric analysis in the previous section provides a panoramic picture of the development of the literature in the field, but it needs to be narrowed down and refined for more in-depth analysis. To do so, we manually reviewed the abstracts of the relevant studies for inclusion in the meta-analysis. If an article's eligibility for inclusion was unclear from its abstract, we performed a full-text review to determine whether the study met our criteria. To be included in the sample, first, the study had to quantitatively examine the effect of revenue diversification or concentration on financial capacity and/or vulnerability. Second, the unit of analysis of the study had to be individual organizations. Third, the focal variable, *revenue diversification,* had to be measured using the Herfindahl–Hirschman index (HHI, with 0 denoting perfect concentration and 1 denoting perfect diversification) instead of only the number of revenue sources (e.g., Despard et al. 2017; Foster and Meinhard 2005), since the latter fails to account for the dispersion of different sources (Tuckman and Chang 1991).[6] Fourth, the dependent variable, *financial vulnerability,* had to be conceptualized as the extent to which a nonprofit scales back its operations when experiencing a financial shock such as an economic downturn and the loss of a major donor (Cordery et al. 2013; Tuckman and Chang 1991; Greenlee and Trussel 2000), and, *financial capacity,* had to be conceptualized as the extent to which a nonprofit maintains or expands financial resources to support its operations (Bowman 2011; Chikoto and Neely 2014). Fifth, the study had to use financial measures of capacity and vulnerability, rather than perceptual or other measures (e.g., Hager 2001; Wicker and Breuer 2013).
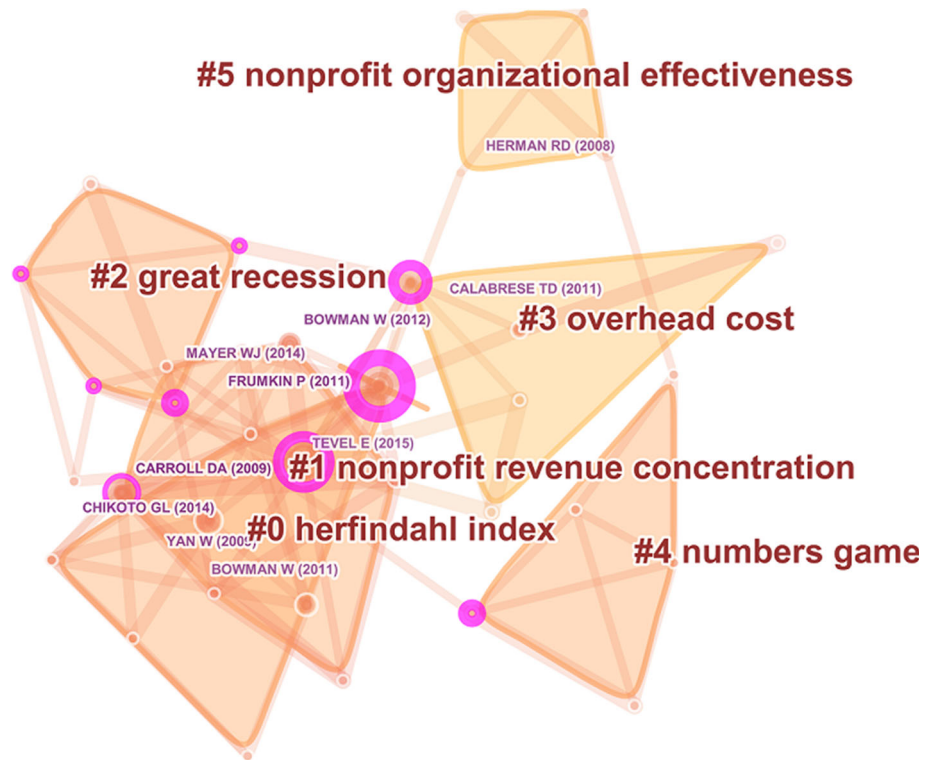
Table 1 summarizes the measures of both dependent variables included in our meta-analysis. After extensive screening, the final set of studies included in the analysis consisted of 17 journal articles, 3 working papers, and 3 dissertations. These 23 studies represent a wide variety of year durations, nonprofit types, countries, policy fields, and research designs, helping to enhance the external validity

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[5] In CiteSpace, this is indicated by different colors, but it may not be distinctive in black and white.

[6] We reverse coded the effects of revenue concentration in the original studies to make comparable the information coded from all the included studies.

Fig. 1 Clusters of literature on nonprofit revenue diversification and concentration and financial performance 1991–2017. *Note*: N = 86, Modularity = .61, Silhouette = .81

Table 1 Measures included in the meta-analysis and example studies

Construct	Measures	Example studies
Financial vulnerability	Reduction in program expenditure	Greenlee and Trussel (2000) and Tuckman and Chang (1991)
	Reduction in net assets	Keating et al. (2005) and Trussel and Greenlee (2004)
	Reduction in net earnings	Gordon et al. (2013) and Keating et al. (2005)
Financial capacity	Revenue growth	Chikoto and Neely (2014) and von Schnurbein and Fritz (2017)
	Surplus margin	Chang and Tuckman (1994) and Wicker and Breuer (2014)
	Fixed assets growth	de Jong (2014) and Frumkin and Keating (2011)
	Expense growth	Frumkin and Keating (2011) and Lin and Wang (2016)
	Others	Calabrese (2012a) and Lam and McDougle (2016)

of the meta-analysis. Detailed descriptions of the included studies are provided in "Appendix." While we cannot guarantee the inclusion of every relevant study, we are confident that we have identified a systematic sample to explore our research question.

The next step is to extract information from these studies. Specifically, we coded two groups of information: effect size and moderator information (Lipsey 2009). In the present analysis, effect size refers to a standardized association between revenue diversification and financial capacity or vulnerability. Following common practice, we employed a correlation-based effect size (i.e., Pearson's r) (Geyskens et al. 2009). To calculate the correlation-based effect sizes from the original studies, we first coded the

studies' regression parameters and statistics (regression coefficient, sample size, number of independent variables used, model specification method, etc.), and then followed the calculation procedures suggested by Borenstein (2009), Fleiss and Berlin (2009), and Ringquist (2013). In particular, when original studies reported multiple effect sizes (because of different variable measurements, model specifications, or sample restrictions), all relevant effect sizes were coded to maintain within-study variation (Ringquist 2013).

Finally, we captured a total of 258 effect sizes, with 76 effect sizes on the diversification–vulnerability relationship and 182 effect sizes on the diversification–capacity relationship. Within the effect sizes on diversification–

vulnerability relationship, 38 were positive, 5 were null, and 33 were negative, ranging from − .3460 to .2865. Within the effect sizes on the diversification–capacity relationship, 67 were positive, 2 were null, and 113 were negative, ranging from − .4897 to .3890. These competing findings confirmed the disparity in the literature, underscoring the need for synthesis. Figure 2 shows the distribution of study-level effect sizes across the studies included in the analysis.

After calculating the effect sizes from individual studies, we coded the moderator information. Moderators are the factors that contribute to effect size variability within and across original studies. They also help explain why different studies reach different results or under what conditions we should expect a particular relationship between revenue diversification and financial capacity or vulnerability. In the present analysis, we examined a series of research design characteristics to examine whether the relationship was consistent across studies with different research designs. Specifically, we explored the potential effect of moderators using the following empirical model:

$$y_i = \beta_0 + \beta_1 x_{1,i} + \beta_2 x_{2,i} + \beta_3 x_{3,i} + \beta_4 x_{4,i} + \beta_5 x_{5,i} + \beta_6 x_{6,i} + \varepsilon_i$$

where y is the correlation-based effect size in the original study i, x_1 is the year duration of study i, x_2 is the number of revenue sources study i uses in the calculation of HHI, x_3 is whether study i controls for policy field in the analysis (yes = 1 and no = 0), x_4 is whether study i controls for organizational size in the analysis (yes = 1 and no = 0), x_5 is whether study i controls for organizational age in the analysis (yes = 1 and no = 0), and x_6 is whether study i is a peer-reviewed journal article (yes = 1 and no = 0). Table 2 reports the descriptive statistics of the moderators.

Meta-Analysis Results

Average Effect Size Analysis

We first aggregated individual effect sizes to estimate an average effect size for diversification–vulnerability or capacity relationships. Before combining individual effect sizes, two methodological treatments were made. First, individual effect sizes were corrected for sampling errors. Individual effect sizes were weighted by an estimate of the inverse of their variance ($n − 3$, where n is the sample size of each study) to give greater weight to more precise estimates. In this way, effect sizes from studies with larger samples were weighted more heavily, since such studies tend to produce estimates that are closer to the population parameters (Ringquist 2013; Shadish and Haddock 2009).

Second, all individual effect sizes in Pearson's r correlations were transformed into Fisher's z correlations to correct the slightly skewed distribution of Pearson's r around a given population (Ringquist 2013). Once the average effect sizes were calculated, the results in Fisher's z were converted back to Pearson's r for easier interpretation.

Due to the high levels of variability observed in effect sizes (see Fig. 2), random-effects models were employed in computing average effects (Borenstein et al. 2010; Ringquist 2013).[7] For the diversification–vulnerability relationship, after combining 76 effect sizes, we calculated a weighted average effect size of − .009 ($z = 1.64$, $p > .1$), with a 95% confidence interval of [− .020, .002]. This finding indicates revenue diversification has a small negative association with financial vulnerability,[8] which means that organizations relying on more diversified revenue portfolios seem less vulnerable to financial shocks. However, the association itself is not statistically significant at the .1 level. Therefore, revenue diversification might have limited effect on financial vulnerability. For the diversification–capacity relationship, after combining 182 effect sizes, we found a weighted average effect size of − .012 ($z = 2.51$, $p < .05$), with a 95% confidence interval of [− .021, − .003]. This result reveals that revenue diversification is detrimental to capacity growth, since there is a statistically significant and negative association between the two, even though the magnitude of the relationship seems very small.
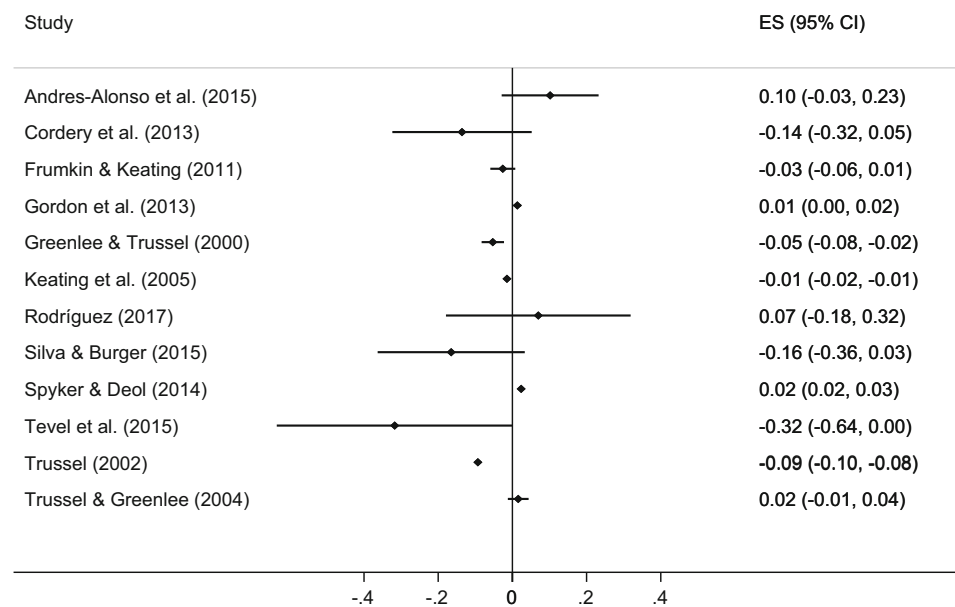
Moderator Analysis

We next conducted a moderator analysis, using the meta-regression model described above, to explore under what conditions we should expect particular effect size estimates. Two methodological challenges in specifying the model are effect size heteroscedasticity and non-independent observations. On the one hand, effect sizes were estimated from original studies with different sample sizes. The variance of the effect size estimates tends to decrease as the sample size increases, thus violating the assumption of homoscedasticity. On the other hand, we coded multiple effect sizes from individual studies to retain within-study variation information. For example, we drew 14 effect sizes from Frumkin and Keating (2011) on the diversification–vulnerability relationship using different

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[7] For effect sizes on the diversification–vulnerability relationship, we found a Q statistic of 10,236.41 ($p < .000$) and an I^2 statistic of 99.3%; for effect sizes on diversification–capacity relationship, we found a Q statistic of 17,564.8 ($p < .000$) and an I^2 statistic of 99.0%. Both groups of effect sizes demonstrate high levels of heterogeneity that is not attributable to sampling error.
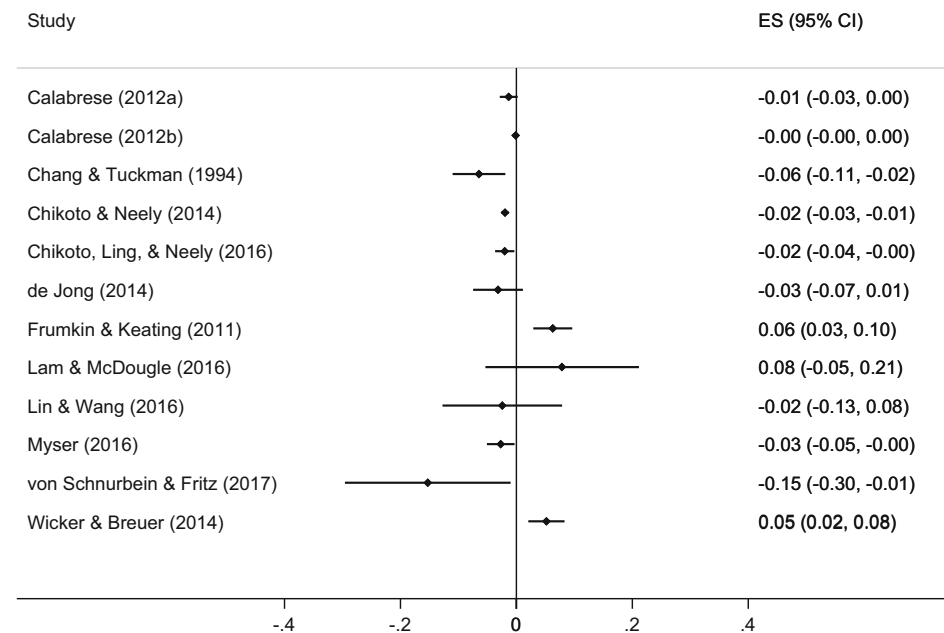
[8] According to Cohen's (1988) effect size benchmarks, a correlation coefficient below .1 is considered a small effect.

(A) Studies on Revenue Diversification – Financial VulnerabilityRelationship

Study	ES (95% CI)
Andres-Alonso et al. (2015)	0.10 (−0.03, 0.23)
Cordery et al. (2013)	−0.14 (−0.32, 0.05)
Frumkin & Keating (2011)	−0.03 (−0.06, 0.01)
Gordon et al. (2013)	0.01 (0.00, 0.02)
Greenlee & Trussel (2000)	−0.05 (−0.08, −0.02)
Keating et al. (2005)	−0.01 (−0.02, −0.01)
Rodríguez (2017)	0.07 (−0.18, 0.32)
Silva & Burger (2015)	−0.16 (−0.36, 0.03)
Spyker & Deol (2014)	0.02 (0.02, 0.03)
Tevel et al. (2015)	−0.32 (−0.64, 0.00)
Trussel (2002)	−0.09 (−0.10, −0.08)
Trussel & Greenlee (2004)	0.02 (−0.01, 0.04)

−.4   −.2   0   .2   .4

(B) Studies on Revenue Diversification – Financial Capacity Relationship

Study	ES (95% CI)
Calabrese (2012a)	−0.01 (−0.03, 0.00)
Calabrese (2012b)	−0.00 (−0.00, 0.00)
Chang & Tuckman (1994)	−0.06 (−0.11, −0.02)
Chikoto & Neely (2014)	−0.02 (−0.03, −0.01)
Chikoto, Ling, & Neely (2016)	−0.02 (−0.04, −0.00)
de Jong (2014)	−0.03 (−0.07, 0.01)
Frumkin & Keating (2011)	0.06 (0.03, 0.10)
Lam & McDougle (2016)	0.08 (−0.05, 0.21)
Lin & Wang (2016)	−0.02 (−0.13, 0.08)
Myser (2016)	−0.03 (−0.05, −0.00)
von Schnurbein & Fritz (2017)	−0.15 (−0.30, −0.01)
Wicker & Breuer (2014)	0.05 (0.02, 0.08)

−.4   −.2   0   .2   .4

measurements of financial vulnerability and nonprofits from different policy fields. As a result, the effect sizes coded from the same study were not independent of each other but rather were clustered within that study, violating the statistical assumption of independence. Following Ringquist (2013), this study employed weighted least squares (WLS) regression with clustered standard errors to estimate the empirical model. This method weights each effect size estimate by the inverse of the sample size to address the heteroscedasticity concern and uses a clustered robust parameter variance–covariance matrix to address the

Table 2 Descriptive statistics

Variable	N	Mean	Median	SD	Min	Max
Effect size (diversification–capacity)	182	− .0092	− .0092	.1089	− .4898	.389
Effect size (diversification–vulnerability)	76	− .0093	.0023	.1185	− .346	.2865
Year duration (number of lagged years)	258	1.3643	1	1.7035	0	7
Number of revenue sources	258	6.2481	5	3.4405	3	19
Control for policy field	258	.5349	1	.4998	0	1
Control for size	258	.5349	1	.4998	0	1
Control for age	258	.1744	0	.3802	0	1
Peer-reviewed article	258	.7558	1	.4304	0	1

"cluster" nature of our data.[9] Table 3 presents the meta-regression results, and we discuss them as follows:

Timing is always a big challenge in the analysis of financial behaviors, because nonprofit data are typically reported on a yearly basis, but the effect of certain financial behaviors may not fall clearly within the same one-year period or it may last for more than just a single year. For example, Greenlee and Trussel (2000) explored financial vulnerability over a three-year period, using revenue diversification in 1992 to examine financial vulnerability in 1995. Chikoto and Neely (2014) employed five-year revenue growth to explore the effect of revenue diversification in 1998 on change in financial capacity from 1998 to 2003. Indeed, in nonprofit studies the distinction between a short-term period and a long-term period is not clear (Bowman 2011). We included one moderator, *year duration*, in the meta-regression model to explore this timing concern, with an attempt to see whether the effect of diversification on vulnerability or capacity differs by the length of time under study. We find some support for the moderating effect of year duration. In the diversification–capacity model, year duration has a statistically significant effect ($p < .05$) on the impact of revenue diversification on financial capacity: The longer period a study examines, the smaller the diversification effect the study finds. The effect of revenue diversification on financial capacity thus seems to become smaller in the long term. In contrast, in the diversification–vulnerability model, the effect of year duration is not statistically significant ($p > .1$), indicating that the effect of revenue diversification on financial vulnerability seems consistent irrespective of the length of years under study.

Revenue diversification thus has a similar effect on financial vulnerability in both the short and the long term.

Although revenue diversification was predominately measured by HHI in the sampled studies, the way HHI was calculated (i.e., the number of revenue sources used) was not always the same. For example, Frumkin and Keating (2011) used three revenue streams (donations, earned income, and investment income), von Schnurbein and Fritz (2017) relied on four revenue sources (government grants, donations, program revenue, and investment income), and de Andrés-Alonso et al. (2015) used five streams (voluntary income, generating income, investment income, charitable income, and other income). Literally, the inclusion of more revenue sources in the HHI calculation is more likely to better capture a nonprofit's revenue diversification efforts, which would consequently lead to more nuanced analyses of the effect of revenue diversification. Chikoto et al. (2016) suggest that the impact of revenue diversification on financial performance is sensitive to the measurement of HHI: The more revenue sources used in the HHI calculation, the more robust effect revenue diversification has. We addressed the sensitivity of the HHI calculation in the meta-regression by including a moderator, *number of revenue sources*, and concurred with Chikoto et al. (2016) argument. In both models, the number of revenue sources used in the HHI calculation has a significant effect ($p < .01$) on moderating the relationship between diversification and capacity and vulnerability. Particularly, the more revenue sources used in the HHI calculation, the smaller the effect of diversification on capacity and vulnerability. In sum, how HHI is constructed matters in the exploration of the financial impacts of revenue diversification.

We also examined the moderating effect of controlling for policy field. It has been widely acknowledged that nonprofits in different policy fields face different policy and resource environments, which would influence their behaviors (Stone and Sandfort 2009). For example, in the social and human services fields, government funding represents a significant share of nonprofit revenue, while in the arts and culture fields, it only plays a minor role.

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[9] We also used generalized estimating equation (GEE) to test the robustness of our meta-regression results in Table 3. The GEE method addresses cluster observations by placing less emphasis on effect sizes from studies generating more effect sizes and thus guards against a few studies dominating the meta-regression results (Liang and Zeger 1986). A detailed methodological comparison of WLS and GEE in meta-regression can be seen in Ringquist (2013). Given that the GEE results are consistent with the WLS results (in terms of signs and statistical significance), we do not report the GEE results here to save space.

Table 3 Meta-regression predicting moderators of effect size heterogeneity

Moderator	Diversification–vulnerability	Diversification–capacity
Year duration	.0085	− .0121**
	(.0078)	(.0050)
Number of revenue sources	− .0168***	− .0093***
	(.0052)	(.0023)
Control for policy field	− .0822*	− .0356
	(.0451)	(.0229)
Control for size	.0499**	.0456**
	(.0175)	(.0195)
Control for age	− .0043	− .0202
	(.0437)	(.0244)
Peer-reviewed article	.0214	.0049
	(.0215)	(.0317)
Constant	− .1321	.0618*
	(.1069)	(.0313)
No. of effect sizes	76	182
No. of studies	12	12
F	352	19.15
R^2	.0805	.1521

Weighted least squares (WLS) regression was used. Clustered robust standard errors (by study) in parentheses. *$p < .10$. **$p < .05$. ***$p < .01$ (two-tailed test)

Nonprofits in different fields thus have to develop different strategies to confront unique landscapes in order to diversify their revenue. Another reason why it is imperative to control for policy field is that the degree to which a nonprofit diversifies its revenue mix is closely associated with its mission and the nature of services provided (Chang and Tuckman 1994; Fischer et al. 2011). Many studies use policy field as a proxy for organization mission and service type (e.g., Suárez and Hwang 2008). In the meta-regression analysis, we included a moderator, *control for policy field*, to examine whether studies controlling for policy field produced different effect sizes. In the diversification–vulnerability model, studies using a policy field control variable reported significantly smaller ($p < .1$) average effects compared to those without such a control. In the diversification–capacity model, studies using a policy field control variable on average seemed to produce smaller effects compared to those without such a control, but the difference between these two groups of effect sizes was not significant at the .1 level. In sum, studies failing to control for policy field might be at the risk of overestimating the effect of revenue diversification on financial vulnerability.

We next explored whether studies controlling for size or age made a difference. Indeed, organizational studies have demonstrated that established organizations are less subject to the liability of smallness and the liability of newness, and thus are more likely to achieve survival and prosperity (Aldrich and Auster 1986; Hannan and Freeman 1983). Hager et al. (2004) found larger and older nonprofits in the

Minneapolis–St Paul region were less likely to close. Similarly, Chikoto-Schultz and Neely (2016) reported that older and larger nonprofits would enjoy better financial stability and growth over time. In this line of reasoning, any examination of organizational performance needs to control for the impacts of size and age. We included two moderators in the meta-regression analysis, *control for size* and *control for age*, to see whether these two controls made a difference. In both models, whether a study controls for size matters: The effect sizes from studies controlling for size are on average significantly larger ($p < .05$) than those from studies that did not control for size. In other words, studies that did not control for size would likely underestimate the effect of revenue diversification on financial capacity and vulnerability. In contrast, controlling for age seemed to make little difference. In both models, although studies with a control for age produced smaller average effect sizes than the ones without a control, the difference was not statistically significant at the .1 level.

Finally, we included a dummy variable, *peer review article*, in the meta-regression to compare the effect sizes from published and unpublished studies to check whether these two groups of studies produced different results. The goal of this treatment is to address the concern for publication bias in meta-analysis: Given that studies with statistically significant findings are more likely to be published, meta-analysis may distort the findings by giving too much weight to the published studies (Rothstein et al. 2006). In both models, despite the slight difference in

average effects between published and unpublished studies, the difference was not statistically significant ($p > .1$). This indicates our analysis was not seriously undermined by publication bias. We also performed other statistical tests to check the robustness of this finding. In both the Begg and the Egger tests, we were not able to reject the null hypothesis of no publication bias.[10] As a result, there was no need for any corrections for publication bias in our analysis.

To sum up, the average effect size analysis and moderator analysis jointly suggested the following findings across existing studies: (1) Revenue diversification overall has no significant association with financial vulnerability, but it does have a small negative association with financial capacity. (2) The length of year under study moderates the effect of revenue diversification on financial capacity: The longer the time period under study, the smaller the effect found. (3) The calculation of HHI matters to the effect of revenue diversification: The more revenue sources used in HHI calculation, the more accurate HHI in representing revenue diversification and the smaller the effect revenue diversification has on both financial vulnerability and capacity. (4) Whether a study controls for policy field and size makes a difference: Studies failing to control for policy field may overestimate effect size estimates, and studies failing to control for organization size could underestimate effect size estimates. Put together, it seems that revenue diversification has little effect on financial vulnerability but has a slight negative effect on financial capacity. Further, this effect on financial capacity becomes smaller in the longer term and when a more comprehensive measure of revenue diversification is used.

Discussion and Conclusion

Most nonprofits operate under financial austerity with limited budgets. Thus, developing effective revenue strategies to promote financial health and organizational sustainability constitutes a pressing managerial challenge for nonprofit leaders. Specifically, given that nonprofits typically rely on a number of sources for funding, how to achieve an optimal mix of nonprofit revenue becomes a prominent issue. One strategy that has been widely discussed by nonprofit researchers and practitioners is revenue diversification. Since each revenue stream has its own benefits and risks, an intuitively reasonable practice is to diversify across different sources to reduce financial

dependence on any single source.[11] For example, after a thorough examination of the pros and cons of government funding, Rushton and Brooks (2007, p. 89) wrote, "nonprofits are wise to diversifying funding sources to the extent that they can, not relying excessively on government funding."

However, although revenue diversification has been advocated by some scholars and practitioners for a long time, recent studies suggest that the implementation of the diversification strategy in real-world settings is more complex than expected. Indeed, existing empirical evidence on the impact of revenue diversification on financial health is highly inconsistent, which calls for a synthesis to make sense of existing studies and integrate their findings to estimate a generalized effect of revenue diversification across studies. In this study, we first employed a bibliometric analysis to systematically categorize and visualize existing studies. We then conducted a meta-analysis to analyze the effect of revenue diversification on financial capacity and vulnerability. Through systematically reviewing a total of 23 existing studies and 258 effect sizes, we found that revenue diversification has a slight detrimental impact on financial capacity and almost null effect on financial vulnerability. Further, through moderator analysis, we note that the length of years under study, the number of revenue sources used to calculate HHI, control for policy field, and control for organization size all contribute to the variations of findings in existing studies.

Our study has a number of theoretical and practical contributions. To begin with, we provide an empirical integration of the extant empirical evidence and offer a cumulative knowledge on the financial impacts of revenue diversification across studies. Indeed, although revenue diversification has been frequently referred to in the nonprofit literature, the empirical findings to date concerning the financial effectiveness of revenue diversification have been highly mixed, with few research efforts made to integrate these disparate findings. As such, our results consolidate previous empirical findings and provide empirical generalizations of the effects of revenue diversification on the two most studied financial outcomes (i.e., capacity and vulnerability) in the literature. In this way, our meta-analysis extends the literature by bridging the divergences in the literature and offering a more systematic synthesis of previous findings. The results thus should lay the foundation for further explorations of nonprofit financial strategies and performance.

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[10] In the Begg test, we found $p = .86$ for effect sizes on diversification–capacity relationship, and $p = .73$ for effect sizes on diversification–vulnerability relationship. In the Egger test, we found $p = .76$ for effect sizes on diversification–capacity relationship and $p = .28$ for effect sizes on diversification–vulnerability relationship.

[11] Here, it is assumed that nonprofits are legally allowed and have the ability to diversify their revenue sources as they like. In reality, however, this may not always be the case, especially for nonprofits in some European countries. We thank an anonymous reviewer for pointing this out.

Moreover, our findings indicate that the benefits of revenue diversification suggested in the literature might be overstated. Although revenue diversification has been advocated by some scholars as an indispensable prerequisite for financial stability, our combination of existing empirical evidence reveals that it has almost null effect on financial stability or vulnerability. In addition, we find that revenue diversification slightly damages financial capacity, which seems to be consistent with several previous studies (Chikoto and Neely 2014; Frumkin and Keating 2011; von Schnurbein and Fritz 2017). In short, if nonprofits attempt to both reduce financial vulnerability and enhance financial capacity, some sort of concentration might turn out to be a more appropriate revenue strategy. Therefore, the reasoning underlying the benefits of revenue diversification, although theoretically appealing, may be empirically unachievable. Part of the reason could be that nonprofits with more diversified revenue portfolios may encounter difficulties in simultaneously managing an array of funding sources with different characteristics. A nonprofit in such a difficult situation would not only incur high transaction costs but it would also be prevented from focusing on its main funding sources for substantive growth. This might be especially troublesome for small- or middle-sized organizations whose managers might lack the capability to effectively handle high levels of revenue diversification.

More broadly, revenue diversification has been used extensively as an explanatory variable to study a wide range of nonprofit financial and non-financial behaviors, but comparatively fewer studies have been devoted to empirically examining the real effectiveness of revenue diversification.[12] Our synthesis of existing studies indicates that revenue diversification has nearly null effect on financial vulnerability and only a small negative effect on financial capacity. The moderator analysis further suggests that the negative effect would become smaller when more comprehensive measures of revenue diversification and longer time period are taken into consideration. Overall, the effect of revenue diversification on financial vulnerability and capacity seems to be trivial. If so, nonprofit scholars and practitioners might need to rethink the basic assumptions they hold about the desirability and importance of revenue diversification or concentration. Clearly, we are not in a position to discredit the body of literature on revenue diversification, but more nuanced examination of its theoretical foundation and empirical reality is needed.

Our findings also come with several limitations. First, financial performance is a multi-dimensional construct (Bowman 2011). However, we only examined the effects of diversification on financial capacity and vulnerability because these two financial outcomes were the most widely studied in the revenue diversification literature where enough effect sizes could be extracted for the meta-analysis. Other outcome indicators such as financial volatility might be significantly affected by revenue diversification, but we could not include them in the present analysis because the number of relevant empirical studies was too limited to warrant any meaningful meta-analysis. Second, meta-analysis is not developed to explore causality; it only examines associations between variables. Therefore, our findings should be best understood as identifying correlative rather than causal relationships. Future studies are needed to deal with the causality issues. Third, our sample mostly covered US charities and spanned a wide time range during which the nonprofit sector evolved and changed rapidly. A more balanced and homogenous sample may be necessary to generate more convincing results. Finally, we only explored the linear association between revenue diversification and capacity and vulnerability, since all the included studies did so and meta-analysis can only build on existing studies. However, it is possible that the effect of revenue diversification is not linear but rather curvilinear, following a U- or inverted U-shaped pattern. For example, some levels of diversification have a favorable impact, but after a certain tipping point the negative effect tends to emerge. Further research is needed to explore this possibility.

Appendix 1

See Table 4.

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[12] A search in Google Scholar with the term "nonprofit revenue diversification" produced nearly 30,000 studies (search conducted on November 13, 2017). However, a more systematic search in the present project only located 23 existing studies that met our inclusion criteria for the meta-analysis.

Table 4 Review of existing studies included in meta-analysis

#	Study	Publication type	Year coverage	Data sources	Sample size	Country of nonprofits	Policy field	Field control	Vulnerability (lagged years)	Capacity (lagged years)	Size control	Age control	HHI calculation	# ES coded
1	de Andrés-Alonso et al. (2015)	Journal Article	2008–2012	Financial statements	228	Britain	International development	Yes	Financial Vulnerability Index (3 year)	N/A	Yes	No	5	4
2	Calabrese (2012a)	Journal Article	1998–2003	NCCS	5350–72,691	United States	501(c)(3) public charities	Yes	N/A	Unrestricted net assets (0 year)	Yes	No	11	14
3	Calabrese (2012b)	Journal Article	1998–2003	NCCS	520,349	United States	501(c)(3) public charities	No	N/A	Operating reserves (1 year)	Yes	No	4	4
4	Chang and Tuckman (1994)	Journal Article	1986	NCCS	113,525	United States	501(c)(3) public charities	Yes	N/A	surplus margin (0 year)	No	No	9	54
5	Chikoto and Neely (2014)	Journal Article	1998–2003	NCCS	50,000–108,000	United States	501(c)(3) public charities	Yes	N/A	Revenue growth, fund balance growth (5 year)	Yes	0	3, 4, 13	18
6	Chikoto, Ling, and Neely (2016)	Journal Article	1998–2003	NCCS	3603, 16,298, 25,175, 103,701	United States	501(c)(3) public charities	Yes	N/A	Revenue growth (5 years)	Yes	Yes	3, 4, 7, 13	16
7	Cordery et al. (2013)	Journal Article	4 years not specified	Financial statements	227	New Zealand	Sports club	Yes	Reduction in net earnings (3 years)	N/A	Yes	No	4	2
8	de Jong (2014)	Dissertation	2005–2012	Financial statements	1390–3413	Netherlands	Fundraising organizations	No	N/A	Revenue growth, program expense growth, and fixed assets growth (1 year)	Yes	No	10	20
9	Frumkin and Keating (2011)	Journal Article	12 years not specified	NCCS	56,870	United States	501(c)(3) public charities	Yes	Reduction in net assets, reduction in program expenditure (1 year)	Revenue growth, fixed assets growth, program expense growth, surplus margin (0 year)	No	No	3	49

Table 4 continued

#	Study	Publication type	Year coverage	Data sources	Sample size	Country of nonprofits	Policy field	Field control	Vulnerability (lagged years)	Capacity (lagged years)	Size control	Age control	HHI calculation	# ES coded
10	Gordon et al. (2013)	Journal Article	2000–2003	NCCS	311,977	United States	501(c)(3) public charities	No	Negative net assets (0 year)	N/A	Yes	No	3	5
11	Greenlee and Trussel (2000)	Journal Article	1985–1995	NCCS	5918	United States	501(c)(3) public charities	No	Reduction in program expenditure (3 years)	N/A	No	No	5	2
12	Keating et al. (2005)	Working Paper	1998–2000	NCCS	290,579	United States	501(c)(3) public charities	No	Negative net assets (0 year), reduction in program expenditure (1 year), reduction in net assets (1 year)	N/A	Yes	No	3	12
13	Lam and McDougle (2016)	Journal Article	2005–2007	NCCS	222	United States (San Diego)	Human services	Yes	N/A	Equity ratio, months of spending, return on assets, mark up, month of liquidity (3 year)	Yes	Yes	3	15
14	Lin and Wang (2016)	Journal Article	2008–2011	Self-administered survey, IRS 990 forms, state administrative data	363–364	US (New Jersey)	Human services	Yes	N/A	Revenue growth, expense growth (3 year)	Yes	Yes	3	2
15	Myser (2016)	Dissertation	2011	NCCS	6780	United States	501 (c) (3) public charities	No	N/A	Return on assets (0 year)	Yes	Yes	3	1
16	Rodríguez (2017)	Dissertation	2011–2013	Financial statement	65	Spain	International development	Yes	Reduction in net assets (2 years)	N/A	Yes	Yes	7	17
17	Silva and Burger (2015)	Working Paper	2000–2001, 2006–2007	Self-administered survey	67, 148	Uganda	International development	Yes	Reduction in net earnings (1 years)	N/A	Yes	No	6	7
18	Spyker and Deol (2014)	Working Paper	2000–2009	Annual Information Return	602,629	Canada	Registered charities	No	Reduction in net assets (3 years)	N/A	Yes	No	3	6

Table 4 continued

#	Study	Publication type	Year coverage	Data sources	Sample size	Country of nonprofits	Policy field	Field control	Vulnerability (lagged years)	Capacity (lagged years)	Size control	Age control	HHI calculation	# ES coded
19	Tevel et al. (2015)	Journal Article	2009–2011	Financial reports	41	Israel	performing arts	Yes	Tuckman and Change index (2 years)	N/A	Yes	0	3	1
20	Trussel and Greenlee (2004)	Journal Article	1992–1995	NCCS	6795	United States	501 (c) (3) public charities	Yes	Reduction in net assets (3 years)	N/A	Yes	0	5	4
21	Trussel (2002)	Journal Article	1996–1999	NCCS	94,002	United States	501 (c) (3) public charities	Yes	Reduction in net assets (3 years)	N/A	Yes	0	5	2
22	von Schnurbein and Fritz (2017)	Journal Article	(2005–2012)	Audited annual reports	191	Swiss	Certified fundraising charities	No	N/A	Revenue growth (7-year)	Yes	Yes	4	1
23	Wicker and Breuer (2014)	Journal Article	2011	Self-administered survey	1080	Germany	Sports governing bodies	Yes	N/A	Surplus (0 year)	Yes	No	19	2

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