

TWO ESSAYS ON NONPROFIT FINANCE

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TWO ESSAYS ON NONPROFIT FINANCE

This dissertation consists of two essays on nonprofit finance. Nonprofit finance concerns obtaining and managing financial resources to support the social purposes of nonprofit organizations. A unique feature of nonprofit finance is that nonprofits derive revenue from a variety of sources. Nonprofit finance thus involves answering two fundamental questions: What is the optimal combination of revenue sources that supports a nonprofit to achieve its mission? Where and how to obtain the revenue sources? The two dissertation essays address these two questions respectively.

The first essay, titled “Modern Portfolio Theory and the Optimization of Nonprofit Revenue Mix,” is among the first to properly apply modern portfolio theory (MPT) from corporate finance to nonprofit finance. By analyzing nonprofit tax return data, I estimate the expected return and risk characteristics for five nonprofit revenue sources as well as the correlations among these returns. I use the estimates to identify the efficient frontiers for nonprofits in different industries, based on which nonprofit managers can select an optimal portfolio that can minimize the risk given a preferred level of service provision or maximize the return given a level of risk. The findings also pose a challenge to the predominant approach used in previous nonprofit finance studies (Herfindahl-Hirschman Index) and suggest that MPT is theoretically and practically more helpful in guiding nonprofit revenue management.

The second essay, titled “Charitable Giving in Nonprofit Service Associations: Identities, Incentives, and Gender Differences,” concerns nonprofit resource attainment, specifically, how do decisionmaking contexts and framing affect donations. Membership

in a service club is characterized by two essential elements: members' shared interest in the club's charitable mission; and private benefits that often come as a result of social interactions with other members, such as networking, fellowship, and fun. A laboratory experiment was designed to examine 1) whether membership in a service club makes a person more generous and 2) the effect of service club membership—stressing either the service or socializing aspects—on individual support for collective goods. The study finds that female individuals are the least generous when they are reminded of the socializing aspect of service-club membership.

Richard Steinberg, PhD, Chair

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Introduction: On Nonprofit Finance

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Finance, according to the Merriam-Webster Dictionary, is defined as:

1) money or other liquid resources of a government, business, group, or individual; 2) the system that includes the circulation of money, the granting of credit, the making of investments, and the provision of banking facilities; 3) the science or study of the management of funds; 4) the obtaining of funds or capital.

Thus, the concept of finance is about money, specifically the system and process of its attainment and management. The three major areas of finance—individual, corporate, and public finance—are well understood, but the area of study in nonprofit finance is less developed (Young, 2007). Perhaps it is because nonprofit organizations are different.

Unlike for-profits that seek to increase the market value of their owners' equity, nonprofits exist primarily to promote the social values they stand for. Different from for-profits that rely on sales as their primary source of revenue, nonprofits derive revenue from various sources. What is more, nonprofits differ from each other in the types of activities they engage in as well as the mixes of revenue they use to support their activities. The uniqueness and complexities of nonprofits present the need to develop an independent area of study in nonprofit finance.

In the past decade, some nonprofit scholars have made efforts to build the field of nonprofit finance. So far the most comprehensive book about nonprofit finance is *Financing Nonprofits: Putting Theory into Practice* (edited by Young, 2007), in which topics are organized by sources of nonprofit revenue and the discussions provide both theoretical contributions and practical guidance. In addition, Bowman's (2011) book,

Financial Fundamentals for Nonprofits, focuses on the financial management issues of different types of nonprofit organizations. Rather than being another financial management textbook, it emphasizes the nonprofit differences and their implications to nonprofit financial management. The other book, *Handbook of Research on Nonprofit Economics and Management*, edited by Seaman and Young (2010), is a collection of survey articles on various nonprofit management topics. Although it is not exclusively devoted to topics on nonprofit finance, this book is a good source for researchers in nonprofit management.

Mainly relying on these three sources, this paper focuses on the following questions: First, what is nonprofit finance? What is the goal of nonprofit financial management? Second, why does it matter to study nonprofit finance? Third, what are the major research topics on nonprofit finance? What finance and microeconomic theories can be borrowed to understand nonprofit finance and help build its own theories? In a limited literature review, this paper provides a quick summary about the known and unknown about nonprofit finance, with a greater emphasis on some topics rather than others.

What is nonprofit finance?

How to define nonprofit finance? Let us start by looking at the major concerns of corporate and public finance. Corporate finance focuses on the following three areas: 1) *capital budgeting*—what long-term investments (e.g. new plants, new products) should a firm make; 2) *capital structure*—where to obtain the long-term financing to pay for its investments, specifically, what is the best mix of equity and debt; and 3) *working*

capital—how should a firm manage the relationship between its short-term assets and liabilities to ensure its operations. Overall, the primary goal of corporate financial management is to increase the market value of the equity owned by shareholders (Ross, Westerfield, & Jordan, 2008).

Public finance is “the branch of economics that studies the taxing and spending activities of government” (Rosen, 2003, p. 252). Essentially, the study of public finance is about “the role of the government in the economy” (Gruber, 2005, p. 2). Some scholars, like Rosen (2003, p. 252), think that the term public finance is “a misnomer, because the fundamental issues are not financial (that is, relating to money). Rather, the key problems relate to the use of real resources.” The study of public finance encompasses both positive and normative analysis, with the former examining the cause and effect of a government policy or activity and the latter dealing with ethical issues like fairness (Rosen, 2003).

In light of corporate and public finance, the study of nonprofit finance should be considered from both financial and mission perspectives. First, the pure financial concerns are about obtaining and managing various sources of income. As Young suggests (2007, p.339), “any theory of non-profit finance must account for three basic issues—financing of current operations, financing of longer term capital needs, and the balance or mix among different sources of income for these purposes.” This is very similar to the three concerns of corporate finance. Second, the pure financial concerns are subject to nonprofit missions. As in the case of public finance, the use of nonprofit financial resources also involves ethical concerns. Nonprofits exist in society to serve social purposes rather than private inurement. Hence, the primary objective of nonprofit

financial management is “to ensure that financial resources are available when needed, as needed, and at a reasonable cost, and are protected from financial impairment and spent according to mission and donor purposes” (Zietlow, Hankin, & Seidner, 2007, p.43). In all, nonprofit finance is the study of financial resources procurement and management that support the social purposes of nonprofit organizations.

Why Study Nonprofit Finance?

Nonprofit organizations play an important role in society. They deliver goods and services when business and government fail to do so. They represent diverse voices and ideas that underlie a pluralistic society. They also make considerable contributions to the U.S. economy, accounting for over 5 percent of the GDP and over 9 percent of all wages and salaries paid in the U.S. (McKeever, 2015). Various types of nonprofit organizations constitute a large and fast-growing nonprofit sector. Between 2003 and 2013, the number of registered nonprofit organizations increased by 2.8 percent from 1.38 million to 1.41 million, not including the unknown number of unregistered nonprofits. About 35 percent of the registered nonprofits reported \$2.26 trillion in total revenue and \$5.17 trillion in total assets in 2013, growing even faster than the country’s GDP over the ten-year period (McKeever, 2015).

Yet, it is not rare to find individual nonprofits facing fiscal stress and going out of business. What should raise concerns is the “bad” management behind the scenes. There are many advantages as well as disadvantages associated with the nonprofit status, which have a direct impact on nonprofit financial management. Gift restrictions, for example, pose a unique challenge to nonprofits that struggle to maintain solvency. The only way to

use restricted gifts is to satisfy donor restrictions. In a survey of donative faith-based nonprofits, however, over half of the organizations reported they temporarily transferred from current restricted funds to meet a shortfall in current unrestricted funds, indicating that “interfund borrowing is a necessary evil practiced by many organizations” (Zietlow, et al., 2007, p.33). More high-profile controversial stories center around nonprofit organizations’ investments in fundraising. In 2012, CNN exposed two nonprofit organizations for spending less than 10% of their total revenue on mission-related services but owing millions of dollars to a direct-marketing company (Perry, 2012). How much is too much for nonprofit fundraising expenses? While marginal analysis is commonly used in the business world, the nonprofit sector seems to be stuck in the battle of accountability and efficiency, particularly when donors are only concerned about the average ratio of fundraising expenses to donations or services.

In all, nonprofit organizations provide significant social and economic values yet can be financially vulnerable. It is important for nonprofit managers to be armed with the appropriate knowledge that helps them to generate, manage, and make effective use of resources in order to accomplish their organizational missions. The study of nonprofit finance aims to provide such knowledge, through which nonprofit managers and policy makers will gain an understanding of the distinctive features of nonprofit finance and approaches to an effective decision-making in the complex operating environment.

Theoretical Perspectives from Microeconomics and Finance

There are in general two perspectives in the current study of nonprofit finance. The first mainly utilizes the ideas and tools from microeconomics to understand nonprofit

behavior, such as the concept of *incentives*, the analysis of the *margin*, the analysis of *markets*, the ideas from *cost-benefits analysis*, and theories of *market and government failure* and *public and private goods* (Young, 2007). The second primarily borrows the concepts and instruments from corporate finance to address the technical issues in nonprofit financial management, such as understanding financial statements, developing financial reports and ratios, liquidity management, long-term financial planning and capital budgeting, debt management, investment policy, risk management, financial performance evaluation, and so on (Zietlow, et al., 2007).

In addition to these two approaches, behavioral finance provides another approach to nonprofit finance, which has yet to attract more attention in future research. Behavioral finance studies how the psychology of investors or managers affects financial decisions and markets. Behavioral finance offers an alternative perspective to standard finance. Standard finance, also known as modern portfolio theory, is based on these four foundational pillars: 1) investors are rational; 2) markets are efficient; 3) investors design their portfolios according to the mean-variance analysis; and 4) expected returns are a function of risk alone. According to behavioral finance, however, investors are predictably irrational; markets are arguably inefficient; investors design portfolios according to the rules of behavioral portfolio theory; and expected return follows behavioral asset pricing theory (Statman, 2008). Behavioral finance may also be useful in explaining nonprofit financial behavior. For example, it can help us understand how nonprofit managers *actually* decide pricing strategies, product portfolios, and financial portfolios.

Major Topics in Nonprofit Finance

The Nonprofit Distinctiveness

Nonprofit finance is distinguished from corporate finance in many ways. The first difference lies in the objective of financial management. The goal of corporate financial management is to maximize the market value of the existing owners' equity. Nonprofits do not exist primarily to generate profits nor do they distribute surplus to their stakeholders. Rather, nonprofits are mission-driven; they use the surplus to further their social purposes. "The absence of owners seeking a handsome return on investment enables nonprofits to practice values-centered management" (Bowman, 2011, p.3).

Second, nonprofits differ from for-profits in the financial management decisions regarding capital budgeting, capital structure, and working capital management. In capital budgeting, a firm identifies the investment opportunities that will earn more than they cost and particularly, evaluates the size, timing, and risk of future cash flows (Ross, et al., 2008, p. 2-3). A nonprofit decides what new programs or ventures to engage in, based on not only pure financial concerns but also mission impact. Similar to for-profits, nonprofits can receive fees and commercial income by charging for goods and service that are private in nature (i.e., excludable and rival in consumption). Different from for-profits, nonprofits engage in both mission-related programs and unrelated business. The former produces "favored goods" that directly contribute to a nonprofit's mission but may subtract from profits, the latter produces "disfavored goods" that are peripheral to mission achievement but can help finance the core mission-related activities (James, 1983; Schiff & Weisbrod, 1991). The product portfolio analysis thus suggests that

nonprofit organizations, in deciding potential programs, should concern the overall balance of mission impact and financial sustainability (Oster, 2010).

Regarding capital structure, a for-profit firm considers the long-term financing to support its long-term investments, specifically, identifies the best mixture of debt and equity. Nonprofits cannot legally issue stocks, although some regard donations as a form of “equity” because donors receive “dividends-in-kind” when they receive the utility by seeing the nonprofit achieved its goal (Wedig, 1994, p. 258). Without the option of raising capital from stockholders, nonprofits rely on various forms of debt. In addition to bank loans, nonprofits can also obtain capital through program-related investments from foundations, which take various forms such as below-market-rate loans, loan guarantees, linked deposits, and equity equivalents (Yetman, 2010).

Working capital management is a daily activity to ensure a firm has sufficient resources for operations (Ross, et al., 2008, p. 3). Working capital is the difference between a firm’s current assets and current liabilities. The working capital ratio, measured by dividing current assets by current liabilities, indicates a firm’s liquidity. An important nonprofit difference that challenges nonprofit working capital management is that nonprofits have assets with donor restrictions. A gift is restricted if a donor specifies a specific purpose or time for its use or mandates to spend the earnings of a gift only. A gift may be temporarily or permanently restricted. As a result, nonprofits should exclude restricted assets from working capital.

Third, unlike for-profits, nonprofits have many revenue sources. In addition to sales of goods and services, nonprofits can generate income from many alternative sources, such as donations, grants, investments, and dues. Looking separately, each

revenue source has its own complications and implications. For example, regarding donations, special management considerations arise as there are restricted and unrestricted gifts. The decision on fundraising expenses involves both financial and ethical concerns. With respect to sales of goods and services, nonprofit managers need to balance the production of preferred and non-preferred goods. Controversies may arise on the unfair competition between nonprofits engaging in unrelated business and their for-profit counterparts. With government grants and contracts, there have been concerns about whether government funding crowds out private contributions (Tinkelman, 2010). With endowments, the question is on whether a nonprofit should accumulate endowments, which reflects a trade-off between serving the needs of the current and future generations (Hansmann, 1987). Taken together, nonprofit managers need to evaluate and decide an appropriate revenue composition that can best serve the nonprofit's mission.

In light of these distinctive features of nonprofit finance, I will summarize the major research topics on individual revenue sources as well as on their interactions and combinations. I will focus on individual giving, commercial income, government funding, investment income, membership income, leaving out other relevant topics such as foundation giving, corporate giving, the valuation of volunteer labor, income and property tax, and financial health and risk management.

Charitable Contributions

Charitable contributions include those from individuals, foundations and corporations. In 2014, the estimated total charitable giving was \$358.38 billion, of which

individual giving by living individuals accounted for 72% (80% if including bequest). Foundations giving constituted 15% of total giving and corporations only 5% (Giving USA 2015). Charitable giving appears to be less important than commercial income and government funding—its share in the total revenue of public charities was only 13.3% in 2014 (McKeever, 2015). It is nonetheless a primary source of income for nonprofits in some subsectors, such as arts and environment (Roeger, Blackwood, & Pettijohn, 2012). In fact, if seen from a different angle, charitable giving is a critical component of finance that two out of five nonprofits would have had a deficit without it (Bowman, 2011, p.137). I will focus on individual donations by living donors in the following discussion.

The large body of research on individual giving generally revolves around three important research questions. First, who gives what? Second, why do people give? Third, what is the optimal level of fundraising expenses? The first question is *who gives what*. That is, what are the characteristics of individuals and households that make donations and how are these characteristics related to how much and where people donate? In a comprehensive review on this topic, Bekkers and Wiepking (2007) summarized the key variables that influence people's charitable giving behavior, including: personal and household income, wealth, employment status, religion, education, age, marital status, number of children, gender, race, ethnicity, immigrant/citizenship status, parental background, volunteering, region, and so on. Knowledge on this topic is largely descriptive. While it helps practitioners and policy makers to identify the current status and future trends of charitable giving, it offers limited value to fundraisers on how to design fundraising campaigns (Bekkers & Wiepking, 2007).

In contrast, understanding *why do people give* provides valuable information for policymakers to develop tax policies and for fundraisers design fundraising campaigns. Vesterlund (2006) did an excellent review of the economics studies on motivations for individual charitable giving. Economists “think about charitable giving as it is just like the purchase of any other commodity” (Vesterlund, 2006, pp. 568). Therefore, contributions are expected to depend on an individual’s income and the price of giving. The price of giving tells us how much it costs to give a nonprofit an additional dollar; for itemizers, the price of giving depends on their marginal tax rate. Economists have examined how sensitive charitable giving is to income and price, measured respectively as the income and price elasticities of demand. In general, studies find that giving is income inelastic but price elastic (Vesterlund, 2006). Knowing how sensitive charitable giving is to income and price not only helps us to predict how changes in the economy and tax policy will affect charitable giving but also can help the government to design better tax policies.

In addition to the effects of income and price, the potential benefits of charitable giving to donors also matter. Vesterlund (2006) summarized two types of benefits often used by economists: public benefits (both the donor and other individuals can enjoy the benefits from giving) and private benefits (only the donor can enjoy the benefits from giving). Previous studies reported various types of private benefits that can motivate individual donations, including material rewards, reputation and social acclaim, signaling of wealth, warm glow, assuaging guilt, commitment, and so forth. According to economists, if an individual is fully motivated by private benefits, her contributions will not be affected by others’ donations. If the benefit is public, then an individual has an

incentive to free ride on others' donations. A related issue is how an increase in government grants to nonprofits will affect individual giving. If the benefit is purely private, then we should observe no effect. If the benefit is purely public, then we can expect complete crowd-out when the economy is large. Findings from many empirical studies suggest that the last dollar donated is motivated by private benefit instead of the nonprofit's output (e.g., Ribar & Wilhelm, 2002), but the result may be altered when considering the interactions among donors or the impact of social norms (Vesterlund, 2006). The knowledge about the motivations for individual giving is informative for fundraisers who want to design effective fundraising campaigns. It can help policy makers and nonprofit managers who are interested in developing policies and mechanisms that can solve the free-rider problem.

The third question is *what is the optimal level of fundraising expenses?* There has long been a debate on how to properly evaluate a nonprofit's fundraising efficiency. Donors would prefer their donations to be spent on programs rather than on fundraising or administrative activities. Therefore, donors would like to give to nonprofits with a low level of fundraising ratio, measured as the ratio of fundraising expenses to donations. Nonprofits with a high fundraising ratio may suffer increased public scrutiny. The fundraising ratio is problematic: based on financial statements or Form 990s, donors can only obtain the historical average ratio rather than the current marginal ratio. Empirical evidence indicates that the incremental responses of donations to increases in fundraising expenses are poorly correlated with the average ratios (Tinkelman, 2006). Instead, Steinberg (1991; 1986) developed a theory and suggested that nonprofits should think at the margin. That is, program-maximizing managers can optimize their investments in

fundraising by spending on fundraising up to the point where an additional dollar raised would be just offset by the last dollar spent; budget-maximizing managers can spend until the marginal response to an additional dollar of fundraising equals zero. Knowledge on this topic has important implications for fundraising practice, financial management, and accountability of nonprofit organizations.

Commercial income

Nonprofit organizations can generate income by charging fees for goods and services that are sufficiently private in nature (i.e. excludable and rival in consumption). In addition to the sales of mission-related goods and services, they may also engage in unrelated business that only indirectly contributes to their missions by providing financial support. In fact, almost half of the total revenue of public charities came from private payments for goods and services in 2013. If including fees from government sources, such as Medicare and Medicaid, fee income accounted for 72% (McKeever, 2015). The commercialization of nonprofits has raised a lot of scholarly attention (e.g., Weisbrod, 1998). Why do nonprofits engage in commercial activities? How should nonprofits decide the mix of goods or services so to achieve an overall balance of mission and revenue impact? How should nonprofits set prices for different goods and services? Additional concerns arise as commercial activities may cause the mission drift of nonprofits and the unfair competition between nonprofits and their for-profit counterparts.

Multiproduct firms. James and Young (2007) summarized several economic theories that explain the reliance of nonprofit organizations on fee income. On the

demand side, nonprofit organizations provide private goods and services in response to the contract failure caused by the asymmetric information between producers and consumers. The supply side theory emphasizes the role of entrepreneurs in establishing nonprofit organizations and seeking additional revenue in the marketplace. According to the model developed by James (1983) and later Shiff and Weisbrod (1991), nonprofits are multiproduct firms in which nonprofit managers derive utilities from producing “preferred” goods and services that satisfy their non-pecuniary motivations and also engage in “non-preferred” commercial activities that cross-subsidize their preferred activities. This model suggests that nonprofits “generate an overall balance of mission impacting and revenue generating activities, such that in the end they are able to be financially sustainable while maximizing their mission objectives” (James & Young, 2007, pp. 113). Based on this model, the nonprofit product portfolio theory provides a framework for nonprofits to choose potential programs with an overall balance of mission and revenue impact (Oster, 2010).

Pricing. Nonprofits can secure revenue by charging fees for goods and services that are sufficiently “private.” Regardless of organizational form, pricing plays an important role in reducing congestion and rationing (and shifting) usage when capacity is constrained. Sophisticated pricing strategies, such as differential pricing and product bundling strategies, can be used to generate more revenue (Seaman, 2010). Pricing is more complicated for nonprofits because they are multiproduct organizations with complex objectives and multiple revenue sources. According to Young and Steinberg (1995, p.160-176), there are five considerations that influence nonprofit pricing strategies: First, the interactions between sales and other sources of revenues, especially

donations. Second, the scope of cross-subsidizing one output using profits from another, particularly, using profits from unrelated business to finance mission-related output. Third, the design of price discrimination policies, specifically, charging a higher price to customers who are able to pay while a lower price to those mission targets who are not able to pay. Fourth, product differentiation in consideration of the long-run competition. Last but not least, the impact of pricing on the mission objective of nonprofit organizations, such as the attainment of output, the effectiveness of expressive missions, the motivational effect on client effort, and the screening effect among different groups of consumers.

In exploring nonprofit pricing, economists are especially interested in understanding “the roles played by demand, capacity constraints and congestions, cost and cost uncertainty, subsidies, competitive versus market power considerations, complex objective functions, and the forces of tradition versus innovation” (Seaman, 2010, pp. 142). Also of interest are the differences between nonprofit and for-profit pricing (e.g., Steinberg & Weisbrod, 1998). Some areas of nonprofit pricing are better understood than others. For example, there has been plenty of theoretical work and empirical studies on price discrimination and product bundling, particularly among performing arts nonprofits and universities (e.g., Hansmann, 1981; Steinberg & Weisbrod, 2005). The effect of competition and market power on nonprofit pricing, particularly among hospitals and universities, has also received a lot of scholarly attention (e.g., Greaney, 2006). However, there is thinner research on the fifth issue identified by Young and Steinberg (1995), such as the psychological role that pricing may play in the behavior of clients and its

implications for optimum pricing. Readers who are interested in the current status of nonprofit pricing studies can refer to Seaman (2010).

Government funding

Government funding to nonprofit organizations come in various forms—tax subsidies, grants, and contracts. The U.S. federal government and many state governments support qualified nonprofits by allowing donors to deduct their charitable contributions from their income tax. 501(c)3 nonprofit organizations are exempt from corporate taxes. In addition to tax subsidies, many nonprofits also receive government grants and contracts, particularly those providing health care and human services (Grønbjerg & Salamon, 2012). In fact, the combined revenue from government grants and contracts constituted about one third of the total revenue for public charities in 2013, making government funding (not including tax subsidies) the second largest revenue source after private payments for goods and services (McKeever, 2015).

Public administration scholars have examined the advantages and disadvantages of government funding using institutional theory and resource dependence theory. On the one hand, government funding is found to be a revenue source with high stability and continuity (e.g., Grønbjerg, 1992; Froelich, 1999). On the other hand, scholars cast caution to the reliance on government funding (Rushton & Brooks, 2007; Froelich, 1999). The fundamental issue related to government funding is the relationship between the nonprofit sector and government. In a comprehensive examination of the past 30 years' government-nonprofit relations, Grønbjerg and Salamon (2012) conclude (pp. 578):

After a rapid period of expanding cooperation, nonprofits have had to deal with a significant retrenchment in public funding, a widespread diversification of the forms of public assistance, a shift from producer-side to consumer-side subsidies, the loss of their “preferred-provider” status in many government programs, increased demand for efficiency, less favorable tax regimes, increased regulatory pressure, and a far more fragmented policy arena.

The implication? Government funding comes with many strings attached. Managing government grants and contracts are likely to cause changes in the management process and organizational structure of nonprofit organizations (e.g., Grønbjerg, 1991; 1992, Froelich, 1999).

There is abundant research on government funding. Besides the perspectives from public administration, economists have examined the effect of tax policies on charitable giving and nonprofit behavior (see the section on charitable contributions), as well as the crowding out effect of public funding on private donations (see the section on revenue interactions).

Investment income

Investment income—interest, dividends, and capital gains from investments in cash, stocks, or bonds—only accounted for about five percent of the total revenue of public charities in 2013 (McKeever, 2015). Nonetheless, investment income is an important revenue source for a small number of organizations with funds available for investing. Nonprofit organizations can use a highly liquid working cash fund, usually consisted of investments in money market funds or bonds with high credit quality and short maturity (e.g., T-bills), to supply cash quickly in the event of a negative cash flow (Bowman, 2011, p. 35). Nonprofits can also build operating reserve funds to cover

unexpected budget deficits, among other purposes (Bowman, 2011, p. 35). Moreover, distinguished from for-profits, nonprofit organizations can hold endowments. Through a well-managed portfolio of long-term investments, endowed nonprofits can have “a perpetual source of income” (Bowman, 2011, p. 40).

Should nonprofits accumulate endowments? On the one hand, quasi-endowments can supply a stable source of income that comes with no strings attached and offers a hedge against the unpredictable losses in other sources of income. On the other hand, for some assets (e.g., historical buildings), their maintenance and operation costs may be more than their income can cover. Like in the case of a loss-making mission-related activity, a for-profit “would get rid of any asset with a negative expected return, but a nonprofit manager is constrained to keep it and find a way to pay for it” (Bowman, 2007, p. 283). Challenges also come from whether accumulating a large endowment for future is a better use of resources than spending them for today’s societal needs. Hansmann (1990) questioned the notion of intergenerational equity as the purpose of endowment accumulation by universities and colleges (p. 9):

In a college or university, each dollar added to endowment represents a dollar less for current research or for educational services to current students or a dollar more in tuition that must be charged current students in order to provide them with the same level of services. The amounts thus saved will presumably be used to provide more research, more education, or lower tuition in the future. Why, then, do universities save rather than spend so much of their income?

Mission-related Investments. Hansmann (1990) made a particularly intriguing comment on the form of investments, that is, financial investments “may not be the best means to the end” even if a university aims to help future generations, because “it is implicitly making the judgement that the dollar will have a higher rate of return if

invested in stocks and bonds than in educating an undergraduate” (p. 18). Similar to Hansmann’s comment on universities and colleges, some thought leaders and practitioners in the field of philanthropy have been urging foundations to make better use of their endowments. Private non-operating foundations, which account for over 90 percent of the U.S. foundations, are required by law to distribute about five percent of their net investment assets for charitable purposes and manage the rest, around 95%, of their assets for pure financial returns without considering social values. For this reason, some thought leaders have been advocating bridging the gap between foundations’ charitable programs and asset management by using investment strategies that align financial investments with mission achievement (Emerson, 2003).

Program-related investments (PRIs) and mission-related investments (MRIs) are examples of the unconventional investments that support foundations in achieving both charitable purposes and some financial returns. Specifically, PRIs are legally defined charitable activities to primarily support foundations’ charitable missions. PRIs, made from either a private foundation’s program funds or investment assets, allow a foundation to gain moderate financial benefits through the repayment of principal and returns on below-market-rate loans or equity. MRIs, on the other hand, are essentially financial investments with social purposes. Made from foundations’ investment assets, MRIs are usually market-rate investments and subject to prudent investor standards as conventional investments (Qu & Osili, 2016). In the field of practice, PRIs and MRIs have garnered much attention. However, the academic research on PRIs and MRIs barely exists. For future research, on the investor side, it would be interesting to examine foundations’ portfolio of mission-related investments in conjunction with other exogenous sources of

income and evaluate the overall impact of those investments. On the recipient side, it would be interesting to explore the impact of mission-related investments on the capital formation of nonprofit organizations.

Membership income

Membership income is a unique source of income to nonprofit membership associations, which comprise about a quarter of the registered nonprofit organizations excluding congregations (NCCS, 2015). Members support their associations in various ways. They pay membership dues and fees; they may also make charitable donations. While only accounting for a tiny portion (less than 1%) of the total revenue for the average 501(c)(3) nonprofits, dues are a significant revenue source for other 501(c) nonprofits, particularly social and recreational clubs, labor, agricultural, or horticultural groups, and business leagues (McKeever, 2015; Steinberg, 2007). The significance of membership dues is likely to be underestimated because the above findings are based on the IRS 990 Form entry on “membership dues and assessments,” in which nonprofits can report only a portion of the actual dues that are commensurate with membership benefits and treating the rest of the dues as member contributions.

Research on the finance of nonprofit membership associations is rare. There are only two studies that I am aware of. First, Steinberg (2007) specified a functional definition of dues and developed a theory that provides guidance to optimize rates and structures of dues. According to the nature of goods provided by an organization and the organization’s governance structure, dues can function as donations, pure dues, or some mixture of these categories. Dues are like donations when an organization provides

nonexcludable collective goods and members do not govern; they otherwise function as pure dues if the organization offers members governance rights or when the organization provides excludable collective goods. Generally, to decide member dues, an organization should consider its mission type, solvency, fairness, member characteristics, and competition (Steinberg, 2007). Bowman's unpublished manuscript (collected in 2014) offers insights into the financial management of membership associations. He found some empirical evidence on the negative correlations between program service revenue and membership dues, indicating that membership associations use program service revenue to keep membership dues low.

There are many interesting but unexplored questions regarding membership income. For example, how do membership dues interact with other sources of income, such as member donations? Does an increase in dues come at the expense of decreased donations? How does a due structure, that is, different rates across membership categories, influence member donations? The unavailability of survey data on dues poses challenges to the study of membership income. Nonetheless, some questions can be explored through experiments. My essay on service club membership and generosity is the first attempt, which hopefully to serve as a basis for more sophisticated experimental studies I would like to follow later.

Revenue Interactions

I have discussed the various sources of nonprofit revenue. How do these different sources of revenue interact with each other? That is, does the increase in one source of revenue lead to the decrease (increase) in others? The issue of "crowding out" and

“crowding in” is complex and needs to be considered at three different levels: the national level, the sectoral level, and the organizational level (Tinkelman, 2010). First, at the national level, we compare total giving, total government spending on the program areas that also supported by nonprofits, and the total level of other sources of nonprofit revenue. Past empirical studies present mixed results on the interactions between individual donations and government spending. Based on the data of federal spending and private giving as a percent of GDP since 1966, Tinkelman (2010) found that government spending and nonprofit program service revenue have both increased faster than GDP while donations have stayed around 2% of GDP. Overall, donations are driven by people’s willingness to give a certain portion of their disposable income (around 2%) and are more or less independent of the other types of revenue.

Second, at the sectoral level, an interesting question is the national demand for a particular public good, particularly, does an increase in government funding for a particular public good crowd out private donations? Scholars are also interested in whether and how various forms of government grants (i.e. matching grants, seed money, or simple lump-sum unrestricted payments) affect the interaction. There is an impressive body of literature on the interaction of individual giving and government funding. Both Tinkelman (2010) and Vesterlund (2006) provided an excellent account of previous empirical studies relying on survey or tax return data. While the reported strengths and directions of the crowding effects vary across studies, most studies reported a crowding out rather than crowding in by government funding. Vesterlund (2006) also summarized some experimental studies and found that the crowding out effect is larger than that

reported by empirical studies. When the strong assumptions of the classical model are relaxed, we may observe the crowding effects at various levels.

Tinkelman (2010) listed six explanations for the incomplete crowding out. First, people may derive utility from the act of giving itself (the “warm glow”), which cannot be substituted by the utility they derive from the level of the public good produced (Andreoni, 1989; Steinberg, 1985; Arrow, 1972). In this case, we would expect incomplete crowding effects. Second, a nonprofit may differentiate how its service mix is supported, making government funding and private giving complementary. Third, individuals may not have perfect information when making their giving decisions (e.g., a nonprofit’s funding sources, program quality, the beneficiaries). Fourth, the cost function of public-good provision may not be linear and continuous. Fifth, the complete crowding out would not hold if not everyone in the economy originally contributes to the public good (Bergstrom, Blume, & Varian, 1986). Finally, the relation between any two revenue sources may not be a simple linear relation. It could be crowding in at low levels of government subsidy and crowding out at higher levels (Brooks, 2000).

The third level is to consider revenue interaction at the organizational level. That is, does the level of private donations to an organization, as well as other sources of revenue, respond to an increase or decrease in government funding? Are the crowding effects due to the acceptance of government funding or the strategic decisions of nonprofit managers? Crowding out may result from not only donors’ perceptions of the funding change but also nonprofit managers’ strategic reactions, or both. The model of multiproduct firm indicates that managers may respond to the decrease in the revenue from their preferred activities by pursuing revenue from non-preferred areas. Similarly,

when obtaining new financial resources, nonprofit managers might decrease the non-preferred activities, such as unrelated business or fundraising efforts. Many recent studies are consistent with the predicted managerial reactions (e.g., Andreoni & Payne, 2003). See Tinkelman (2010) for a summary of the studies.

Revenue Diversification

Given the many revenue sources and the complexities, scholars have been interested in nonprofit revenue choice and how a certain revenue composition may affect the financial health and organizational success of a nonprofit. My essay on nonprofit income portfolio optimization is also along this line. Among the existing studies, some have focused on whether revenue diversification or concentration is associated with the financial health of nonprofits (e.g.; Tuckman and Chang, 1991; Chang and Tuckman, 1994; Greenlee and Trussel, 2000; Carroll and Stater, 2009; Frumpkin and Keating, 2011; Chikoto and Neely, 2014). Others have developed theories that explain the revenue choice by nonprofit managers (e.g., Grønbjerg, 1992; Bielefeld, 1992; Kingma, 1993; Chang and Tuckman, 1994; Froelich, 1999; Kearns, 2006; Young, 2006). I will focus on the latter issue in the following discussion. A detailed literature review on the former issue is available in my essay on nonprofit income portfolio optimization.

What motivates a nonprofit manager's choice of revenue mix? Scholars from different disciplines have offered different explanations. Institutional theory posits that nonprofits seek heterogeneous revenue sources to increase their legitimacy and recognition in a community (Galaskiewicz, 1990; Bielefeld, 1992). Alternatively, resource dependence theory suggests that nonprofits can achieve funding stability and

organizational success by concentrating on a few revenue sources as they develop a long-time relationship with a few funders (e.g. Grønbjerg, 1992; Froelich, 1999). Based on the utility maximization model of traditional microeconomic theory, Chang and Tuckman (1990, 1991) hypothesize that nonprofit managers are motivated by a desire to increase surplus to accumulate wealth and equity. As a result, nonprofit managers consciously pursue a diversified revenue mix to manage financial risk and reduce financial vulnerability. Similarly, Kingma (1993) interpreted the goal of nonprofit managers as “to provide a certain level of services (a given level of expected return) while minimizing unpredictable changes in revenues (risk)” (p. 105). According to the “multiattribute utility theory” developed by Kearns (2007), a nonprofit organization has a complex organizational structure with multi-stakeholders inside and outside of the organization. Therefore, deciding nonprofit revenue mix is a process influenced by many stakeholders’ perspectives and utilities. Young’s (2006) normative theory suggests that nonprofit managers should choose an income portfolio that reflects the mix of benefits it provides in addition to the financial management concerns (e.g., feasibility, interactions, solvency, risk, mission).

Despite the fruitful research, Chang and Tuckman (2010) suggest several interesting future research topics, among which they state there is need to identify measures of risk for the sector and to use these measures to evaluate the growth of nonprofit revenue streams and their volatility. While with a different study motivation, my essay on nonprofit income portfolio optimization is also a response to this suggestion by Chang and Tuckman.

Connecting the Dots

Nonprofit finance concerns obtaining and managing various financial resources in order to support the social purposes of nonprofit organizations. The concepts and tools from corporate finance and microeconomics have informed nonprofit finance, but we should also bear in mind that nonprofit finance is different from corporate finance in many ways. Nonprofits differ from for-profits in both the financial management objective and the decisions regarding capital budgeting, capital structure, and working capital management. Unlike for-profits, nonprofits can generate income from many alternative sources. Looking separately, each revenue source has its own complications and implications to financial management. Taken together, the sources of revenue may interact or correlate with each other and influence the performance of the overall portfolio. Therefore, nonprofit financial management involves answering two fundamental questions: What is the optimal combination of revenue sources that supports a nonprofit to achieve its mission? Where and how to obtain the revenue sources? My two essays address these two questions respectively.

The first essay is among the first to properly apply modern portfolio theory (MPT) to the optimization of nonprofit revenue mix. By analyzing nonprofit tax return data, I estimate the expected return and risk characteristics for five nonprofit revenue sources as well as the correlations among these returns. I use the estimates to identify the efficient frontier for nonprofits in different industries, based on which nonprofit managers can select an optimal portfolio that can minimize the risk given a preferred level of service provision or maximize the service given a level of risk. The findings also pose a challenge to the predominant approach used in previous nonprofit finance studies

(Herfindahl-Hirschman Index) and suggest that MPT is theoretically and practically more helpful in guiding nonprofit revenue management.

The second essay concerns nonprofit resource attainment, specifically, how do decisionmaking contexts and framing affect donations. A laboratory experiment was designed to test whether membership in a nonprofit service club makes a person more generous. Membership in a service club is characterized by two essential elements: members' shared interest in the club's charitable mission; and private benefits that often come as a result of social interactions with other members, such as networking, fellowship, and fun. The study finds that female individuals are the least generous when they are reminded of the socializing aspect of service-club membership. Male individuals in the social treatment donated more than those in the mission treatment mathematically, although the results are not statistically significant. Results are consistent with a variant of social identity theory we develop, as well as motivational crowding-out from psychology and economics.

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Essay I Modern Portfolio Theory and the Optimization of Nonprofit Revenue Mix

Heng Qu

Abstract

A unique feature of nonprofit finance is that nonprofit organizations receive revenue from a variety of sources. Therefore, an important question of nonprofit financial management is: what is the optimal combination of revenue sources that best serves a nonprofit? Previous literature on the impact of nonprofit revenue structure shows mixed results. While most studies suggest that “revenue diversification” reduces financial vulnerability and revenue volatility, a few other studies instead indicate revenue concentration contributes to organizational efficiency and revenue growth. These studies predominantly use Herfindahl-Hirschman Index (HHI) as an indicator of revenue diversification, which, however, is an inappropriate measure according to modern portfolio theory (MPT). In this paper, I use MPT as an alternative approach to examining nonprofit revenue mixes. By analyzing the NCCS-GuideStar Digitized Data from 1998 to 2003, this paper demonstrates how to find the optimal revenue mix using the MPT approach and examine whether HHI is a reliable indicator of risk.

Key words: Modern Portfolio Theory, revenue mix optimization, revenue diversification, revenue concentration, risk, Herfindahl-Hirschman Index

Introduction

Nonprofit organizations receive revenue from a variety of sources. In 2013, for example, the \$1.73 trillion total revenue reported by nearly one million public charities was composed of 47.5 percent program service revenue from private sources, 32.5 percent government funding, 13.3 percent private contributions, 4.8 percent investment income, and 1.9 percent other sources (McKeever, 2015). Taking a more granular look, program service revenue from private sources can include ticket sales for arts and culture organizations, tuition payments for education organizations, or patient revenue for hospitals, among others. Government funding can be grants, contracts, or fees for goods and services. Private contributions can be gifts and grants from individuals, foundations, or corporations. Investment income includes interest on savings, dividends from securities, rental income, and capital gains. “Other income” can include a range of revenue sources, such as membership dues, special events, sales of assets, sales of inventory, and so forth.

To a certain degree, nonprofit organizations have a choice over different mixes of revenue sources. Nonprofit scholars tend to simplify it as choosing a more concentrated or diversified revenue structure. Many empirical studies favor revenue diversification, suggesting that diversification can increase community buy-in and organizational legitimacy (Bielefeld, 1992; Galaskiewicz & Bielefeld, 1998), reduce financial vulnerability (e.g., Tuckman & Chang, 1991; Greenlee & Trussel, 2000; Hager, 2001), or decrease revenue volatility (e.g., Carroll & Stater, 2009; Wicker, Longley, & Breuer, 2013). A few studies support revenue concentration, demonstrating that such concentration can contribute to organizational success (Grønbjerg, 1992), organizational

efficiency (Frumkin & Keating, 2011), and financial capacity growth (Chikoto & Neely, 2014). Many studies have been focused on what determines a nonprofit's revenue structure and how the structure influences a nonprofit's financial health and performance, but few studies provide insights on what is and how to choose the optimal combination of revenue sources for a nonprofit organization. This paper fills the gap in the literature by exploring the question of nonprofit revenue mix optimization.

Methodologically, previous studies predominantly use the Herfindahl-Hirschman Index (HHI) as an indicator of revenue diversification to predict nonprofit financial health. According to the HHI approach, a revenue mix becomes more diversified as the number of revenue sources increases and/or the shares of sources become more equal. The higher the degree of diversification, the lower the level of a nonprofit's financial vulnerability or revenue volatility. The HHI approach, however, has major drawbacks. First, it only captures the number of revenue sources and the proportion of each source to total revenue, without considering the covariances between revenue sources, that is, how one individual revenue source moves in relation to another. Second, HHI uses information on gross revenue, leaving out the expenses involved to generate a certain level of revenue and ignoring the volatility of each revenue source. In contrast, modern portfolio theory (MPT) suggests that simply increasing the number of revenue sources in a portfolio does not necessarily reduce the portfolio risk and more revenue sources do not always lead to a well-diversified portfolio (i.e. revenue mix in a nonprofit setting). Because portfolio risk depends on both the variability of the returns on individual revenue sources as well as the covariances between the returns, the magic of revenue diversification works by carefully selecting revenue sources, the returns on which have

low correlations with one another (Markowitz, 1952; 1959). However, with the exception of Kingma (1993) and Grasse, et al. (2015), very few studies paid attention to the covariances between the returns on nonprofit revenue sources. Even the two articles applying MPT did not properly use the MPT approach to calculate nonprofit portfolio risk as their empirical results are based on the gross revenue growth rather than the net return of revenue sources.

In this paper, I use MPT as an alternative approach to HHI to examine a less explored but more meaningful question: what is the optimal combination of revenue sources that can best support a nonprofit organization to achieve its mission (i.e. the provision of mission-related services and goods)? This is a optimization problem, in which a nonprofit manager's goal is to choose a combination of revenue streams (i.e. a portfolio) that can maximize the organization's services (i.e. expected portfolio return) given her level of risk tolerance, or alternatively, a revenue mix that can minimize the unexpected changes (i.e. portfolio risk) given a certain level of services (Kingma, 1993). To answer this question, I analyze the National Center on Charitable Statistics (NCCS)-GuideStar National Nonprofit Research Database ("digitized data") between 1998 and 2003. The five revenue sources explored in this paper include contributions and grants; land, buildings, and equipment for investments; savings and temporary cash investments; securities; and sales from special events and activities. For each of the four major nonprofit subsectors (arts, culture, and humanities; education; health; and human services) and the whole sample, I examine the expected return and risk characteristics of the five nonprofit revenue sources as well as the correlations between the returns on revenue sources. I then demonstrate how to use the information to identify efficient frontiers for

nonprofits in different industries, based on which a nonprofit manager can select the optimal revenue mix that minimizes the risk given her preferred level of service provision. I find that the specific expected return and risk characteristics of individual revenue sources, as well as efficient frontiers, vary by each subsector. Regardless, similar patterns hold across different subsectors. Contributions and grants are the riskiest (and most rewarding) revenue source among all, and the return from contributions and grants has significant and high correlations with the returns on savings and temporary cash investments, and securities. Comparing HHI and the portfolio risk based on the MPT approach, I find that revenue mixes with a small number of revenue sources, or a high level of revenue concentration as indicated by HHI, do not always have high portfolio risk; and lower levels of HHI exhibit no associations with optimal revenue mixes.

This paper makes methodological and theoretical contributions by correctly applying the MPT approach to studying nonprofit finance, which, as shown from the results, is better than the HHI approach in guiding nonprofit revenue strategies. In the following sections, I will first summarize the literature on nonprofit revenue diversification and introduce modern portfolio theory. Then, I will describe methods, followed by a discussion on data. Next, I will present the results on the characteristics of revenue sources and the efficient frontiers by subsector and the whole sample, and compare HHI and MPT. Finally, I will conclude by discussing the contributions and limitations of this study, along with plans for future research.

Literature

HHI and Nonprofit Revenue Diversification

The large body of literature on nonprofit revenue strategies revolves around two major questions: First, how does the level of revenue diversification, measured by HHI, influence the financial health and organizational performance of nonprofits? Second, what affects the revenue composition of a nonprofit? Theories exist to explain why and how nonprofits choose a certain revenue combination.

Revenue diversification and nonprofit financial conditions. The first strand of the literature focuses on developing models to predict the financial health and performance of nonprofit organizations. Revenue diversification, measured by HHI, is a key independent variable in nearly all of the existing empirical studies. Tuckman and Chang (1991) first introduced revenue concentration as one criterion of nonprofit financial vulnerability, and they further elaborated the Revenue Diversification Index based on HHI (Chang & Tuckman, 1994). Shown in the formula below, the level of revenue diversification is measured as the sum of the squares of the shares of the revenue from individual revenue sources to total revenue:

$$DI = \left(\frac{r_1}{R}\right)^2 + \left(\frac{r_2}{R}\right)^2 + \dots + \left(\frac{r_n}{R}\right)^2 = \sum_{i=1}^N \left(\frac{r_i}{R}\right)^2,$$

where N is the total number of revenue sources, r_i is the revenue from the i th revenue source, and R is the total revenue from all sources. DI is on a scale of zero to one. The closer the index is to zero, the greater the degree of revenue diversification. DI decreases as the total number of revenue sources increases or when the shares of individual revenue sources are distributed more equally.

Tuckman and Chang (1991) initiated the line of research on nonprofit *financial vulnerability*. They defined financially vulnerable nonprofits as those “likely to cut back its service offerings immediately when it experiences a financial shock” (p.445). While Tuckman and Chang did not offer an operational definition of financial vulnerability, other scholars operationalized the definition, using measures as a reduction in program expenses or a decrease in net assets (e.g., Greenlee and Trussel, 2000; Trussel, 2002; Frumpkin and Keating, 2011). In general, these studies report a statistically significant positive correlation between revenue concentration and financial vulnerability of nonprofit organizations, suggesting that revenue diversification is a rewarding strategy for nonprofit financial health.

The other line of research, also using HHI as an indicator of revenue diversification, concentrates on *revenue volatility*, and generally finds that nonprofits with a higher level of revenue diversification experience lower revenue volatility. In addition to this general finding, Carroll and Stater (2009) admit that the “positive effect of diversification on revenue stability does not capture possible trade-offs [crowding out] between funding sources, for instance earned income crowding out private donations” (p. 962). Mayer and his colleagues (2012) point out that simply increasing the level of revenue diversification does not necessarily reduce revenue volatility, and that “the impact of a change in diversification depends very much on the composition change of a portfolio” (p.15). Wicker and her colleagues (2013) report that revenue diversification has a greater impact in reducing club-specific volatility than systematic volatility for a sample of German sports clubs, which is consistent with modern portfolio theory.

In contrast, a few studies provide evidence in favor of revenue concentration. Grønbjerg (1992) find that human service organizations with high reliance on a single institutionally based revenue source scored higher in organizational success (e.g. surpluses, fund balances). Similarly, a study of 144 nonprofits whose annual revenue had increased to at least \$50 million since 1970 shows that most of these organizations grew by concentrating on a single revenue source that offered a good match for their work (Foster, Kim, & Christiansen, 2009). Two other studies that use HHI to measure revenue diversification (concentration) also report similar results. Frumpkin and Keating (2011) note that the rewards of revenue diversification (i.e. financial health) are achieved at the cost of organizational efficiency (i.e. administrative expenses, fundraising expenses, and fundraising efficiency). Chikoto and Neely (2014) suggest that revenue concentration, rather than revenue diversification, contributes to the financial capacity growth of nonprofits.

Factors of nonprofit revenue composition. Nonprofit organizations vary in their revenue composition. For example, private contributions are the most important revenue source for arts, culture, and humanities organizations, while private payments for goods and services account for a significant portion of total revenue for education, health, and human service organizations (Roeger, Blackwood, & Pettijohn, 2012). Therefore, another strand of literature focuses on the factors that affect nonprofit revenue composition. Some empirical studies find that the level of revenue diversification varies by types of nonprofit activities as well as types of organizations. For instance, commercial nonprofits have higher revenue concentration than donative nonprofits; nonprofits with high fundraising expenditures have a higher level of revenue diversification (Chang & Tuckman, 1994).

Some studies find that a nonprofit's revenue mix is determined by the nature of the services it provides. Contrary to the findings of Chang and Tuckman (1994), Fischer, et al. (2011) report that nonprofits offering private benefits to a specific group of individuals rely more on earned income and have more diversified revenue streams. In contrast, those providing public benefits to the general public depend more on donations and have a higher level of revenue concentration.

Scholars from different disciplines offer different explanations on the choice of nonprofit revenue composition. Institutional theory posits that nonprofits seek heterogeneous revenue sources to increase their legitimacy and recognition in a community (Bielefeld, 1992). Resource dependence theory suggests that nonprofit can achieve funding stability and organizational success by concentrating on a few revenue sources as they develop a long-time relationship with a few funders (e.g. Grønbjerg, 1992; Froelich, 1999). According to the "multiattribute utility theory," nonprofit portfolio decisionmaking is influenced by many stakeholders' perspectives and utilities (Kearns, 2007). Young's (2007) normative theory suggests that nonprofits should choose an income portfolio that reflects the mix of benefits it provides in addition to the financial management concerns (e.g., feasibility, interactions, solvency, risk, mission). Last but not the least, the economics perspective of objective maximization rationalizes nonprofit behavior as objective-maximizing activities subject to some known constraints (e.g., Weisbrod, 1988; Hansmann, 1987; James, 1983). For example, Chang and Tuckman (1990; 1991) hypothesize that nonprofit managers are motivated by a desire to increase surplus to accumulate wealth and equity. As a result, nonprofit managers consciously pursue a diversified revenue mix to manage financial risk and reduce financial

vulnerability. The objective maximization perspective has been also applied to model optimal fundraising expenses (Steinberg, 1991) and optimal rates and structures of membership dues (Steinberg, 2007). As to the choice of revenue composition, nonprofits either seek to maximize their mission-related services given a level of risk tolerance; or minimize the financial risk for a chosen level of services (Kingma, 1993). This paper follows the economic perspective of objective maximization.

The existing research offers much insight into nonprofit revenue management but provides little guidance on what is an optimal combination of revenue sources. For the majority of research debating on revenue diversification versus concentration, HHI is not a stable indicator of revenue diversification. Hence, it is important to develop a more refined measurement of revenue diversification, which is the MPT approach discussed below.

Modern Portfolio Theory and Nonprofit Finance

Modern portfolio theory and its key insights. Harry Markowitz, through his essay “Portfolio Selection” (1952) and book *Portfolio Selection: Efficient Diversification of Investments* (1959), developed the theory of portfolio choice, which establishes the foundations of the modern portfolio theory. For his pioneering contributions to the theory of financial economics and corporate finance, Harry Markowitz, along with Merton Miller and William Sharpe, was awarded the Nobel Prize in Economic Sciences in 1990. MPT suggests that the purpose of portfolio analysis is to find portfolios that best meet the objectives of an investor (Markowitz, 1975, p.3). Investors can make their portfolio choices by balancing the expected return and risk of a portfolio, also known as the mean-

variance analysis. The risk of a portfolio depends on the variance of return on each individual asset as well as the pairwise covariances of returns on assets. Therefore, a well-diversified portfolio can mitigate risk by considering both the variances and covariances.

MPT offers three important insights to portfolio selection. First, “A good portfolio is more than a long list of good stocks and bonds” but “a balanced whole” (Markowitz, 1975, p.3). Investments are risky due to the uncertainty of the returns on securities. However, what matters to an investor is not the risk of an individual security, but its contribution to the risk of the whole portfolio.

Second, returns on securities are correlated. It implies that diversification could not eliminate the risk of a portfolio simply by adding as many securities as possible. “One hundred securities whose returns rise and fall in near unison afford little more protection than the uncertain return of a single security” (Markowitz, 1975, p.5). Rather, diversification reduces portfolio risk by selecting securities with low or negative correlations with each other.

Third, there is a tradeoff between expected return and risk, that is, high risk is generally associated with high expected return, whereas low risk with low expected return. As such, the analysis of portfolios involves the considerations of both return and risk. “The proper choice among efficient portfolios depends on the willingness and ability of the investor to assume risk” (Markowitz, 1975, p.6). Using the mean-variance analysis, MPT suggests that investors can deliberately choose the proportions of individual securities so to minimize the risk of the portfolio for a given level of expected portfolio return, or maximize the expected return for a given level of risk.

MPT was developed for to help investors to choose security investments given their risk preferences, but can be varied to apply for the analysis of nonprofit revenue mixes. Markowitz referred to investors' other sources of income as "exogenous assets" (p.34):

For a private investor this might include a salary; for a university it would include tuition and endowments. These other sources of income are not irrelevant to the portfolio selection decision. It is desirable to choose a portfolio whose performance will not be too highly correlated with the investors' other income. It is undesirable to have a portfolio perform worst when it is needed most. Such considerations may be handled formally by including other sources of income as a fictitious security or "exogenous asset." The holding of this asset is not subject to choice in the analysis, but the correlations of its income with the yields of securities will influence the selection of portfolio.

The Kingma Model and Nonprofit Financial Risk. Kingma (1993) applied MPT to nonprofit financial stability and developed a model to help nonprofit managers determine the optimal level of revenue diversification. Drawing an analogy between corporate and nonprofit finance, Kingma interpreted the goal of nonprofit managers as to "provide a certain level of services (a given level of expected return) while minimizing unpredictable changes in revenues (risk)" (p. 105). "The expected revenue of a portfolio for a nonprofit organization is the weighted sum of the expected revenues from each of the organization's revenue sources" (P.109). The risk, which he defined as the unpredictability of a nonprofit's revenue, "is a weighted sum of the variance and covariance of its individual revenue streams" (p. 109). Assuming a nonprofit derives all its revenue (I) from two sources—government (G) and donations (D), Kingma modeled the expected return R_I and risk of a nonprofit's revenue portfolio as follows (p. 110)¹:

¹ The equation (2) of $Var[R_I]$ in Kingma (1993, p.110) is incomplete, which I correct in the above equation.

$$E[R_I] = kE[R_G] + (1 - k)E[R_D]$$

$$\begin{aligned} \text{Var}[R_I] &= \text{Var}[kR_G + (1 - k)R_D] \\ &= k^2\text{Var}(R_G) + (1 - k^2)\text{Var}(R_D) + 2k(k - 1)\text{Cov}(R_D, R_G), \end{aligned}$$

where R_G and R_D are the net return expected from government sources and donations respectively, and k is the percentage of net return from government sources. The Kingma model suggests that, for a given level of expected return $E[R_I]$, the optimal level of revenue diversification—the choice of k that minimizes the portfolio variance $\text{Var}[R_I]$ —depends on both the variances of individual revenue sources and the covariance between the sources.

Through this pioneering work, Kingma sent out invitations for more research along this line. He also suggested future studies to test his model in different subsectors, because “covariance of revenue sources across nonprofit organizations of different types is irrelevant for the policy that an individual nonprofit organization must make” (p.113). However, the Kingma model received little attention over the past 20 years, with two exceptions. The first one was by Jegers (1997), who in theory expanded the Kingma model by interacting nonprofit managers’ risk attitudes with the efficient frontier. Recently, based on the Kingma model, Grasse, et al. (2015) used the digitized data to empirically identify the efficient frontier for nonprofit arts organizations. Unfortunately, as with many other empirical studies on revenue diversification, Grasse, et al. (2015) did not properly define “return.” This is important because proper measurement of return is the cornerstone of portfolio analysis, which I will discuss in detail in the following section.

Return Versus Revenue Growth. In addition to the concept of revenue diversification, another common misunderstanding in the nonprofit literature is the definition of return. The expected return on an investment is a fundamental concept in portfolio analysis, which is often proxied by the average of historical returns on the investment. In corporate finance, the gain (or loss) from an investment is called the return on that investment. It has two components. One is the income component as an investor receives cash dividends from owning the asset. The other is the capital gain or loss when the value of the asset increases or decreases. The sum of the dividends and capital gain or loss is dollar returns. It is more common to use percentage returns, which tell how much an investor earns for each dollar invested. Percentage returns are calculated as the dollar return of an investment at the end of a period divided by the beginning value of the investment (Ross, Westerfield, & Jordan, 2008, p.369-371):

Percentage return

$$= \frac{\textit{Dividends end of a period} + \textit{Capital gain(loss)over the period}}{\textit{Beginning value of an investment}}$$

Previous nonprofit literature calculated the “return” from a revenue source in various ways. For example, Wicker et al. (2013) simply used the revenue from individual revenue sources, without considering the revenue-generating expenses. In Grasse et al. (2015, p.17), the return for a revenue source was calculated by subtracting the revenue received in a year from that in the previous year. This approach represents the absolute change in gross revenue. In Kingma’s model (1993, p.110), the return was defined as the expected percentage change in net income, where net income is gross revenue net of revenue-generating costs (p.110). By definition, this is the percentage change in net

income rather than percentage return. The net income or gross revenue from contributions received in the previous year, for example, cannot be perceived as the beginning value of this year's "investment." Unlike buying and holding a stock from the market, nonprofit organizations do not hold contributions or grants and let their value grow (or lose) over a period of time. Instead, they spend the income for charitable purposes. Fundraising is thus like "buying" assets (i.e. contributions, grants) that depreciate 100% within a year or two and the return on fundraising only comes from the income component. In this paper, I take a step further by correctly applying the MPT approach to empirical analysis, using the net rate of return rather than the change in gross revenue or net income.

Method

It takes several steps to obtain the efficient frontier for nonprofit organizations in each subsector. First, for each subsector, I calculate the average annual return for each revenue source. Second, I compute the expected return and standard deviation of these returns over the years in the database. Third, I develop the variance-covariance matrix and correlation coefficients between the returns on each pair of revenue sources.

Expected Return and Risk

First, suppose that the nonprofit organization i has a total number of revenue sources S . For an individual revenue source s , given the revenue Rev and the revenue-

generating expenses Exp , the annual return r on the revenue source s for the organization i in year t :²

$$r_{sit} = \frac{Rev_{sit} - Exp_{sit}}{Exp_{sit}},$$

where s takes values from 1 to S , i takes values from 1 to I , t takes values from 1 to T .

Second, calculate the annual average return $e(r)$ on individual revenue sources for each subsector, and then obtain the expected return $E(R_s)$ as the average return on source s in the past:

$$e(r_{st}) = \frac{1}{I} \sum_{i=1}^I r_{ist}, i = 1, 2, \dots, I$$

$$E(R_s) = \frac{1}{T} \sum_{t=1}^T e(r_{st}), t = 1, 2, \dots, T$$

Third, compute the variance σ^2 and standard deviation σ (risk) of the return on each revenue source s :

$$\sigma_s^2 = \sum_{t=1}^T [e(r_{st}) - E(R_s)]^2 / (T - 1)$$

$$\sigma_s = \sqrt{\sum_{t=1}^T [e(r_{st}) - E(R_s)]^2 / (T - 1)}$$

Fourth, compute covariances and correlation coefficients between returns on each pair of revenue sources. For example, given the annual returns of two revenue sources,

² I use net income and expenses to obtain returns on total contributions and grants, and special events and activities. For savings and temporary cash investments, land, buildings, and equipment, and securities, I use net income and average investments to calculate returns. See the Data section for details.

r_{xt} and r_{yt} , the covariance $cov(r_x, r_y)$ and correlation coefficient ρ_{xy} are calculated respectively as:

$$cov(r_x, r_y) = \frac{\sum_{t=1}^T (e(r_{xt}) - E(R_x))(e(r_{yt}) - E(R_y))}{T - 1}$$

$$\rho_{xy} = \frac{cov(r_x, r_y)}{\sigma_x \sigma_y}$$

Fifth, the portfolio weight w of a revenue source is the share of the investment (or expenses) in total portfolio investments (or total revenue-generating expenses). Given the weight w of expenses (or average investments over a year) on each revenue source s in a portfolio P , the portfolio return $E(R_P)$ is the weighted average return of the revenue sources in the portfolio:

$$E(R_P) = \sum_{s=1}^S w_s E(R_s),$$

$$\text{where } s = 1, 2, \dots, S, \text{ and } \sum_{s=1}^S w_s = 1$$

Finally, obtain the portfolio variance σ_P^2 and portfolio risk σ_P . The variance of a portfolio combination is equal to the weighted average covariance of the returns on individual revenue sources:

$$\sigma_P^2 = \sum_s \sum_j w_s w_j Cov(r_s, r_j) = \sum_s \sum_j w_s w_j \sigma_s \sigma_j \rho_{sj}$$

$$\sigma_P = \sqrt{\sum_s \sum_j w_s w_j \sigma_s \sigma_j \rho_{sj}}$$

Efficient Frontier of Revenue Sources

According to MPT, all possible combinations of assets can be plotted in a risk-return space. The collection of all these possible combinations defines a region in this space, which is the feasible set. When there is no risk-free asset, the upward-sloped upper boundary of this region is the *efficient frontier*, which is a collection of *efficient portfolios* with the lowest portfolio risk for a given level of portfolio expected return or the highest expected return for a given level of risk. When there is a risk-free asset available, the efficient frontier is the tangent line starting from the vertical axis where the return on the risk-free asset locates. Any portfolio above the frontier is not feasible and cannot be achieved. Any portfolio within the feasible set but not on the efficient frontier is sub-optimal because the portfolio that lies directly above it on the efficient frontier has higher expected return for the same level of risk. Identifying the efficient frontier is thus to find the set of efficient portfolios (Markowitz, 1952; 1959; Chen, Chung, Ho, & Hsu, 2010).

[Figure I-1 here]

Mathematically, the portfolio optimization problem can be formulated as solving for the weights of investments in a portfolio by minimizing the portfolio risk for each target level of expected portfolio return, subject to the weights summing up to one and all weights are positive (no short sales) (Hubbert, 2012).

Min

$$\sigma_P^2 = \sum_s \sum_j w_s w_j \text{Cov}(r_s, r_j)$$

Subject to

$$E(R_P) = \sum_{s=1}^S w_s E(R_s) = d^*, \text{ where } d^* \text{ is the target expected return,}$$

$$\sum_{s=1}^S w_s = 1,$$

$$w_s \geq 0, \quad s = 1, 2, \dots, S$$

The portfolio optimization problem with the inequality constraint is a quadratic programming problem, which is to minimize a function of the form $\frac{1}{2}x'Dx - d'x$ subject to one or more constraints of the form $A'_{eq}x = b_{eq}$ (l equality constraints) and $A'_{neq}x \geq b_{neq}$ (m inequality constraints), where D is an $n \times n$ matrix, x and d are $n \times 1$ vectors, A'_{neq} is an $m \times n$ matrix, b_{neq} is an $m \times 1$ vector, A'_{eq} is an $l \times n$ matrix, and b_{eq} is an $l \times 1$ vector. Equivalently, the above portfolio optimization problem can be written as:

$$\text{Min } w'\Sigma w - q \times d'w,$$

where w is the vector of weights, equivalent of x ,

Σ is the covariance matrix of returns of the revenue sources, equivalent of D ,

$q \geq 0$ is the level of risk tolerance: $q = 0$ works to minimize portfolio variance, $q = \infty$

works to maximize portfolio return,

d is the vector of expected returns,

$w'\Sigma w$ is the variance of portfolio returns,

$d'w$ is the expected return of the portfolio.

For the objective function, set $D = 2 \times \Sigma$, $q = 0$, and $d = (0, \dots, 0)'$, then we have $w' \Sigma w$.

For the $l = 2$ equality constraints $w' d = d' w = d^*$ and $w' 1 = 1' w = 1$, set $A'_{eq} =$

$\begin{pmatrix} d' \\ 1' \end{pmatrix}$ and $b_{eq} = \begin{pmatrix} d^* \\ 1 \end{pmatrix}$, we have $A'_{eq} x \equiv \begin{pmatrix} d' \\ 1' \end{pmatrix} w = \begin{pmatrix} d^* \\ 1 \end{pmatrix}$. For the $m = n$ inequality

constraints $w \geq 0$ (n is the number of revenue sources), set $A'_{neq} = I_n$ and $b_{neq} =$

$\begin{pmatrix} 0 \\ \vdots \\ 0 \end{pmatrix}$, we have $A'_{neq} x \equiv I_n w = w \geq 0$. We can then use the R package *quadprog* function

to solve this quadratic programming problem and find efficient portfolios.

Data

Variables

The paper uses a sample of public charities from the National Center on Charitable Statistics (NCCS)-GuideStar National Nonprofit Research Database (“digitized data”). The database includes tax-exempt nonprofit organizations that are required to file IRS Form 990 or 990-EZ between 1998 and 2003 (NCCS, n.d.).³ The time period of the database is not ideal as it covers the U.S. stock market’s Dom Com Bubble Burst in the late 1990s followed by the early 2000s economic recession. Nonetheless, the digitized data provide the most detailed financial information that is necessary for calculating the expected return and risk of revenue sources. Part I of Form 990 provides information on revenue and expenses, which are recognized when they are measurable and earned if using the accrual basis of accounting. Part IV of Form 990 is a

³ Congregations and organizations with less than \$25,000 in gross receipts are not required to file Form 990 and thus not included in the database (NCCS, n.d.).

balance sheet that presents an organization's assets and liabilities (beginning and end of year). The digitized data include a variety of revenue source categories, and this paper analyzes the following categories: 1) voluntary contributions and grants, 2) savings and temporary cash investments, 3) securities, 4) land, buildings, and equipment, and 5) special events and activities.⁴

Voluntary contributions and fundraising expenses. The IRS defines voluntary contributions as any payments “for which the donor does not receive full retail value from the recipient organization” (IRS, 2000, p.16). Voluntary contributions include those that are received directly from the public (line 1a) and any payments from special events that are in excess of the retail value of the goods or services sold. Voluntary contributions also include those received indirectly from the public through federated fundraising agencies (line 1b). Government grants (line 1c) are treated as contributions if their primary purpose is to enable the recipient organization to further its exempt purposes “rather than to serve the direct and immediate needs of the grantor” (IRS, 2000, p. 17). Fundraising expenses (line 15) are defined as “the total expenses those incurred in

⁴ Several revenue sources are not included in the analysis. First, membership income is not included due to the lack of data on the corresponding expenses. Second, sales of inventory are also omitted because it is difficult to differentiate organizations that used smoothing production from those who did not. Third, program services are excluded from the analysis for two reasons. First of all, there are no data on the expenses associated with producing the services and goods for sale. Program service expenses reported on Form 990 are expenses of the organizations' mission-related activities, which may include grants to individuals and organizations. Second, when a nonprofit receives program service revenue by charging for the tax-exempt services it provides, the nonprofit does not seek to maximize their net income from the program services. Many nonprofits offer program services at a discounted price and use income from other revenue sources to compensate for the loss (James, 1983). In corporate finance, there is little reason to invest in an asset when the expected return is negative. However, it is not rare for nonprofits to continue negative-return revenue activities, which serve their mission purpose but not financial objective. For these reasons, I do not consider the revenue from mission-related program services as a source for return maximization.

soliciting voluntary contributions” (IRS, 2000, p.21), which include: “publicizing and conducting fundraising campaigns; soliciting bequests and grants from foundations or other organizations, or government grants; participating in federated fundraising campaigns; preparing and distributing fundraising materials; conducting special events that generate contributions in addition to the retail value” (IRS, 2000, p.21). Form 990 reports how much a nonprofit spends on fundraising as well as how much contributions, gifts, and grants it generates each year. Suppose a nonprofit manager chooses an amount to spend on fundraising to obtain an amount of voluntary contributions and grants in return, the annual return on fundraising r_{fr} for a nonprofit i in year t can be written as:⁵

$$r_{fr} = \frac{Contributions_{it} - Fundraising_{it}}{Fundraising_{it}}$$

Savings and temporary cash investments include “interest-bearing checking accounts, savings, and temporary cash investments, such as money market funds, commercial paper, certificates of deposit, and U.S. Treasury bills or other governmental obligations that mature in less than 1 year” (IRS, 2000, p.23). The return on savings and temporary cash investments r_{sc} of an organization i is the interest income (line 4) divided by the average savings and temporary cash investments (line 46) held within year t , where the average assets are calculated by dividing the sum of the beginning and end of year assets by two.⁶

⁵ It is possible that the return on the current year’s fundraising (i.e. net contributions and grants) does not fully realize until the next year. I assume the lag effect of return on fundraising is sufficiently small so the formula is a reasonable approximation.

⁶ It is better to use the average of assets over a year rather than the beginning or ending value. First, operating assets can be bought and sold during a year, while the beginning and ending value represents information at a certain point. Second, income is earned over

$$r_{sc} = \frac{\text{Interest on savings and temporary cash investments}_{it}}{(\text{Beginning of year investments}_{it} + \text{End of year investments}_{it})/2}$$

Securities. The annual return on securities r_{se} of an organization i in year t is calculated as the sum of dividends and interest from securities (line 5) and gains (or losses) from sales of securities (line 8c, column (A)) divided by the average securities held as investments in year t (line 54).⁷

$$r_{se} = \frac{\text{Dividends\&Interest}_{it} + \text{Gain(loss)}_{it}}{(\text{Beginning of year securities}_{it} + \text{End of year securities}_{it})/2}$$

Land, buildings, and equipment (LB&E). The annual return r_{rt} on land, buildings, and equipment (e.g., rental properties) held for investment purposes are expressed as net rental income (line 6c) divided by the average investment assets in year t (55c).⁸

$$r_{rt} = \frac{\text{Net rental income (loss)}_{it}}{(\text{Beginning of year investments}_{it} + \text{End of year investments}_{it})/2}$$

a year. Therefore, using the average assets would more accurately reflect the rate of return.

⁷ There are two issues with the ratio of return on securities. First, while securities are reported at their market value on audited financial statements, they could be reported as either book value or market value on Form 990 (IRS, 2000, p.24). The final sample includes only the organizations that followed GAAP and used accrual accounting, so it is reasonable to take the market value as a default. Second, the rate of return is calculated differently from the standard way, which is the sum of the cash component and capital gains (losses) on a security investment divided by the original cost of the investment. Form 990 does not contain information on capital gains or losses of securities, the change in the beginning and ending values of securities does not necessarily reflect capital gains (losses) result from the price change of securities. The change could also be caused by purchases or sales of securities.

⁸ Land, buildings, and equipment are reported at their book value, that is, their original cost minus accumulated depreciation (Form 990, p.24). I use net book value to calculate the return on LB & E investments. Note that a problem associated with this approach is that older assets may have a smaller rate of return than newer assets, because older assets have larger accumulated depreciation and thus a larger net book value.

Special events and activities. Special events “only incidentally accomplish an exempt purpose. Their sole or primary purpose is to raise funds other than contributions to finance the organization’s exempt activities. This is done by offering goods or services that have more than a nominal value for a payment that is more than the direct cost of those goods and services” (IRS, 2000, p.19). Examples of special events and activities include “dinners, dances, carnivals, raffles, bingo games, other gambling activities, and door-to-door sales of merchandise” (IRS, 2000, p.19). Special events may generate both sales revenue (reportable on line 9a) and contributions (reportable on line 1). Treating special events as an investment on which a nonprofit organization spends a certain amount of expenses in order to obtain a certain amount of sales revenue (not including contributions), the annual return on special events and activities r_{se} is written as net income from special events (line 9c) divided by direct expenses other than fundraising expenses (line 9b):

$$r_{se} = \frac{\text{Net sales income from special events}_{it}}{\text{Direct expenses}_{it}}$$

Data Limitations and Cleaning

Form 990 has been publicly available since 1996 and is widely used as a source of data for nonprofit finance research. However, the IRS Form 990 data have many limitations, particularly regarding the accuracy of reported financial information (Keating & Frumkin, 2003; Wing, Gordon, Hager, Pollak, & Ronney, 2006). By comparing the Form 990 data with the audited financial statements (e.g. Froelich & Knoepfle, 1996; Froelich, Knoepfle, & Pollak, 2000; Krishnan, Yetman, & Yetman, 2006) or with annual

reports to state regulatory agencies (Keating, Parsons, & Roberts, 2008; Krishnan & Yetman, 2011), researchers revealed that some financial information reported on Form 990 is not consistent with the other documents. Specifically, quite a few studies find that nonprofit organizations typically manipulate financial reporting on Form 990 by expense allocation. To “improve” organizational efficiency on the form, nonprofits are found to under-report fundraising and/or administrative expenses while over-reporting program service expenses (Krishnan & Yetman, 2011; Keating et al., 2008; Krishnan et al., 2006; Jones & Roberts, 2006; Urban Institute and Center on Philanthropy at Indiana University, 2004; Trussel, 2003). To minimize the unrelated business income taxes (UBIT), organizations may shift revenue or expenses from taxable to tax-exempt activities (Omer & Yetman, 2003; 2007).

Due to these data limitations, unusable, erroneous, or suspicious observations need to be carefully eliminated based on several commonly used filters (e.g. Calabrese, 2013; Bowman, Tuckman, & Young, 2012; Tinkelman & Neely, 2010). The original sample includes 1,388,480 observations, and the final sample has 135,672 observations after the following steps of data cleaning.

Private Foundations. The original sample includes 99% of public charities and 1% of private foundations. These two types of organizations differ in their charitable and financial activities. In addition, private foundations are required to file Form 990-PF, which is different from Form 990 filed by public charities. Therefore, I exclude private foundations from the original sample.

Form 990-EZ. The IRS allows small organizations (gross receipts < \$100,000 and total assets < \$250,000) to file Form 990-EZ (IRS, 2000). Compared to Form 990, Form

990-EZ includes different line items of expenses and less detailed financial information. There are about 20% of records filing 990-EZ in the original sample and they are excluded.

Group Returns. The IRS allows a central organization to file a group return for its affiliating organizations. Group returns (only 0.2% of the original observations) can bias the sample with extremely large financials and are excluded. There are about 30% observations that do not report whether or not they filed a group return. I follow the previous literature to take the “unknown” type of returns as individual returns, because “it is the most plausible default option for filers” (Bowman et al., 2012, p. 571).

Accounting methods other than accrual. Generally Accepted Accounting Principles (GAAP) requires audited financial statements to be based on accrual accounting methods. However, Form 990 reporting is not subject to GAAP (Keating & Frumkin, 2003). Therefore 47 percent of the records use either cash-basis or “other” accounting methods. The cash-basis method—recording revenue (expenses) when cash is actually received (paid)—does not accurately reflect an organization’s financial condition. For example, it does not reveal an organization’s unpaid bills (Bowman, 2011, p.16). In contrast, accrual accounting records revenue (expenses) when they are earned (incurred) (Keating & Frumkin, 2001). For example, it recognizes a purchase of services as an expense when there is an invoice to be paid (Bowman, 2011, p.16). Although using this filter means losing nearly half of the sample, it can be misleading to mingle the data from both accrual and cash accounting. For example, a capital purchase is an expense based on cash accounting; however, it is not an expense if using accrual accounting because capital purchase does not cause change in net assets (Bowman et al., 2012). To

ensure the consistency, comparability, and reliability of financial reporting across different nonprofit organizations, I follow previous literature to eliminate all the records that are not based on the accrual method from the original sample (e.g., Bowman et al., 2012).

Erroneous items. The Form 990 data may involve errors (Wing et al., 2006). First, revenue items (Part I of Form 990) are not supposed to take negative values unless they are reported as net income or (loss), such as net income or (loss) from rents (line 6c), from sales of assets other than inventory (line 8c and 8d), from special events (line 9c), or from sales of inventory (line 10c). Therefore, observations with negative revenue items are excluded. In addition, for the revenue sources mentioned above, Form 990 requires nonprofit organizations to report both gross revenue and expenses in order to calculate net income or loss. Nonetheless, these expenses are not supposed to be negative. I take the absolute value for a handful of negative expenses for each of these revenue sources.⁹ Second, I exclude the records reporting expenses erroneously, such as negative expenses or individual expenses items in excess of total expenses. Additionally, there are a number of records with zero expenses on program services (24%), management (31%), fundraising (73%), or even total expenses (1%). It is hard to imagine how an organization can function without any expenses on management or program services.¹⁰ Thus, the records with 0 management, program services, and total expenses are all excluded. For

⁹ Some nonprofit organizations may insert negative expenses by error. Instead of subtracting expenses from gross revenue, they sum gross revenue and negative expenses for net income. Therefore, I use the absolute values to replace the negative expenses reported in the Revenue section of Form 990. On the other hand, gross revenue items should not be negative, so they are excluded instead.

¹⁰ It could be that some organizations did not break down total expenses into categories and only report a lump-sum number.

the fundraising expenses, I exclude the observations with 0 value when an organization actually receives positive total contributions, gifts, or grants. Other erroneous items are also eliminated, including observations with negative total assets, or those with an unknown NTEE category.

A strongly balanced panel. After the above data cleaning steps, the sample size drops to 306, 118. The subsector-level annual return on each revenue source is obtained by computing the average of organizational annual returns from all organizations in a subsector. To reduce any organizational heterogeneity that may impact the subsector-level return, I keep a strongly balanced panel, using the annual information from the same organizations for each year between 1998 and 2003. By only keeping organizations with all six years' data, the sample size is further reduced to 135,672 observations (22,612 organizations).

Table I-1 shows the data cleaning step by step. Table I-2 offers a comparison between the original and the cleaned sample. In general, the observations in the new sample have larger average total revenue and total end-of-year assets, but smaller total expenses. Losing 90% of the data points may appear worrisome, but it can be more so should I kept the erroneous or suspicious data to compute returns and risks, which would lead to misleading results. It is also a common practice among previous studies using the 990 data to conduct rigorous data cleaning and obtain a much smaller analysis sample (e.g., Yetman & Yetman, 2013; Calabrese, 2013; Bowman, Tuckman, & Young, 2012; Tinkelman & Neely, 2010). Based on this sample, the results of this study is more informative to large organizations than smaller ones.

[Table I-1 and I-2 Here]

Extreme and missing values of organizational annual returns. The analysis is conducted using four subsamples (subsectors) and the whole sample. In calculating the *subsectoral* annual returns on each revenue source, any organizations with extreme or missing values for the *organizational* annual return of a revenue source are excluded from the analysis with respect to that revenue source (Table I-3). First, there are some extremely large or small values for the returns on individual revenue sources at the organizational level. For example, in the subsample of arts, culture, and humanities nonprofits, the largest value of organizational annual return from contributions and grants is 61,328, while the median value 7.68. The smallest value of organizational annual return from securities is -185, while the median value is 0.03. These extreme values could be due to the idiosyncratic differences in organizations' capabilities or because of reporting errors. In either case, it is legitimate to exclude the extreme values from the analysis and reduce the bias that they would bring to the annual average of returns at the subsectoral level. I use the following exclusion criteria for extreme values. For contributions and grants as well as special events, in each year, any data points that lie more than three times the interquartile ranges ($3 \times \text{IQR}$) in each subsample and the whole sample are labeled as extreme values. For the other revenue sources, using the $3 \times \text{IQR}$ criteria would result in a significant loss of data points, so I only exclude the observations with returns larger than 100% (or smaller than -100%).¹¹ Second, there are also some

¹¹ Note that rather than dropping all the observations with extreme values, I only exclude the extreme values from the analysis with respect to that particular revenue source. For example, an organization reporting an extremely large return on fundraising may not have an extreme value of the return on special events. Therefore, the organization is only

missing values. It is a missing value when an organization did not report a revenue source or when the denominator (expenses or investments) in calculating the return is zero. After excluding the extreme and missing values, a strongly balanced panel is maintained but the number of organizations used for calculations varies by revenue sources. In general, after excluding the extreme and missing values, the organizational annual returns on revenue sources do not vary significantly by the level of organization size, as measured by quintiles of organizations' average total revenue, total expenses, and total assets. The only exception is the return on rental properties, for which larger organizations tend to have a higher level of return.

[Table I-3]

Results: Expected Return, Risk, and Efficient Portfolios

In this section, I present the expected return and risk characteristics of individual revenue sources as well as the efficient portfolios and efficient frontiers for nonprofits in different subsectors and in the whole sample. Based on the National Taxonomy of Exempt Entities (NTEE) system, I examine four major nonprofit subsectors: 1) arts, culture, and humanities (12% of the final sample); 2) education (14%); 3) health (17%); and 4) human services (37%).¹² Table I-4 presents the summary statistics of the subsectors and the whole sample. I report three organizational size indicators: an

excluded when calculating the average fundraising return at the subsectoral level but kept in the analysis of the average return on special events.

¹² The remaining 20 percent of the sample consists of miscellaneous types of organizations (e.g. environment, international, public and societal benefit, mutual benefit, religion-related), which I will not discuss by individual subsector in this paper due to the limited data points for these types of organizations. However, they are included in the analysis for the whole sample.

organization's six-year average total revenue, six-year average total expenses, and six-year average ending total assets (all values are inflation-adjusted to 2003 dollars). Seen from the three indicators, the education organizations in the sample on average have the largest size (revenue = \$24.8M, expenses = \$20.4M, assets = \$85.8M), followed by health organizations (revenue = \$18.1M, expenses = \$17.5M, assets = \$98.2M). Arts, culture, and humanities organizations are comparatively much smaller (revenue = \$4.35M, expenses = \$3.68 M, assets = \$12.3M). Human services subsector has the largest number of organizations but the average size of human service organizations is the smallest among the major subsectors (revenue = \$3.86M, expenses = \$3.66 M, assets = \$5.34M).

[Table I-4]

Arts, Culture, and Humanities

The subsample of the arts, culture, and humanities nonprofits includes 15,822 observations (2,637 organizations). Arts, culture, and humanities nonprofits, such as theaters, museums, and historical societies, are those primarily to “promote appreciation for and enjoyment and understanding of the visual, performing, folk, and media arts; the humanities (e.g. archaeology, art history); history and historical events; and/or communications (e.g. film, radio)” (NTEE, n.d.).

The summary statistics of organizational annual returns on individual revenue sources can be found in Table I-5. At the subsector level, the annual return on a revenue source is the average of the organizational annual return on that source over all active organizations. To illustrate, there are 2,016 arts, culture, and humanities organizations

received contributions and grants for all the six years in the sample. By taking the average of the organizational annual return of all the 2016 organizations, we get the subsectoral annual return from contributions and grants for each of the six years between 1998 and 2003. The expected return on a revenue source at the subsector level is then the six-year average of the subsectoral annual return, and the risk is the standard deviation of the subsectoral annual return from the expected return. Table I-6 presents the expected return and risk characteristics of revenue sources for the sample of arts, culture, and humanities organizations. Fundraising for contributions and grants is the riskiest revenue-generating activity ($s=1.06$), but it also comes with the largest expected return ($r=9.05$). Special events and activities are also comparatively high-risk and high-reward ($r=0.93$, $s=0.05$). In contrast, the returns from land, building, and equipment (LB&E) ($r=0.032$, $s=0.005$), and saving and temporary cash investments ($r=0.053$, $s=0.012$), and securities ($r=0.047$, $s=0.031$) are less riskier and less rewarding. Note the particular return and risk characteristics of securities due to the special time period observed. Consistent with the Dot Com Bubble Burst in the late 1990s and the following stock market crash, the return on securities was high from 1998 to 2000 and then took a downturn from 2001. The return on securities hit the bottom in the economic recession during 2002 and 2003. For this particular time period, the return on securities may appear to be more risky than that if observed during other periods.

[Table I-5, I-6]

Portfolio diversification is an attempt to find a number of revenue sources that march to the beat of different drummers so that the odds that all sources will go down at

the same time become small. The drummers, or the correlation coefficients of the returns on revenue sources, offer the key to a proper portfolio diversification. A correlation coefficient, on a scale of -1 to 1, indicates how likely the returns of two revenue sources move up and down together and to what degree their movements are driven by the same market force (Investopedia, n.d.). A correlation coefficient of 1 means perfect positive correlation, that is, the returns of two revenue sources move in the same direction with the same magnitude 100% of the time. The closer the correlation coefficient is to 1, the stronger the relationship between the returns of two revenue sources. On the other hand, a correlation coefficient of -1 means perfect negative correlation, that is, the returns of two revenue sources move in opposite directions with the same magnitude 100% of the time. A correlation coefficient of zero indicates that there is no relationship between the returns of two revenue sources, meaning that they are equally likely to move in the same direction as to move in opposite directions. The closer the correlation coefficient is to 0, the weaker the relationship between the two revenue sources.¹³ A well-diversified portfolio (or revenue mix) is composed of revenue sources with little or low correlations so that when the return from one source declines, there is a good chance that the returns from the others increase.

For arts, culture, and humanities organizations, the returns from contributions and grants, interest, and securities are significantly highly correlated with each other, suggesting that the returns from these three revenue sources move up and down together most of the time (Table I-7). For example, the correlation coefficient of the returns from contributions and securities is 0.96, meaning that these two revenue sources, likely driven

¹³ Experienced investors in general take correlation coefficients equal or less than 0.7 as reasonably good but above 0.8 are poor for portfolio diversification (Anke, 2010).

by the same market force, move in the same direction nearly all the time. When the return from contributions decreases, the return from securities follows in tandem. When the return from contributions increases, so does that from securities. If starting from a single-source portfolio consisted of 100% contributions, adding securities is not likely to improve the portfolio by reducing the portfolio risk. In contrast, both rental properties and special events have generally low correlations with the other revenue sources (although not significant), so they may be used as risk-reducing sources in composing diversified portfolios. This is why simply adding as many revenue sources as possible, as HHI indicates, may not be productive in reducing portfolio risk but could drag down the return of the whole portfolio.

[Table I-7]

Given the expected return/risk characteristics of the returns on individual revenue sources, as well as the correlations between them, we can then find efficient portfolios and plot the efficient frontier. Efficient portfolios are those with the minimum portfolio risk for a given level of expected portfolio return or those with the maximum return for a given level of risk. Table I-8 shows a range of efficient portfolios with different return and risk combinations. Figure I-2 presents the efficient frontier, which is a collection of efficient portfolios. A nonprofit manager can use the efficient frontier to obtain an optimal portfolio for a certain level of risk or return. The lowest point of the efficient frontier is the minimum variance portfolio, which has the smallest portfolio risk and return ($r=0.036$, $s=0.004$). To achieve the minimum variance portfolio, an arts, culture, and humanities organization needs to put 79% of its total investment in rental properties

and 21% in savings and temporary cash investments. Note that the weight of a revenue source is the investment value of that source divided by the total portfolio value, not by total revenue from the portfolio. Seen from Figure I-2, as the expected portfolio return increases, so does the portfolio risk. The highest point of the efficient frontier is the maximum return portfolio, which has the largest expected return but also the greatest risk ($r=9.049$, $s=1.063$). To achieve the maximum return, an organization needs to invest 100% in fundraising activities for contributions and grants. Because special events have a decent level of return and a reasonably good correlation with contributions and grants, including special events can mitigate the high risk involved in pursuing only contributions and grants while achieving high levels of expected returns. A nonprofit manager who is very risk-averse would choose the portfolios at the lower end of the efficient frontier. Any portfolios below the frontier are feasible but sub-optimal because they are dominated by the portfolios on the frontier.

[Table I-8 and Figure I-2 here]

Education

Nonprofit organizations in the education subsector are organizations like preschools, elementary and secondary schools, universities, research institutes, and so on. There are 19,326 observations (3212 organizations) in the subsample of education nonprofits. Table I-9 exhibits the summary statistics of annual returns from revenue sources at the organizational level. At the subsector level (Table I-10), contributions and grants are still the revenue source with the largest expected return and risk ($r = 9.32$, $s = 0.845$), followed by special events ($r = 1.133$, $s = 0.03$). Rental properties, savings and

temporary cash investments, and securities are all low-risk and low-reward revenue sources. Among them, rental properties are the least risky revenue source ($r = 0.041$, $s = 0.003$). Possibly due to the particularly volatile years for the U.S. stock market in this study, securities make a less desirable revenue source ($r = 0.052$, $s = 0.035$), because they have more volatility but smaller expected return than savings and temporary cash investments ($r = 0.058$, $s = 0.014$). Comparing with the arts, culture, and humanities organizations, the expected returns from contributions and grants, special events, and rental properties for the education organizations are more rewarding and less risky.

[Table I-9, I-10]

Let us take a look at the correlation coefficients of the returns from each pair of revenue sources (Table I-11). Contributions and grants, rents, interest, and securities are all significantly highly correlated with each other, indicating that they tend to move up and down together most of the time. That is, the portfolio combinations with any of these four revenue sources would not necessarily be less risky than a single-source portfolio. Special events, in contrast, have negative or low correlations (not significant) with the other revenue sources and could be helpful in diversifying away portfolio risk.

[Table I-11]

Table I-12 lists the examples of efficient portfolios and Figure I-4 is the efficient frontier for the education subsector. The minimum variance portfolio consists of 100% investments in rental properties. Although rental properties approach risk-free, they do not offer a decent level of expected return. As the level of portfolio expected return increases, rental properties are dropped from the efficient portfolios. In contrast,

contributions and grants are highly risky but also highly rewarding. At the lower end of the efficient frontier, where the portfolios have low levels of expected return and risk, contributions and grants do not make a significant component of the portfolios due to their high risk. As the portfolio return increases, the proportion of the investments for contributions and grants also increases. At the higher end of the efficient frontier, contributions and grants become a major revenue source of the high-reward portfolios. The maximum return portfolio is a single-source portfolio with 100% investments for contributions and grants. Consistent with the correlation coefficients discussed above, securities are not used to compose any efficient portfolios. On the other hand, special events can be used to form efficient portfolios in most cases for its negative or low correlations with the other revenue sources.

[Table I-12, Figure I-4]

Health

As an important component of the U.S. nonprofit sector, the health subsector includes a diversity of nonprofit organizations, such as hospitals, nursing homes, counseling organizations, voluntary health associations, medical research centers, and so forth. There are 3,872 health nonprofits (23,232 observations), accounting for 17 percent of the nonprofit organizations in the sample. The annual returns from revenue sources at the organizational and subsector level are reported in Table I-13 and 14, respectively. Once again, contributions and grants are the revenue source with the largest expected return and risk ($r=11.437$, $s=0.474$), followed by special events and activities ($r=1.389$, $s=0.042$). Rental properties, savings and temporary cash investments, and securities are

all comparatively low-risk and low-reward sources. Rental properties have the smallest risk and expected return ($r=0.015$, $s=0.007$) among the five revenue sources. Securities ($r=0.049$, $s=0.031$) appear to be less appealing than savings and temporary cash investments ($r=0.052$, $s=0.014$) because the latter offers greater expected return for smaller risk. Comparing with the arts and education subsectors, contributions and special events in the health subsector have even larger expected return but much smaller risk.

[Table I-13, I-14]

Shown in the correlation coefficients table (Table I-15), contributions and grants, savings and temporary cash investments, and securities are significantly and highly correlated with each other. It suggests that the portfolios with these any combinations of three sources are not well diversified because they tend to fall down together. On the other hand, rental properties and special events have negative or reasonably good correlations with all the other sources, suggesting that these two revenue sources are good candidates for portfolio diversification.

[Table I-15]

Table 16 presents the examples of efficient portfolios and Figure I-6 is the efficient frontier for the health subsector. The minimum variance portfolio, with a portfolio risk of only 0.003 and an expected return of 0.027, consists of 67% investments in rental properties and 33% in savings and temporary cash investments. Once again, as the expected portfolio return increases, so does the proportion of investments for contributions and grants in the portfolio. The maximum return portfolio, which has an

expected return of 11.437 and risk of 0.474, consists of 100% investments for contributions and grants. Due to its decent expected return and nice correlations with other revenue sources, special events are included in most of the efficient portfolios except for the minimum variance and maximum return portfolios. In contrast, securities are not used in forming any of the efficient portfolios. Comparing with the arts and education organizations, health organizations face much lower risk at high levels of expected return.

[Table I-16, Figure I-6]

Human Services

Nonprofit human service agencies comprise a central piece of the U.S. nonprofit sector and encompass a broad range of organizations and programs designed to enhance the wellbeing of individuals, families, and the community as a whole, such as food pantries, soup kitchens, shelters for homeless, job training centers, crime prevention organizations, disaster preparedness and relief services organizations. Well-known nonprofits like American Red Cross, United Way, and Salvation Army are all human service organizations. This subsector has the largest number of organizations. There are 8,443 human service organizations (50,658 observations), which account for 37% of the nonprofits in our sample. The subsample of human service organizations nonetheless has the smallest size in terms of their six-year average total revenue (\$3.86M), total expenses (\$3.66M), and total assets (\$5.34M) (Table I-3).

Shown in Table I-18, similar to the other subsectors, contributions and grants for the human service organizations are the most rewarding and risky revenue source ($r=16.018$, $s=1.179$), followed by special events ($r=1.507$, $s=0.032$). In fact, the expected

returns and risks of contributions and special events are larger than those in the other subsectors. Once again, rental properties, savings and temporary cash investments, and securities have comparatively smaller return and risk. Rental properties are still the least risky revenue source that offers the smallest expected return ($r=0.026$, $s=0.003$). Securities ($r=0.043$, $s=0.025$) are unattractive comparing with savings and temporary cash investments ($r=0.057$, $s=0.015$), because securities have larger risk for smaller expected return.

[Table I-17, I-18]

The correlation coefficients of the returns between contributions, savings and temporary cash investments, and securities are significantly high and positive, indicating they are driven by similar market forces and tend to move in tandem (Table I-19). On the other hand, rental properties and special events have low or negative correlations with the other revenue sources, which make them helpful for portfolio diversification.

[Table I-19]

Table I-20 presents a range of efficient portfolios and Figure I-8 is the efficient frontier for human service nonprofits. As rental properties possess little volatility, they are used to construct the efficient portfolios at the lower end of the efficient frontier. The minimum variance portfolio is consisted of 98% of investments in rental properties and 2% in special events. Similarly, because investments in contributions and grants can offer large expected return, their weight in an efficient portfolio increases as the level of portfolio return increases. The maximum return portfolio is the one consisted of full

investment in contributions and grants. Special events are used for diversifying away the portfolio risk in most cases while securities are not used to form any efficient portfolios.

[Table I-20, Figure I-8]

The whole sample

We have seen similar patterns from the results by subsector. Finally, let us examine the revenue sources regardless the types of organizations. In the whole sample, there are 22,612 organizations and 135, 672 observations in total. These nonprofit organizations on average have 34.8 million dollars in the six-year average total assets (Table I-3). Similar to what we have found so far, the revenue source with the largest expected return and risk is still contributions and grants ($r=12.356$, $s=0.925$). The second place is special events and activities, with an expected return of 1.264 and a risk of 0.021. Rental properties, savings and temporary cash investments, and securities are all in the low-risk and low-reward category. Rental properties are nearly risk-free but they also come with the smallest expected return ($r=0.028$, $s=0.001$). Comparing with cash investments ($r=0.054$, $s=0.014$), securities ($r=0.047$, $s=0.030$) do not offer a decent level of return given the associated risk (Table I-22).

[Table I-21, I-22]

The correlation coefficients of the returns from contributions and grants, savings and cash investments, and securities are significantly high, meaning that these revenue sources can offer little buffer to each other if included in one portfolio (Table I-23). In contrast, both rental properties and special events have reasonably good correlations with

the other revenue sources (not significant). Depending on the desired level of expected portfolio return, both of them may be included to reduce portfolio risk. Table I-24 includes a list of efficient portfolios, which give the minimum portfolio risk for each level of expected portfolio return. Figure I-6 is the efficient frontier for the whole sample of nonprofit organizations. The minimum variance portfolio is dominated by investments in rental properties, with only 2% in interest for savings and temporary cash investments. As the portfolio return improves, the proportion of investments in rental properties decreases while that in contributions and grants increases. The maximum return portfolio is the one composed of 100% investment in contributions and grants, which has a portfolio return of 12.36 and a risk of 0.93. Special events are used to diversify portfolios in most cases while securities are not used to form any efficient portfolios. The patterns are similar to those seen in each subsector.¹⁴

[Table I-23, I-24, Figure I-10]

Discussion

HHI Versus MPT

Can we use HHI as a simple and convenient approximate to the theoretically preferred MPT risk? Or is HHI too simple to be useful? The results discussed above have shown how correlation coefficients between two revenue sources play an important role in revenue diversification. While the HHI approach suggests that revenue diversification

¹⁴ In the section on data cleaning, I have described the exclusion criteria for extreme values of the returns on revenue sources. As a robustness check, I also relaxed the criteria and only exclude the organizations with any organizational annual return from contributions and grants larger than 100. The alternative method does not lead to drastically different results. Tables 25 to 27 showcase the results of the whole sample using the alternative exclusion method.

is the increase in the number of revenue sources in a portfolio, the MPT approach tells us it is not always the case. To compare these two approaches, I also compute the corresponding HHI for efficient portfolios.¹⁵ It shows that HHI is not a monotone function of portfolio risk in some ranges; an increase in diversification by one measure corresponds to a decrease in diversification by another.

Figure I-3 shows the HHI and the MPT risk of efficient portfolios for the subsample of arts, culture, and humanities nonprofits. There seems to be a monotonic relationship between HHI and MPT risk for efficient portfolios with a portfolio risk above 0.2. However, for efficient portfolios with a risk level below 0.2, HHI is not a reliable predictor of the portfolio risk. For example, the portfolio with a risk as low as 0.04 has an HHI as high as 0.81 (Portfolio 5, Table I-8). Explained by the HHI approach, the portfolio is risky because it is heavily concentrated on the revenue from special events. From the perspective of MPT, given the level of the expected return, the portfolio is diversified by including three revenue sources that have low correlations with each other. Overall, HHI is not consistent in predicting the MPT risk of efficient portfolios. For a certain level of HHI, there could be more than one corresponding level of portfolio risk. For example, the HHI of 0.8 is associated with three risk levels from low to high (0.04, 0.07, and 0.67). This proves that revenue diversification is more complicated than counting the number and evenness of revenue sources in a portfolio. Additionally, for the portfolio risk ranging from 0 to 1.063, HHI is between 0.41 and 1 on a 0 to 1 scale. Note that although HHI and MPT risk have a similar range of values, they are not comparable

¹⁵ Note that the portfolio weight of each revenue source using the MPT approach is the proportion of the investments/expenses of obtaining revenue from that source rather than the revenue from that source. The corresponding HHI is based on the shares of revenue from individual revenue sources and the total revenue from the portfolio combination.

in cardinality. HHI takes ordinal values from 0 to 1, while MPT risk is cardinal and can take any values.

Figure I-2 also shows the relationship between HHI and the expected return of efficient portfolios. For efficient portfolios with an expected return below about 2, the level of HHI fluctuates as the level of return increases. There appears to be a consistent trade-off relationship between HHI and expected return for efficient portfolios with higher levels of expected return, but a nonprofit manager will always end up with sub-optimal portfolios if using HHI in the place of MPT risk to make portfolio selections.

[Figure I-3 here]

Similar patterns hold for nonprofits providing education (Figure I-5), health care (Figure I-7), human services (Figure I-9), as well as for the whole sample (Figure I-11). Despite the seemingly positive linear relationship between HHI and MPT risk for efficient portfolios with higher levels of risk, HHI does not reliably or consistently approximate the MPT risk at lower levels. A certain level of HHI may correspond to more than one level of MPT risk. The non-monotonic relationship signifies that revenue concentration is not always associated with high portfolio risk. The lower levels of HHI do not appear in this chart because they are not feasible or inefficient portfolios.

[Figure I-5, I-7, I-9, I-11 here]

Figure I-4, I-6, I-8, and I-10 shows a similar pattern of the relationship between the HHI and the expected return of efficient portfolios for education, health, human services nonprofits, and for the whole sample. For the efficient portfolios with

comparatively lower levels of expected return, the level of HHI sways between moderate to high as the level of return increases. For the efficient portfolios with higher levels of expected return, the level of HHI increases as the expected return on efficient portfolios rises. However, if replacing the MPT risk with HHI as a tool for portfolio selection, a nonprofit manager will always obtain inefficient portfolios that are dominated by the efficient portfolios on the efficient frontier.

Most previous studies suggest that HHI and nonprofit financial risk are significantly negatively correlated, that is, a higher level of revenue concentration predicts a higher level of financial vulnerability and volatility. In contrast, my finding from all the subsectors and the whole sample indicate that low-risk efficient portfolios can be achieved by revenue concentration. The HHI approach uses the number and shares of revenue sources in a portfolio to predict risk, missing the co-movement of revenue sources that is essential in the MPT analysis. Therefore, revenue concentration, as indicated by a high HHI, does not always lead to a high portfolio risk. Using the approach HHI as a tool to approximate risk in portfolio selections, a nonprofit manager would always obtain sub-optimal portfolios, that is, falsely assuming more “risk” for a given level of expected return. This would presumably lead to overly risk-averse behavior among nonprofits.

Beyond Portfolio Optimization

Modern portfolio theory greatly simplifies portfolio selection as an objective maximization problem. In addition to the expected return and risk of a portfolio, there are nonetheless several additional choice constraints that are unique to nonprofit

organizations in deciding a revenue mix. The first constraint is the organizational heterogeneity in the availability of funding streams. A revenue source could be more readily available to some organizations than to others. For example, membership income is only available to membership organizations. The income from the sales of a particular good may not be available if the nature of the good is not sufficiently private or mission-congruent. A non-excludable good cannot be charged therefore no fee income can be derived from selling it. Generally speaking, private payments for services and goods are primary revenue sources for education and health organizations, accounting for over half of their total revenue. While private contributions constitute a significant portion of the total revenue for arts and culture organizations, government funding flows more into human service and health care organizations. Investment income, on the other hand, only constitutes a small fraction of the total revenue for nonprofits (Roeger, et al., 2012).

The second is the constituency constraint, which comes from the differing preferences of various types of stakeholders in the decisionmaking process of portfolio selections. This constraint is minimal in a pure for-profit setting as there is a less ambiguous goal common to shareholders—to increase the current stock value. In the nonprofit sector, however, various stakeholders—donors, funders, customers, beneficiaries—have different utility functions in evaluating the attributes of revenue sources, such as their mission appropriateness, income significance, financial risk, opportunity costs, impact on organizational autonomy, and so on (Kearns, 2007). This is not contradictory with the MPT approach. In fact, a nonprofit manager can incorporate the preferences of different stakeholders into the organization's risk attitude or expected

service provisions, given which the nonprofit manager can find the optimal portfolio that either maximizes the return or minimize the risk.

The third is the regulatory constraint. Different revenue activities may reflect differently on an organization's nonprofit status and mission purpose. In the U.S., nonprofits are governed by both state and federal laws. The state laws vary at the state and local levels, meaning some portfolios may endanger the tax-exempt status of a nonprofit. In addition, there has been an overall growth in fees for service, sales of goods, investment income, and other types of commercial revenue in the past decades. Regardless, the nonprofit sector is increasingly confronting a crisis in their nonprofit identity, as it becomes more difficult to distinguish themselves from their for-profit counterparts (Salamon, 2012). In the case that private fees for a service are highly rewarding, it is still not appropriate for a nonprofit to make 100% investment in sales of the service due to its nonprofit status. In fact, because nonprofits are exempt from corporate income tax, there have been concerns about the "unfair" competition between for-profits and nonprofits that rely heavily on commercial income (Weisbrod, 1998). In the case that a nonprofit suffers from negative returns from a mission-fulfilling program service, the organization could not withdraw from providing the service due to its mission constraint. Rather, the nonprofit should maximize the return from other revenue sources and use the income to cross-subsidize its mission-related programs (James, 1983). In a for-profit setting, there are little reasons for investors to pursue an investment with negative returns. This is also a reason that I left out the program service revenue from the portfolio analysis.

Applying MPT to Nonprofit Finance: Caveats, Challenges and Future Research

Criticisms of MPT in Corporate Finance

Despite the theoretical and practical importance of MPT, we need to be aware of the criticisms of MPT in corporate finance as well as the additional complications when applying MPT to nonprofit finance. As a mathematical approximation based on a series of assumptions, MPT has been criticized for not being able to really model the market. For example, MPT assumes that returns on assets are normally distributed, while some empirical evidence shows that markets more than often experience large swings, which are 3 to 6 standard deviations from the mean (Mandelbrot & Hudson, 2004). Unlike what MPT assumes, correlations between asset returns are not fixed over time. In fact, many investments tend to become more positively correlated and move downward together during financial crisis (Fustey, 2011). Some studies also provide counterexamples to the tradeoff between risk and return (Murphy, 1977). Moreover, MPT has been criticized for relying on historical data to predict future market performance. These criticisms are relevant in a nonprofit setting. Due to data availability, the current study examined a particular time period for the U.S. stock market and economy. The results show that securities are not a desirable revenue source for nonprofit revenue mix optimization. However, it would be interesting to examine the same revenue sources in other time periods and test if their return and risk characteristics vary over time. It would also allow us to determine with more confidence to what degree the nonprofit historical data can predict future performance.

MPT has also received criticisms from behavioral finance. MPT assumes investors are always rational, risk-averse, and seek to maximize their economic utility

without any other considerations (e.g., emotions). It also assumes investors always have accurate projections of returns, and are interested in solving the mean-variance optimization problem. However, behavioral finance has refuted these assumptions. Instead of rational calculations, plenty of studies find that people often use heuristics (rules of thumb) when making decisions under uncertainty, which can cause cognitive biases and market inefficiency (e.g., Tversky and Kahneman, 1973; 1974; Thaler, 1992; 1999). In fact, investors may act overconfidently (e.g., Odean, 1998; 1999), underreact or overreact to new market information (e.g., De Bondt and Thaler, 1985; Daniel, Hirshleifer, & Subrahmanyam, 1998). Similarly, rather than being always risk averse, prospect theory suggests that people's attitudes toward risks may vary, depending on how a problem is framed. Specifically, people tend to be risk-averse facing choices concerning gains but risk-seeking facing choices involving losses (Kahneman and Tversky, 1979). In general, behavioral finance describes how decisions under uncertainty are *actually* made. On the other hand, MPT is a normative theory about how decisions under uncertainty *should* be made. For this reason, MPT is still a valuable theoretical approach.

Challenges of MPT in Nonprofit Finance

There are differences between corporate and nonprofit finance and therefore additional complications when applying a corporate finance concept to nonprofit finance. First of all, when different for-profits purchase an asset from the market, they face the same expected return and risk properties associated with that asset. However, when different nonprofits pursuing a revenue source, such as donations from individuals, the return on the source is determined by both the "asset-specific" factors common to all

organizations in a subsector and the “investor-specific” factors that are unique to an organization’s characteristics in generating the revenue (e.g. the donor pool unique to an organization). To illustrate, suppose the Art Institute of Chicago and Indianapolis Museum of Art both conduct the same fundraising activities to obtain member donations every year. Over time, they may observe different expected return and risk of member donations due to their different member pools.

Conceptually, the risk of a nonprofit revenue source has three components (Greenlee & Tuckman, 2007). In addition to the organization-specific risk that I have discussed above, nonprofits also face a market risk that affects all nonprofits (e.g., economic recessions, changes in tax laws) and an industry risk that affects nonprofits in a particular subsector (e.g., the industry-specific supply and demand for services or government regulations). In this paper, I examined the correlations between the returns of individual revenue sources for a specific time period without exploring the affecting factors behind them. For example, what are the forces driving the co-movement of the returns of contributions and securities? Do internal forces account for a bigger role in the observed patterns of correlations than external forces? It would be meaningful for future studies to decompose the three types of risk, examine what drives the movement of returns, and how diversification influences each of the risk components.

Second, while MPT assumes linear rates of return on investments, nonprofits face a changing marginal rate of return on fundraising, which may vary across different nonprofits or different life stages of a nonprofit (Steinberg, 1986; Tinkelman, 2006). This paper uses average return on fundraising, assuming that nonprofit organizations generally realize the return on fundraising within a year and the marginal rate of return is constant

for the years observed. Future studies on nonprofit portfolio analysis need to model the non-linear rate of return on fundraising.

Third, the Form 990 data provide a basis for this study to compare the results with previous research. However, the data have many limitations. In the analysis of corporate finance, each day represents a data point. In the digitized data, there are only six years' data points, which may not be sufficient for observing the expected return and risk properties of nonprofit revenue sources. More data points would also allow us to observe if the correlations between revenue sources change over time. In addition, there are only five revenue sources with complete information for analysis in this dataset. In reality, nonprofit revenue sources are more granulated. My results show that the risk of contributions and grants varies by different subsectors, which may be due to the different compositions. For example, contributions include those directly from the general public, those from members or loyal donors, those from United Way and other federated campaigns, grants from foundations, or in-kind donations from corporates, among others. Even government grants can come from different levels of government. Third, the sample used in this study is abnormal in terms of the size of organizations. For the results to be more practically meaningful, future studies should examine the expected return and risk properties of more granulated revenue sources, possibly using a different dataset.

Conclusion

This paper applies modern portfolio theory to nonprofit revenue management and challenges the predominant use of Herfindahl-Hirschman Index in studying revenue diversification. HHI indicates that revenue diversification is achieved by increasing the

number of revenue sources and/or the equality of the shares of revenue in total revenue. Contrary to HHI, MPT suggests that a portfolio (i.e. revenue mix) with 100 revenue sources, which however move in the same direction, is not less risky than a portfolio with only one source. In fact, according to MPT, a well-diversified portfolio is a combination of assets whose returns do not move together all the time, that is, do not put all your eggs in one basket. Just like an investor in the for-profit world, the objective of a nonprofit manager is to deliberately choose a portfolio of revenue sources that can minimize the risk of the portfolio for a given level of expected return (program services), or maximize the expected return for a given level of risk. The expected return of a portfolio is computed as the weighted average of the expected returns on individual revenue sources which comprise the portfolio. The weights are the proportion of the investment/expenses of individual revenue sources in total portfolio value. The risk (standard deviation) of a portfolio depends on not only the variances of individual revenue sources in the portfolio but also how the returns on the revenue sources vary together (covariance).

By analyzing the NCCS-GuideStar Digitized Data from 1998 to 2003, this paper demonstrates how to find an optimal portfolio for a nonprofit using the MPT approach. Due to the data limitations, the results on the properties of the five revenue sources are more theoretically than practically suggestive. By subsector of nonprofits and in the whole sample, I analyzed five revenue sources—contributions and grants; land, buildings, and equipment for investment (rental properties); saving and temporary cash investments; securities; and sales from special events. The results vary by subsectors but similar patterns hold for all. Overall, among the five revenue sources, contributions and grants are the revenue source with the highest expected return and risk, followed by sales from

special events. The other three revenue sources are comparatively less rewarding and less risky. Note that securities generally do not have a desirable return and risk package. It may be largely due to the observed time period (1998-2033) that covers the Dot Com Bubble Burst in the late 1990s and the economic recession in the early 2000s during which the U.S. stock market and economy experienced unusual ups and downs. In general, special events and rental properties have low correlations with contributions and grants (but insignificant) and therefore could be helpful in portfolio diversification and in mitigating some of the high risk associated with contributions and grants. In contrast, saving and temporary cash investments, securities, and contributions and grants present significant and high correlations with each other across subsectors, meaning that they tend to move together and may not be good candidates for revenue diversification. For the four subsectors—arts, culture, and humanities; education; health; and human services—and the whole sample, I also identified the efficient frontier, which is a collection of efficient portfolios.

More importantly, I compared the HHI with the MPT risk of efficient portfolios and find a non-monotonic relationship between the two. For a certain level of HHI, there could be more than two corresponding levels of portfolio risk. For very low levels of portfolio risk, HHI can be as high as 1. It suggests that revenue concentration, as indicated by HHI, may not always cause high portfolio risk. In general, the efficient portfolios in my analysis have HHI ranging from around 0.5 to 1, which indicates the efficient portfolios are concentrated. On the other hand, the portfolios with lower levels of HHI, although more “diversified,” are not efficient portfolios. If using HHI to approximate risk and to guide portfolio selections, nonprofits will always end up

choosing sub-optimal portfolios, that is, assuming greater risk for a certain level of return. The findings cast cautions to future studies using HHI as a measure for revenue diversification to predict nonprofit financial health.

This paper is among the first to properly apply modern portfolio theory to nonprofit revenue management. It addresses two common misbeliefs in previous literature. First, portfolio analysis is based on net return rather than the change in gross revenue; second, revenue diversification involves evaluating the covariances of revenue sources rather than naively adding more revenue sources to a portfolio of revenue combination. My findings pose a challenge to the predominant approach in previous studies and suggest that HHI is unreliable in guiding revenue mix selections. I propose that MPT can be theoretically and practically more helpful in guiding nonprofit revenue management as it offers a more sophisticated guidance to what is the optimal revenue combination rather than a rough categorization of revenue diversification or concentration.

Table I-1. Data Cleaning

Original sample size	1,388,480
Less: private foundations	14,645
Less: organizations filing 990-EZ	282,032
Less: group returns	2,880
Less: organizations not reporting on the accrual basis	435,748
Less: organizations with reporting errors in revenue items ¹	2,240
Less: organizations with reporting errors in expenses ²	337,416
Less: organizations with negative or 0 assets	6,715
Less: organizations with unknown NTEE code	686
Less: organizations reporting 0 or negative functional expenses	1,279
Less: organizations with missing years	169,167
Final sample size	135,672

Notes:

1. Organizations reporting negative gross revenue items
2. Organizations reporting negative expenses, 0 program services or management or total expenses; Organizations reporting 0 fundraising expenses but with positive private donations or grants.

Table I-2. Summary Statistics: Original Sample vs. Cleaned Sample

Original Sample

	Total Revenue (\$)	Total Expenses (\$)	Ending Total Assets (\$)
Mean	3,587,624	14,100,000	7,442,082
SD	50,200,000	12,700,000,000	943,000,000
Median	175,203	155,416	194,050
Min	(348,000,000)	(147,000,000)	(34,700,000)
Max	20,000,000,000	14,900,000,000,000	798,000,000,000
N	1,388,480	1,388,480	1,388,480

Cleaned Sample

	Total Revenue (\$)	Total Expenses (\$)	Ending Total Assets (\$)
Mean	9,675,159	8,662,796	34,800,000
SD	73,300,000	61,300,000	3,230,000,000
Median	1,222,203	1,116,984	1,636,269
Min	(356,000,000)	849	60
Max	6,380,000,000	3,620,000,000	882,000,000,000
N	135,672	135,672	135,672

Table I-3. Cleaning Organizational Annual Returns on Revenue Sources in Subsectors and Whole Sample

Arts, Culture, Humanities

Org Annual Returns	Missing	≥ 3 IQR *	$> 100\%$ or $<100\%$	# of Obs	# of Orgs
Contributions	449	1214	N/A	12096	2016
Rents	13882	N/A	102	660	110
Interest	4036	N/A	204	9282	1547
Securities	9042	N/A	129	4734	789
Special events	8872	257	N/A	4422	737

* The 3IQR thresholds for contributions range from 45.47 to 67.10, depending on year.

* The 3IQR thresholds for special events range from 6.71 to 7.56, depending on year.

Education

Org Annual Return	Missing	≥ 3 IQR*	$> 100\%$ or $<100\%$	# of Obs	# of Orgs
Contributions	2482	1379	N/A	13410	2235
Program services	909	50	N/A	18402	3007
Rents	15714	N/A	165	2010	335
Interest	4451	N/A	385	11850	1975
Securities	7432	N/A	148	9822	1637
Special events	13713	184	N/A	3552	592

* The 3IQR thresholds for contributions range from 54.58 to 70.09, depending on year.

* The 3IQR thresholds for special events range from 7.23 to 8.22, depending on year.

Health

Org Annual Return	Missing	≥ 3 IQR*	$> 100\%$ or $<100\%$	# of Obs	# of Orgs
Contributions	5198	1488	N/A	14478	2413
Program services	1084	95	N/A	21570	3595
Rents	20644	N/A	106	1002	167
Interest	6714	N/A	351	12768	2128
Securities	13035	N/A	175	7338	1223
Special events	14661	320	N/A	5772	962

* The 3IQR thresholds for contributions range from 72.94 to 82.77, depending on year.

* The 3IQR thresholds for special events range from 8.07 to 10.37, depending on year.

Human Services

Org Annual Return	Missing	≥ 3 IQR	$> 100\%$ or $< 100\%$	# of Obs	# of Orgs
Contributions	10795	3472	N/A	32040	5340
Program services	564	187	N/A	49476	8246
Rents	44849	N/A	150	2316	386
Interest	13741	N/A	982	28926	4821
Securities	32760	N/A	326	12090	2015
Special events	33738	610	N/A	10836	1806

* The 3IQR thresholds for contributions range from 106.94 to 132.02, depending on year.

* The 3IQR thresholds for special events range from 8.77 to 9.65, depending on year.

Whole Sample

Org Annual Return	Missing	≥ 3 IQR	$> 100\%$ or $< 100\%$	# of Obs	# of Orgs
Contributions	21554	9729	N/A	91,416	15236
Program services	4457	452	N/A	128,772	21462
Rents	118446	N/A	539	7,296	1216
Interest	35132	N/A	2,283	79,092	13182
Securities	77011	N/A	1,037	42,450	7075
Special events	90670	1653	N/A	28572	4762

* The 3IQR thresholds for contributions range from 75.14 to 94.63, depending on year.

* The 3IQR thresholds for special events range from 8.06 to 9.08, depending on year.

Table I-4. Summary Statistics by Subsector and Whole Sample, 1998-2003

<i>Arts, Culture, Humanities</i>	N	Mean	S.D.	Median
Average Total Revenue	15,822	4,350,877	17,400,000	1,021,878
Average Total Expenses	15,822	3,684,991	15,200,000	895,344
Average Total Assets	15,822	12,300,000	64,300,000	1,387,160
Age in 2003	2,604	29	16	25
<hr/>				
<i>Education</i>	N	Mean	S.D.	Median
Average Total Revenue	19,326	24,800,000	147,000,000	3,179,512
Average Total Expenses	19,326	20,400,000	111,000,000	2,722,543
Average Total Assets	19,326	85,800,000	755,000,000	5,574,859
Age in 2003	3,176	34	19	32
<hr/>				
<i>Health</i>	N	Mean	S.D.	Median
Average Total Revenue	23,232	18,100,000	90,600,000	1,721,309
Average Total Expenses	23,232	17,500,000	87,400,000	1,588,720
Average Total Assets	23,232	98,200,000	4,490,000,000	2,007,518
Age in 2003	3,809	26	16	22
<hr/>				
<i>Human Services</i>	N	Mean	S.D.	Median
Average Total Revenue	50,658	3,858,229	33,400,000	1,059,563
Average Total Expenses	50,658	3,661,055	32,400,000	977,417
Average Total Assets	50,658	5,340,762	39,400,000	1,403,512
Age in 2003	8,323	27	16	23
<hr/>				
<i>All</i>	N	Mean	S.D.	Median
Average Total Revenue	135,672	9,675,159	71,400,000	1,276,505
Average Total Expenses	135,672	8,662,796	60,300,000	1,143,135
Average Total Assets	135,672	34,800,000	1,880,000,000	1,692,544
Age in 2003	22,302	28	17	24

Notes:

1. All dollar values are inflation-adjusted to 2003 dollars.
2. Average total revenue is an organization's six-year average total revenue.
3. Average total expenses are an organization's six-year average total expenses.
4. Average total assets are an organization's six-year average end-of-year total assets.

Table I-5. Summary Statistics of Organizational Annual Returns on Revenue Sources, Arts, Culture, and Humanities, 1998-2003

Revenue Sources	Average	SD	Median	Min	Max	# of Obs	# of Orgs
Contributions & Grants	9.049	9.018	6.282	-1.000	66.981	12096	2016
Rents	0.032	0.088	0.000	-0.122	0.785	660	110
Interest	0.053	0.092	0.030	0.000	0.970	9282	1547
Securities	0.047	0.090	0.035	-0.868	0.838	4734	789
Special events	0.932	1.217	0.667	-1.000	7.481	4422	737

Table I-6. Subsector Annual Returns on Revenue Sources, Arts, Culture, and Humanities, 1998-2003

Fiscal Year	Contributions & Grants	Rents	Interest	Securities	Special events
1998	10.433	0.033	0.062	0.080	1.005
1999	9.893	0.030	0.056	0.066	0.986
2000	9.430	0.030	0.063	0.071	0.896
2001	8.756	0.029	0.061	0.042	0.883
2002	8.118	0.027	0.039	0.011	0.898
2003	7.662	0.041	0.036	0.010	0.927
Expected Return	9.049	0.032	0.053	0.047	0.932
Risk	1.063	0.005	0.012	0.031	0.051

Table I-7. Correlation Coefficients of Returns on Revenue Sources, Arts, Culture, and Humanities

	Contributions & Grants	Rents	Interest	Securities	Special Events
Contributions & Grants	1.0000	-0.2694	0.8209**	0.9626***	0.6832
Rents	-0.2694	1.0000	-0.3981	-0.2257	0.2789
Interest	0.8209**	-0.3981	1.0000	0.9012**	0.2037
Securities	0.9626***	-0.2257	0.9012**	1.0000	0.5346
Special Events	0.6832	0.2789	0.2037	0.5346	1.0000

Note: * significant at 0.10 level, ** significant at 0.05 level, *** significant at 0.01 level.

Table I-8. Efficient Portfolios, Arts, Culture, and Humanities: Expected Return, Risk, Weights, and HHI

Expected Return	Risk	%Contributions & Grants	% Rents	% Interest	% Securities	%Special Events	HHI
0.036	0.004	0%	79%	21%	0%	0%	0.67
0.220	0.012	0%	63%	17%	0%	21%	0.41
0.404	0.022	0%	47%	12%	0%	41%	0.44
0.588	0.032	0%	30%	8%	0%	62%	0.60
0.772	0.042	0%	14%	3%	0%	82%	0.81
0.956	0.053	0%	0%	0%	0%	100%	0.97
1.140	0.071	3%	0%	0%	0%	97%	0.79
1.324	0.092	5%	0%	0%	0%	95%	0.67
1.508	0.113	7%	0%	0%	0%	93%	0.59
1.692	0.135	9%	0%	0%	0%	91%	0.55
1.875	0.158	12%	0%	0%	0%	88%	0.52
2.059	0.181	14%	0%	0%	0%	86%	0.50
2.243	0.203	16%	0%	0%	0%	84%	0.50
2.427	0.226	18%	0%	0%	0%	82%	0.50
2.611	0.249	21%	0%	0%	0%	79%	0.51
5.370	0.597	55%	0%	0%	0%	45%	0.76
5.554	0.620	57%	0%	0%	0%	43%	0.78
5.738	0.644	59%	0%	0%	0%	41%	0.79
5.922	0.667	61%	0%	0%	0%	39%	0.81
6.106	0.690	64%	0%	0%	0%	36%	0.82
6.290	0.714	66%	0%	0%	0%	34%	0.84
6.474	0.737	68%	0%	0%	0%	32%	0.85
6.658	0.760	71%	0%	0%	0%	29%	0.86
6.842	0.783	73%	0%	0%	0%	27%	0.87
7.025	0.807	75%	0%	0%	0%	25%	0.89
7.209	0.830	77%	0%	0%	0%	23%	0.90
7.393	0.853	80%	0%	0%	0%	20%	0.91
7.577	0.877	82%	0%	0%	0%	18%	0.92
7.761	0.900	84%	0%	0%	0%	16%	0.93
7.945	0.923	86%	0%	0%	0%	14%	0.94
8.129	0.946	89%	0%	0%	0%	11%	0.95
8.313	0.970	91%	0%	0%	0%	9%	0.96
8.497	0.993	93%	0%	0%	0%	7%	0.97
8.681	1.016	95%	0%	0%	0%	5%	0.98
8.865	1.040	98%	0%	0%	0%	2%	0.99
9.049	1.063	100%	0%	0%	0%	0%	1.00

Table I-9. Summary Statistics of Organizational Annual Returns on Revenue Sources, Education, 1998-2003

Revenue Sources	Average	SD	Median	Min	Max	# of Obs	# of Orgs
Contributions & Grants	9.320	10.040	5.989	-1.000	69.980	13410	2235
Rents	0.041	0.120	0.000	-0.634	0.968	2010	335
Interest	0.058	0.101	0.031	-0.164	0.998	11850	1975
Securities	0.052	0.082	0.039	-0.676	0.941	9822	1637
Special events	1.133	1.345	0.864	-1.455	7.867	3552	592

Table I-10. Subsector Annual Returns on Revenue Sources, Education, 1998-2003

Fiscal Year	Contributions & Grants	Rents	Interest	Securities	Special events
1998	10.212	0.045	0.071	0.089	1.149
1999	9.863	0.045	0.064	0.073	1.149
2000	9.911	0.041	0.066	0.078	1.104
2001	9.322	0.040	0.068	0.052	1.089
2002	8.485	0.040	0.044	0.012	1.149
2003	8.125	0.038	0.036	0.008	1.162
Expected Return	9.320	0.041	0.058	0.052	1.133
Risk	0.845	0.003	0.014	0.035	0.030

Table I-11. Correlation Coefficients of Returns on Revenue Sources, Education

	Contributions & Grants	Rents	Interest	Securities	Special Events
Contributions & Grants	1.0000	0.8445**	0.9466***	0.9951***	-0.3442
Rents	0.8445**	1.0000	0.7196	0.8157**	0.1327
Interest	0.9466***	0.7196	1.0000	0.9386***	-0.5647
Securities	0.9951***	0.8157**	0.9386***	1.0000	-0.3501
Special Events	-0.3442	0.1327	-0.5647	-0.3501	1.0000

Note: * significant at 0.10 level, ** significant at 0.05 level, *** significant at 0.01 level

Table I-12. Efficient Portfolios, Education: Expected Return, Risk, Weights, and HHI

Return	Risk	%Contributions &Grants	% Rents	% Interest	% Securities	%Special Events	HHI
0.041	0.003	0%	100%	0%	0%	0%	1.00
0.231	0.006	0%	65%	18%	0%	17%	0.42
0.420	0.009	0%	17%	49%	0%	34%	0.41
0.609	0.013	0%	0%	50%	0%	50%	0.54
0.799	0.017	1%	0%	36%	0%	63%	0.61
0.988	0.021	1%	0%	23%	0%	76%	0.69
1.177	0.025	2%	0%	9%	0%	89%	0.78
1.367	0.031	3%	0%	0%	0%	97%	0.78
1.556	0.043	5%	0%	0%	0%	95%	0.67
1.745	0.060	7%	0%	0%	0%	93%	0.60
1.935	0.078	10%	0%	0%	0%	90%	0.55
2.124	0.096	12%	0%	0%	0%	88%	0.52
2.314	0.115	14%	0%	0%	0%	86%	0.51
2.503	0.135	17%	0%	0%	0%	83%	0.50
2.692	0.154	19%	0%	0%	0%	81%	0.50
5.533	0.449	54%	0%	0%	0%	46%	0.74
5.722	0.469	56%	0%	0%	0%	44%	0.76
5.911	0.489	58%	0%	0%	0%	42%	0.78
6.101	0.509	61%	0%	0%	0%	39%	0.79
6.290	0.528	63%	0%	0%	0%	37%	0.81
6.479	0.548	65%	0%	0%	0%	35%	0.82
6.669	0.568	68%	0%	0%	0%	32%	0.84
6.858	0.588	70%	0%	0%	0%	30%	0.85
7.047	0.607	72%	0%	0%	0%	28%	0.86
7.237	0.627	75%	0%	0%	0%	25%	0.88
7.426	0.647	77%	0%	0%	0%	23%	0.89
7.615	0.667	79%	0%	0%	0%	21%	0.90
7.805	0.686	81%	0%	0%	0%	19%	0.91
7.994	0.706	84%	0%	0%	0%	16%	0.93
8.184	0.726	86%	0%	0%	0%	14%	0.94
8.373	0.746	88%	0%	0%	0%	12%	0.95
8.562	0.765	91%	0%	0%	0%	9%	0.96
8.752	0.785	93%	0%	0%	0%	7%	0.97
8.941	0.805	95%	0%	0%	0%	5%	0.98
9.130	0.825	98%	0%	0%	0%	2%	0.99
9.320	0.845	100%	0%	0%	0%	0%	1.00

Table I-13. Summary Statistics of Organizational Annual Returns on Revenue Sources, Health, 1998-2003

Revenue Sources	Average	SD	Median	Min	Max	# of Obs	# of Orgs
Contributions & Grants	11.437	12.849	7.116	-1.000	82.634	14478	2413
Rents	0.015	0.083	0.000	-0.511	0.996	1002	167
Interest	0.052	0.090	0.029	-0.851	0.970	12768	2128
Securities	0.049	0.090	0.036	-0.904	0.949	7338	1223
Special events	1.389	1.593	1.055	-1.000	10.362	5772	962

Table I-14. Subsector Annual Returns on Revenue Sources, Health, 1998-2003

Fiscal Year	Contributions & Grants	Rents	Interest	Securities	Special events
1998	11.961	0.016	0.064	0.081	1.425
1999	11.823	0.008	0.059	0.071	1.322
2000	11.704	0.007	0.064	0.075	1.406
2001	11.302	0.014	0.058	0.041	1.386
2002	11.108	0.018	0.039	0.009	1.361
2003	10.728	0.027	0.030	0.018	1.434
Expected Return	11.437	0.015	0.052	0.049	1.389
Risk	0.474	0.007	0.014	0.031	0.042

Table I-15. Correlation Coefficients of Returns on Revenue Sources, Health

	Contributions & Grants	Rents	Interest	Securities	Special Events
Contributions & Grants	1.0000	-0.7769*	0.9153**	0.9311***	-0.25
Rents	-0.7769*	1.0000	-0.8267**	-0.7028	0.56
Interest	0.9153**	-0.8267**	1.0000	0.9046**	-0.16
Securities	0.9311***	-0.7028	0.9046**	1.0000	-0.02
Special Events	-0.2484	0.5612	-0.1582	-0.0207	1.00

Note: * significant at 0.10 level, ** significant at 0.05 level, *** significant at 0.01 level

Table I-16. Efficient Portfolios, Health: Expected Return, Risk, Weights, and HHI

Return	Risk	%Contributions &Grants	% Rents	% Interest	% Securities	%Special Events	HHI
0.027	0.003	0%	67%	33%	0%	0%	0.55
0.260	0.006	2%	95%	0%	0%	4%	0.62
0.493	0.010	2%	83%	0%	0%	15%	0.41
0.726	0.015	3%	71%	0%	0%	26%	0.35
0.959	0.020	4%	58%	0%	0%	38%	0.36
1.192	0.025	4%	46%	0%	0%	49%	0.40
1.424	0.030	5%	34%	0%	0%	61%	0.45
1.657	0.035	6%	22%	0%	0%	72%	0.50
1.890	0.040	6%	10%	0%	0%	84%	0.55
2.123	0.045	7%	0%	0%	0%	93%	0.59
2.356	0.052	10%	0%	0%	0%	90%	0.54
2.589	0.059	12%	0%	0%	0%	88%	0.51
2.822	0.068	14%	0%	0%	0%	86%	0.50
3.054	0.078	17%	0%	0%	0%	83%	0.50
3.287	0.088	19%	0%	0%	0%	81%	0.50
7.013	0.261	56%	0%	0%	0%	44%	0.77
7.246	0.273	58%	0%	0%	0%	42%	0.79
7.479	0.284	61%	0%	0%	0%	39%	0.80
7.712	0.295	63%	0%	0%	0%	37%	0.82
7.945	0.306	65%	0%	0%	0%	35%	0.83
8.177	0.317	68%	0%	0%	0%	32%	0.85
8.410	0.329	70%	0%	0%	0%	30%	0.86
8.643	0.340	72%	0%	0%	0%	28%	0.87
8.876	0.351	75%	0%	0%	0%	25%	0.88
9.109	0.362	77%	0%	0%	0%	23%	0.90
9.342	0.373	79%	0%	0%	0%	21%	0.91
9.575	0.385	81%	0%	0%	0%	19%	0.92
9.807	0.396	84%	0%	0%	0%	16%	0.93
10.040	0.407	86%	0%	0%	0%	14%	0.94
10.273	0.418	88%	0%	0%	0%	12%	0.95
10.506	0.429	91%	0%	0%	0%	9%	0.96
10.739	0.441	93%	0%	0%	0%	7%	0.97
10.972	0.452	95%	0%	0%	0%	5%	0.98
11.205	0.463	98%	0%	0%	0%	2%	0.99
11.437	0.474	100%	0%	0%	0%	0%	1.00

Table I-17. Summary Statistics of Organizational Annual Returns on Revenue Sources, Human Services, 1998-2003

Revenue Sources	Average	SD	Median	Min	Max	# of Obs	# of Orgs
Contributions & Grants	16.019	18.770	9.406	-1.000	131.505	32040	5340
Rents	0.026	0.105	0.000	-0.307	0.999	2316	386
Interest	0.057	0.099	0.031	-0.192	0.986	28926	4821
Securities	0.043	0.090	0.027	-0.910	0.958	12090	2015
Special events	1.507	1.579	1.148	-1.000	9.565	10836	1806

Table I-18. Subsector Annual Returns on Revenue Sources, Human Services, 1998-2003

Fiscal Year	Contributions & Grants	Rents	Interest	Securities	Special events
1998	17.573	0.025	0.071	0.068	1.494
1999	16.973	0.021	0.062	0.060	1.508
2000	16.441	0.026	0.067	0.063	1.563
2001	15.594	0.029	0.066	0.039	1.471
2002	15.031	0.028	0.042	0.009	1.488
2003	14.502	0.030	0.036	0.017	1.520
Expected Return	16.019	0.026	0.057	0.043	1.507
Risk	1.180	0.003	0.015	0.025	0.032

Table I-19. Correlation Coefficients of Returns on Revenue Sources, Human Services

	Contributions & Grants	Rents	Interest	Securities	Special Events
Contributions & Grants	1.0000	-0.7643*	0.8526**	0.9293***	0.1085
Rents	-0.7643*	1.0000	-0.4910	-0.6771	-0.2261
Interest	0.8526**	-0.4910	1.0000	0.8978**	0.0326
Securities	0.9293***	-0.6771	0.8978**	1.0000	0.3237
Special Events	0.1085	-0.2261	0.0326	0.3237	1.0000

Note: * significant at 0.10 level, ** significant at 0.05 level, *** significant at 0.01 level

Table I-20. Efficient Portfolios, Human Services: Expected Return, Risk, Weights, and HHI

Return	Risk	%Contributions &Grants	% Rents	% Interest	% Securities	%Special Events	HHI
0.085	0.002	0%	98%	0%	0%	2%	0.86
0.410	0.007	0%	77%	0%	0%	23%	0.48
0.735	0.014	0%	56%	0%	0%	44%	0.52
1.060	0.022	0%	34%	0%	0%	65%	0.66
1.385	0.029	0%	13%	0%	0%	86%	0.83
1.711	0.037	1%	0%	0%	0%	99%	0.84
2.036	0.056	4%	0%	0%	0%	96%	0.68
2.361	0.079	6%	0%	0%	0%	94%	0.58
2.686	0.103	8%	0%	0%	0%	92%	0.53
3.011	0.129	10%	0%	0%	0%	90%	0.51
3.337	0.154	13%	0%	0%	0%	87%	0.50
3.662	0.180	15%	0%	0%	0%	85%	0.50
3.987	0.206	17%	0%	0%	0%	83%	0.51
4.312	0.232	19%	0%	0%	0%	81%	0.53
4.637	0.258	22%	0%	0%	0%	78%	0.55
9.840	0.679	57%	0%	0%	0%	43%	0.82
10.166	0.706	60%	0%	0%	0%	40%	0.84
10.491	0.732	62%	0%	0%	0%	38%	0.85
10.816	0.758	64%	0%	0%	0%	36%	0.86
11.141	0.785	66%	0%	0%	0%	34%	0.87
11.466	0.811	69%	0%	0%	0%	31%	0.88
11.792	0.837	71%	0%	0%	0%	29%	0.89
12.117	0.864	73%	0%	0%	0%	27%	0.90
12.442	0.890	75%	0%	0%	0%	25%	0.91
12.767	0.916	78%	0%	0%	0%	22%	0.92
13.092	0.943	80%	0%	0%	0%	20%	0.93
13.417	0.969	82%	0%	0%	0%	18%	0.94
13.743	0.995	84%	0%	0%	0%	16%	0.95
14.068	1.022	87%	0%	0%	0%	13%	0.96
14.393	1.048	89%	0%	0%	0%	11%	0.96
14.718	1.074	91%	0%	0%	0%	9%	0.97
15.043	1.101	93%	0%	0%	0%	7%	0.98
15.369	1.127	96%	0%	0%	0%	4%	0.99
15.694	1.154	98%	0%	0%	0%	2%	0.99
16.019	1.180	100%	0%	0%	0%	0%	1.00

Table I-21. Summary Statistics of Organizational Annual Returns on Revenue Sources, Whole Sample, 1998-2003

Revenue Sources	Average	SD	Median	Min	Max	# of Obs	# of Orgs
Contributions & Grants	12.356	13.638	7.833	-1.000	94.624	91416	15236
Rents	0.028	0.101	0.000	-0.650	0.999	7296	1216
Interest	0.054	0.094	0.030	-0.851	0.998	79092	13182
Securities	0.047	0.090	0.034	-0.922	0.997	42450	7075
Special events	1.264	1.467	0.932	-1.455	9.041	28572	4762

Table I-22. Subsector Annual Returns on Revenue Sources, Whole Sample, 1998-2003

Fiscal Year	Contributions & Grants	Rents	Interest	Securities	Special events
1998	13.565	0.029	0.066	0.078	1.284
1999	13.026	0.026	0.060	0.067	1.261
2000	12.760	0.027	0.064	0.071	1.285
2001	12.069	0.028	0.062	0.043	1.236
2002	11.614	0.027	0.040	0.009	1.244
2003	11.100	0.029	0.033	0.014	1.273
Expected Return	12.356	0.028	0.054	0.047	1.264
Risk	0.925	0.001	0.014	0.030	0.021

Table I-23. Correlation Coefficients of Returns on Revenue Sources, Whole Sample

	Contributions & Grants	Rents	Interest	Securities	Special Events
Contributions & Grants	1.0000	-0.2578	0.8810**	0.9464***	0.4499
Rents	-0.2578	1.0000	-0.2096	-0.2257	0.1255
Interest	0.8810**	-0.2096	1.0000	0.9234***	0.2267
Securities	0.9464***	-0.2257	0.9234***	1.0000	0.5371
Special Events	0.4499	0.1255	0.2267	0.5371	1.0000

Note: * significant at 0.10 level, ** significant at 0.05 level, *** significant at 0.01 level

Table I-24. Efficient Portfolios, Whole Sample: Expected Return, Risk, Weights, and HHI

Return	Risk	%Contributions &Grants	% Rents	% Interest	% Securities	%Special Events	HHI
0.029	0.001	0%	98%	2%	0%	0%	0.96
0.280	0.004	0%	80%	0%	0%	20%	0.54
0.532	0.009	0%	59%	0%	0%	41%	0.52
0.784	0.013	0%	39%	0%	0%	61%	0.65
1.035	0.017	0%	19%	0%	0%	81%	0.83
1.287	0.022	0%	0%	0%	0%	100%	0.98
1.538	0.037	2%	0%	0%	0%	98%	0.77
1.790	0.056	5%	0%	0%	0%	95%	0.65
2.041	0.076	7%	0%	0%	0%	93%	0.57
2.293	0.096	9%	0%	0%	0%	91%	0.53
2.545	0.116	12%	0%	0%	0%	88%	0.51
2.796	0.137	14%	0%	0%	0%	86%	0.50
3.048	0.157	16%	0%	0%	0%	84%	0.50
3.299	0.178	18%	0%	0%	0%	82%	0.51
3.551	0.199	21%	0%	0%	0%	79%	0.52
7.576	0.531	57%	0%	0%	0%	43%	0.80
7.827	0.551	59%	0%	0%	0%	41%	0.81
8.079	0.572	61%	0%	0%	0%	39%	0.83
8.331	0.593	64%	0%	0%	0%	36%	0.84
8.582	0.614	66%	0%	0%	0%	34%	0.85
8.834	0.635	68%	0%	0%	0%	32%	0.86
9.085	0.655	71%	0%	0%	0%	29%	0.88
9.337	0.676	73%	0%	0%	0%	27%	0.89
9.588	0.697	75%	0%	0%	0%	25%	0.90
9.840	0.718	77%	0%	0%	0%	23%	0.91
10.091	0.738	80%	0%	0%	0%	20%	0.92
10.343	0.759	82%	0%	0%	0%	18%	0.93
10.595	0.780	84%	0%	0%	0%	16%	0.94
10.846	0.801	86%	0%	0%	0%	14%	0.95
11.098	0.821	89%	0%	0%	0%	11%	0.96
11.349	0.842	91%	0%	0%	0%	9%	0.97
11.601	0.863	93%	0%	0%	0%	7%	0.98
11.852	0.884	95%	0%	0%	0%	5%	0.98
12.104	0.905	98%	0%	0%	0%	2%	0.99
12.356	0.925	100%	0%	0%	0%	0%	1.00

Table I-25. Robustness check: Summary Statistics of Organizational Annual Returns on Revenue Sources, Whole Sample, 1998-2003

Revenue Sources	Average	SD	Median	Min	Max	# of Obs	# of Orgs
Contributions & Grants	13.223	15.321	8.039	-1.000	99.980	93726	15621
Rents	0.028	0.101	0.000	-0.650	0.999	7296	1216
Interest	0.054	0.094	0.030	-0.851	0.998	79092	13182
Securities	0.047	0.090	0.034	-0.922	0.997	42450	7075
Special events	1.264	1.467	0.932	-1.455	9.041	28572	4762

Note: In the robustness check, the 3*IQR exclusion criteria for organizational annual returns on contributions and grants are relaxed while the exclusion criteria for other revenue sources remain the same. Using the new criteria, the organizations with organizational annual returns on contributions and grants larger than 100 are excluded.

Table I-26. Robustness check: Subsector Annual Returns on Revenue Sources, Whole Sample, 1998-2003

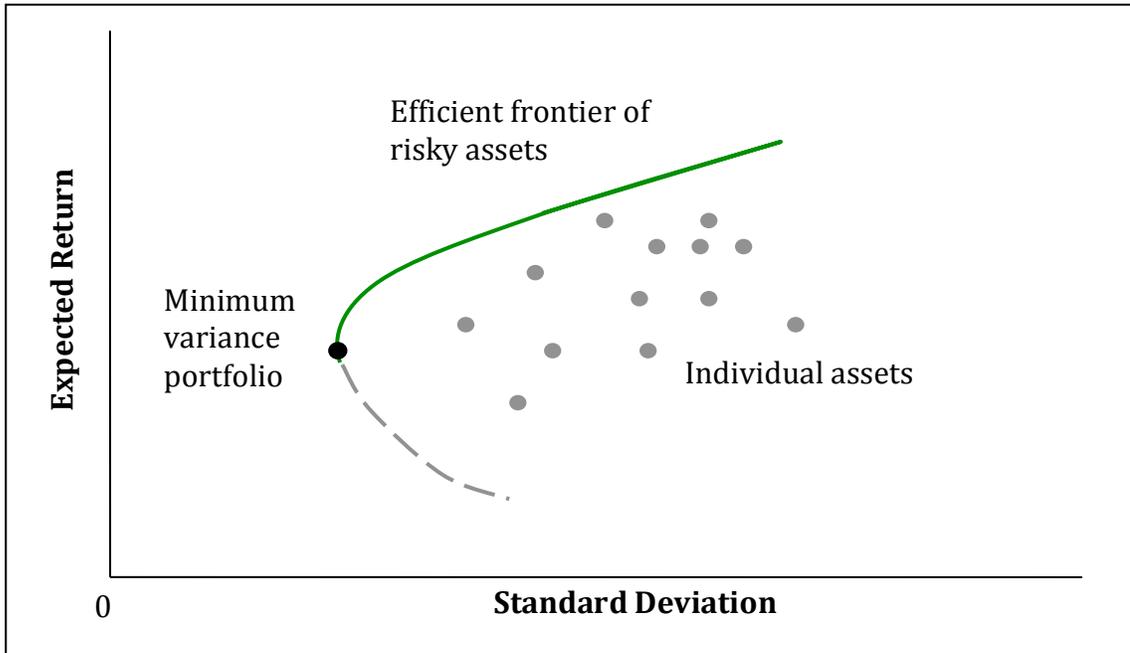
Fiscal Year	Contributions & Grants	Rents	Interest	Securities	Special events
1998	14.209	0.029	0.066	0.078	1.284
1999	13.779	0.026	0.060	0.067	1.261
2000	13.618	0.027	0.064	0.071	1.285
2001	12.944	0.028	0.062	0.043	1.236
2002	12.590	0.027	0.040	0.009	1.244
2003	12.201	0.029	0.033	0.014	1.273
Expected Return	13.223	0.028	0.054	0.047	1.264
Risk	0.769	0.001	0.014	0.030	0.021

Table I-27. Robustness check: Correlation Coefficients of Returns on Revenue Sources, Whole Sample

	Contributions & Grants	Rents	Interest	Securities	Special Events
Contributions & Grants	1.0000	-0.2701	0.8777**	0.9540***	0.4819
Rents	-0.2701	1.0000	-0.2096	-0.2257	0.1255
Interest	0.8777**	-0.2096	1.0000	0.9234***	0.2267
Securities	0.9540***	-0.2257	0.9234***	1.0000	0.5371
Special Events	0.4819	0.1255	0.2267	0.5371	1.0000

Note: * significant at 0.10 level, ** significant at 0.05 level, *** significant at 0.01 level.

Figure I-1. The Efficient Frontier of Risky Assets



Source: Chen, W.-P., Chung, H., Ho, K.-Y., & Hsu, T.-L. (2010). Portfolio Optimization Models and Mean-Variance Spanning Tests. In C.-F. Lee, A. C. Lee, & J. Lee (Eds.), *Handbook of Quantitative Finance and Risk Management* (Vol. I, pp. 165-184). New York, NY: Springer.

Figure I-2. Efficient Frontier and HHI, Arts, Culture, and Humanities

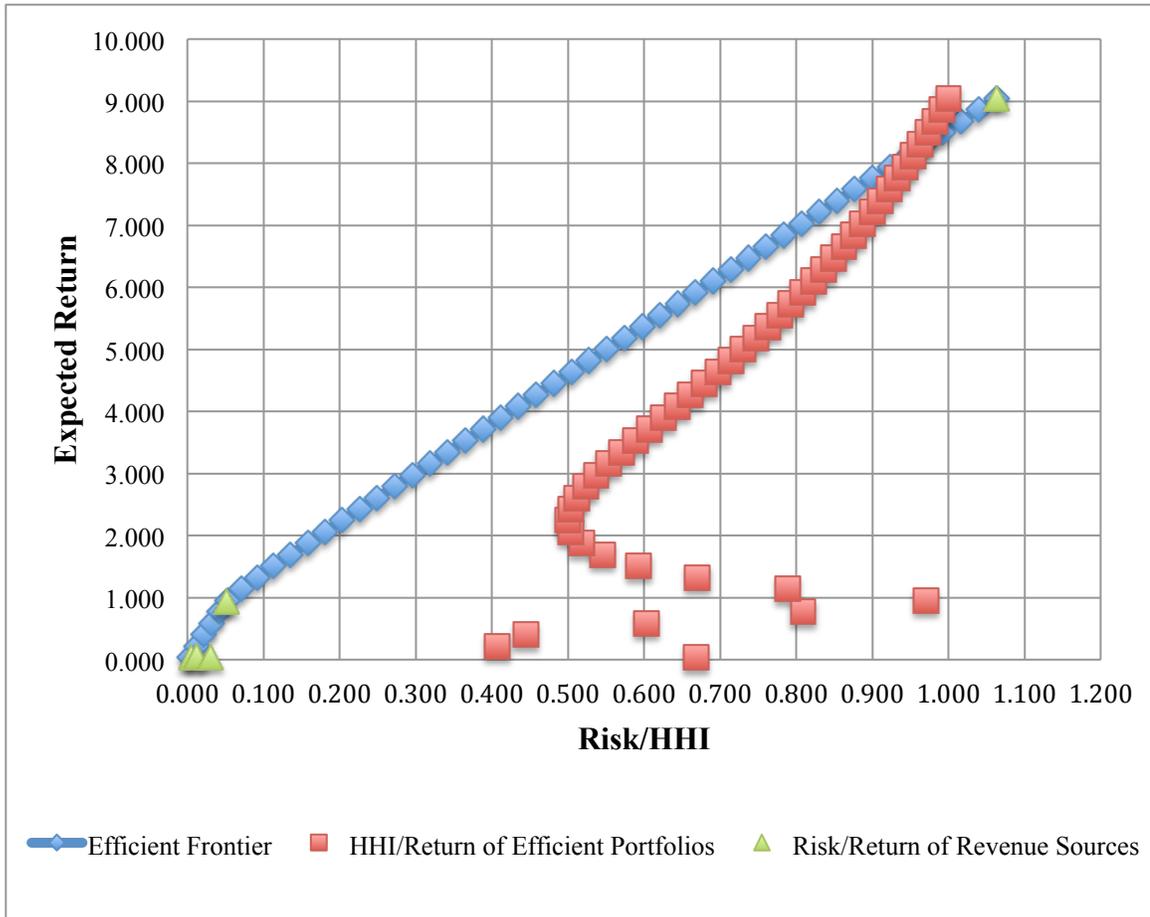


Figure I-3. HHI vs. MPT Risk of Efficient Portfolios, Arts, Culture, and Humanities

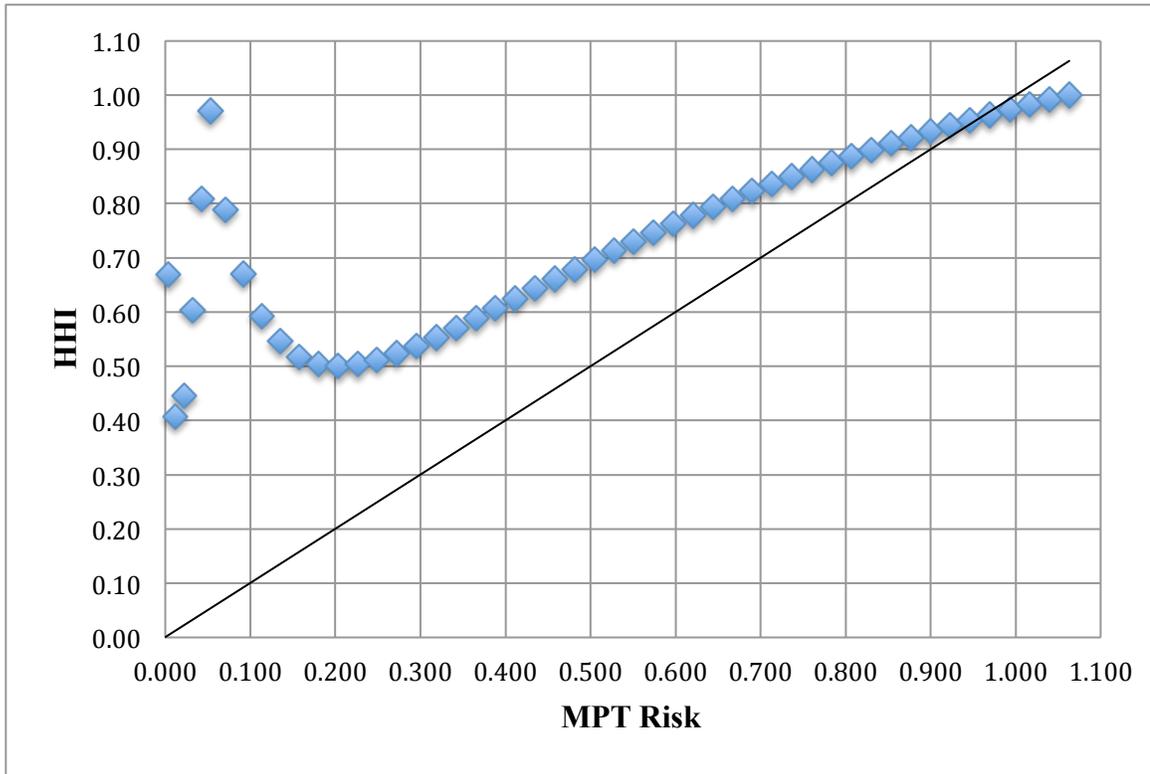


Figure I-4. Efficient Frontier and HHI, Education

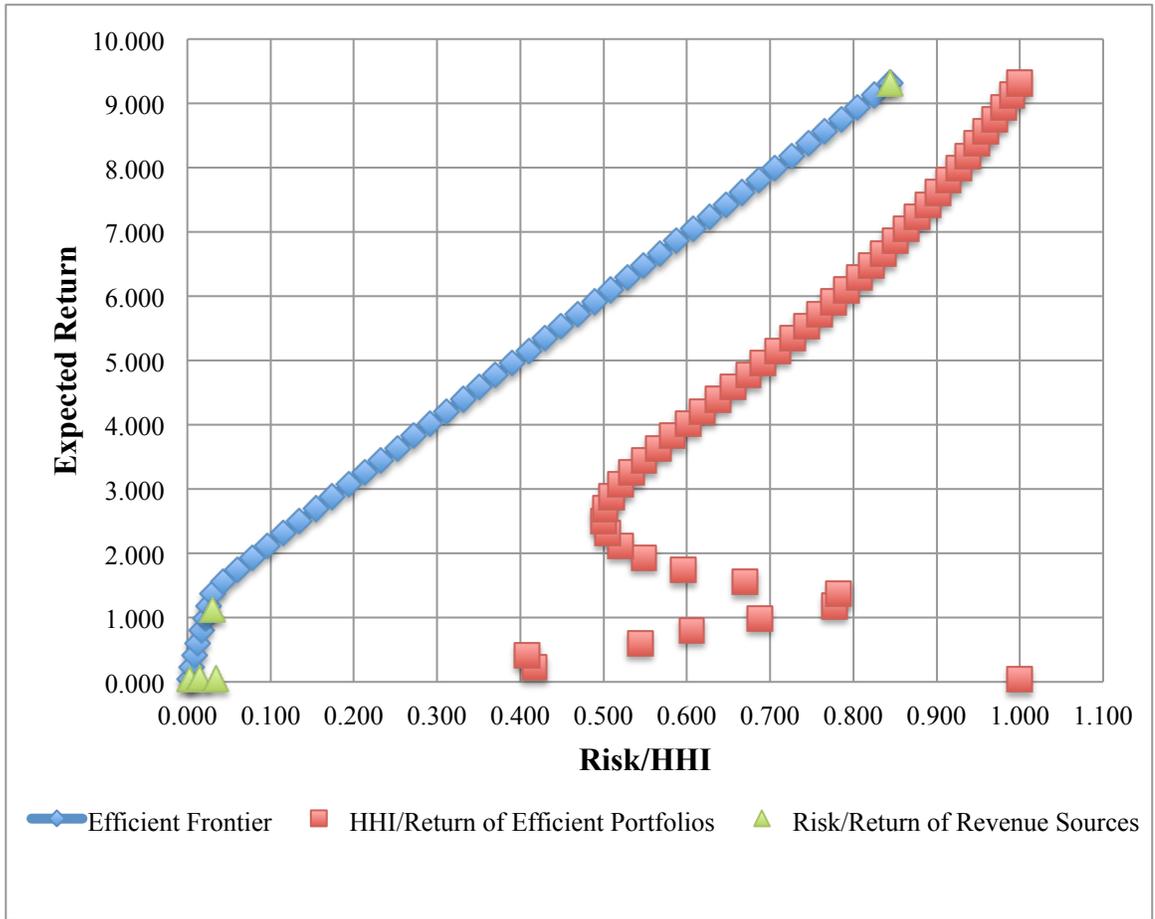


Figure I-5. HHI vs. MPT Risk of Efficient Portfolios, Education

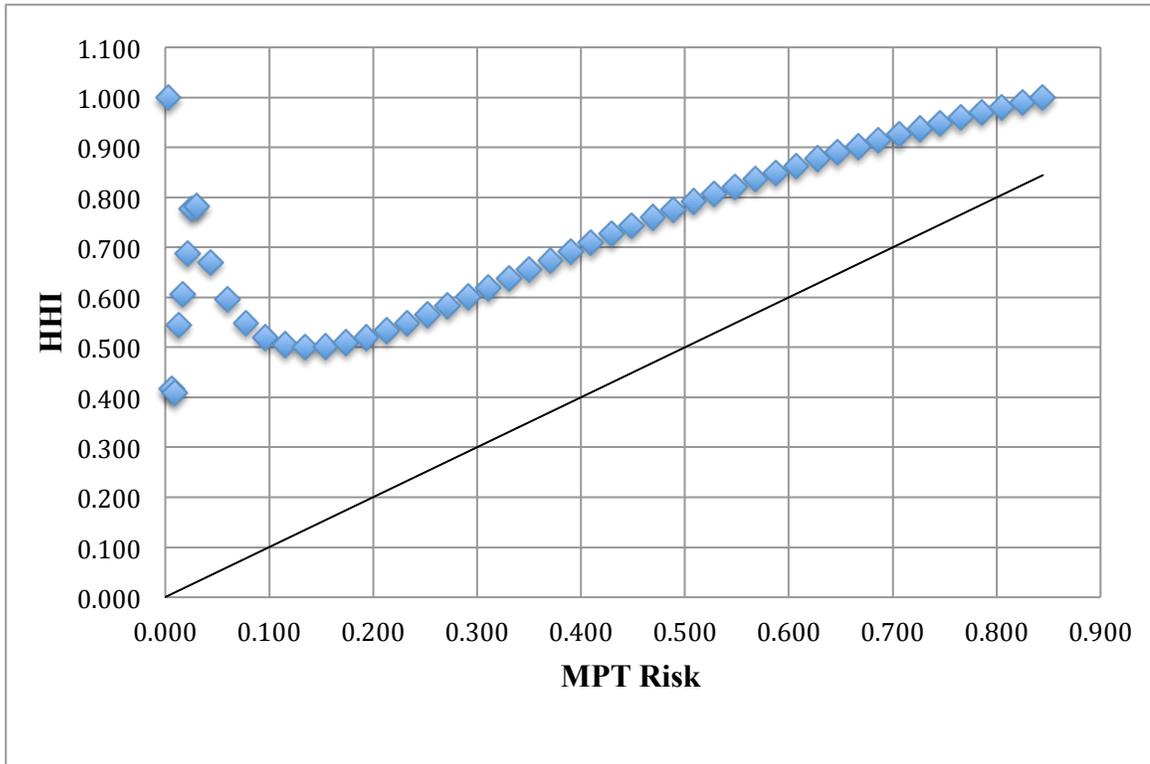


Figure I-6. Efficient Frontier and HHI, Health

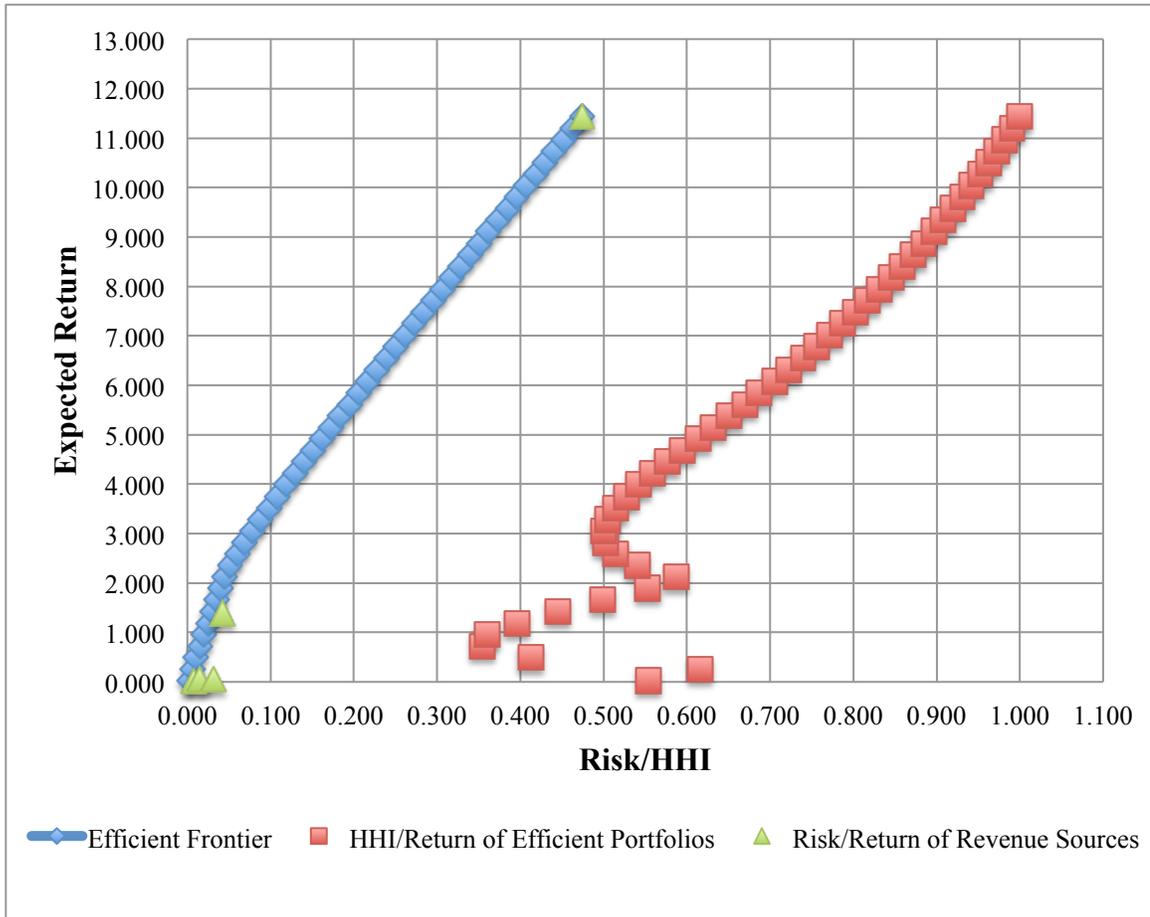


Figure I-7. HHI vs. MPT Risk of Efficient Portfolios, Health

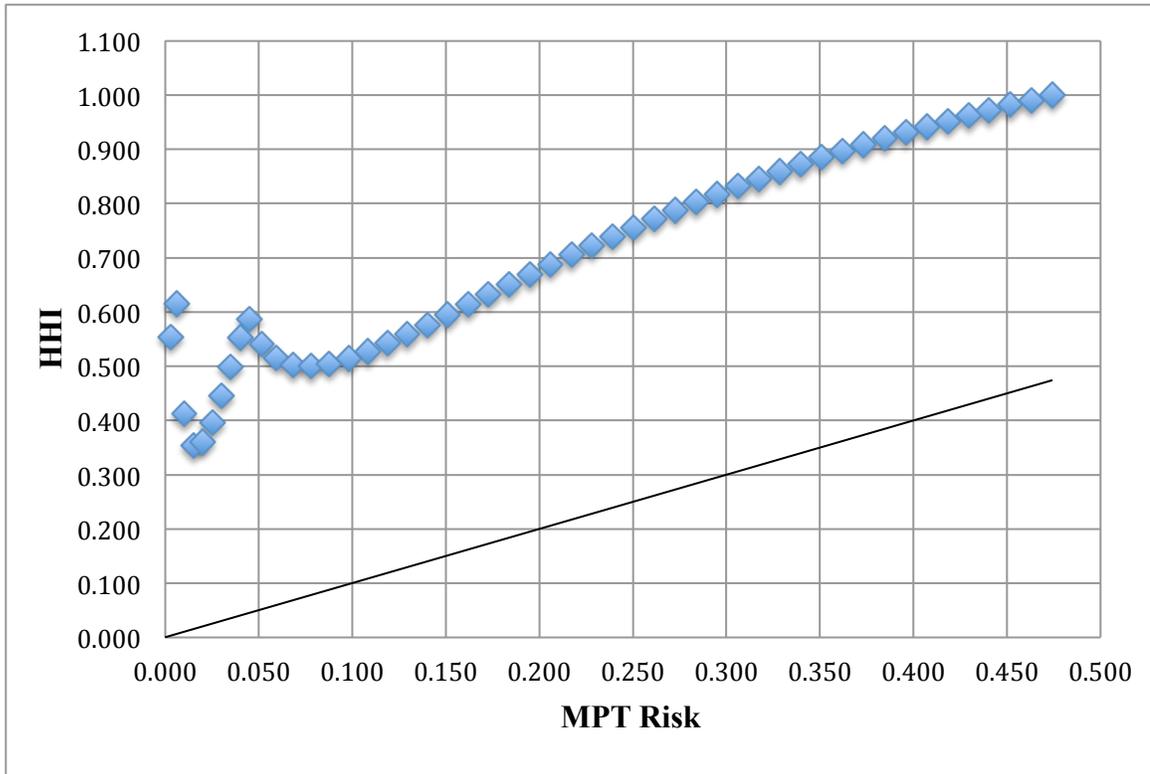


Figure I-8. Efficient Frontier and HHI, Human Services

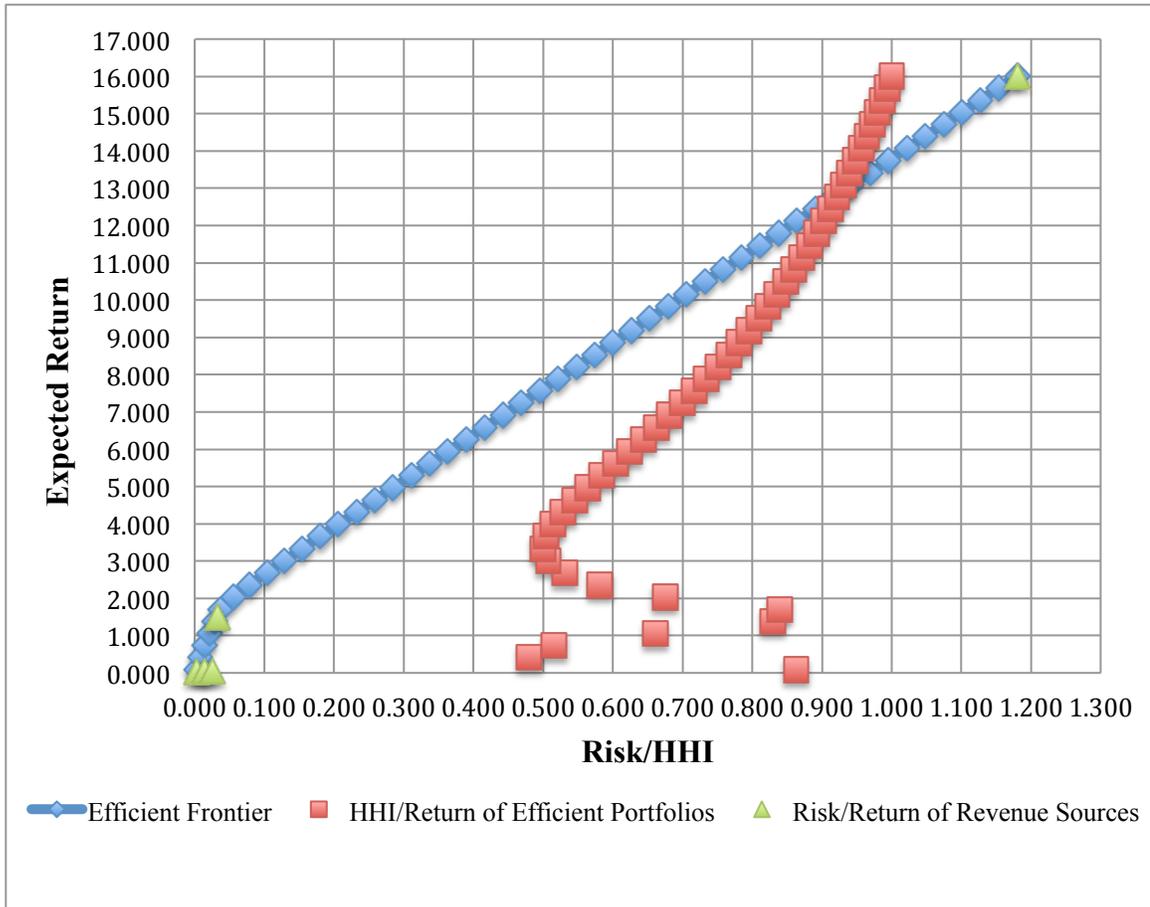


Figure I-9. HHI vs. MPT Risk of Efficient Portfolios, Human Services

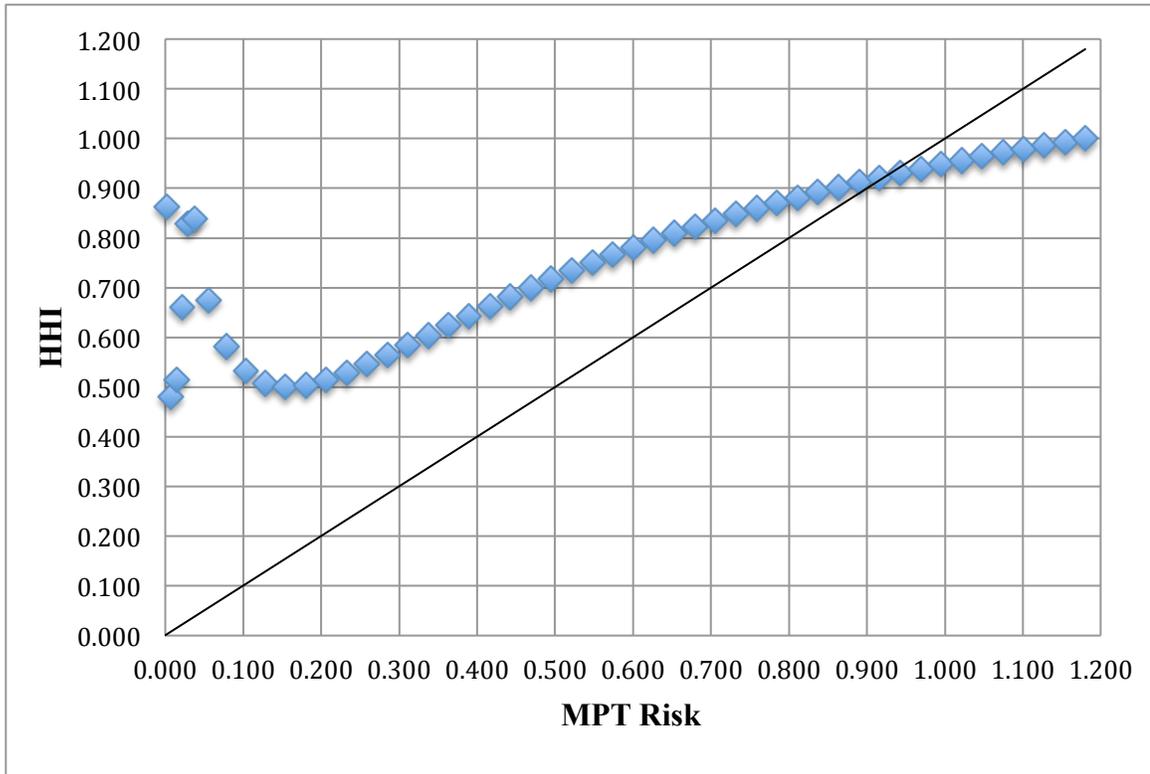


Figure I-10. Efficient Frontier and HHI, Whole Sample

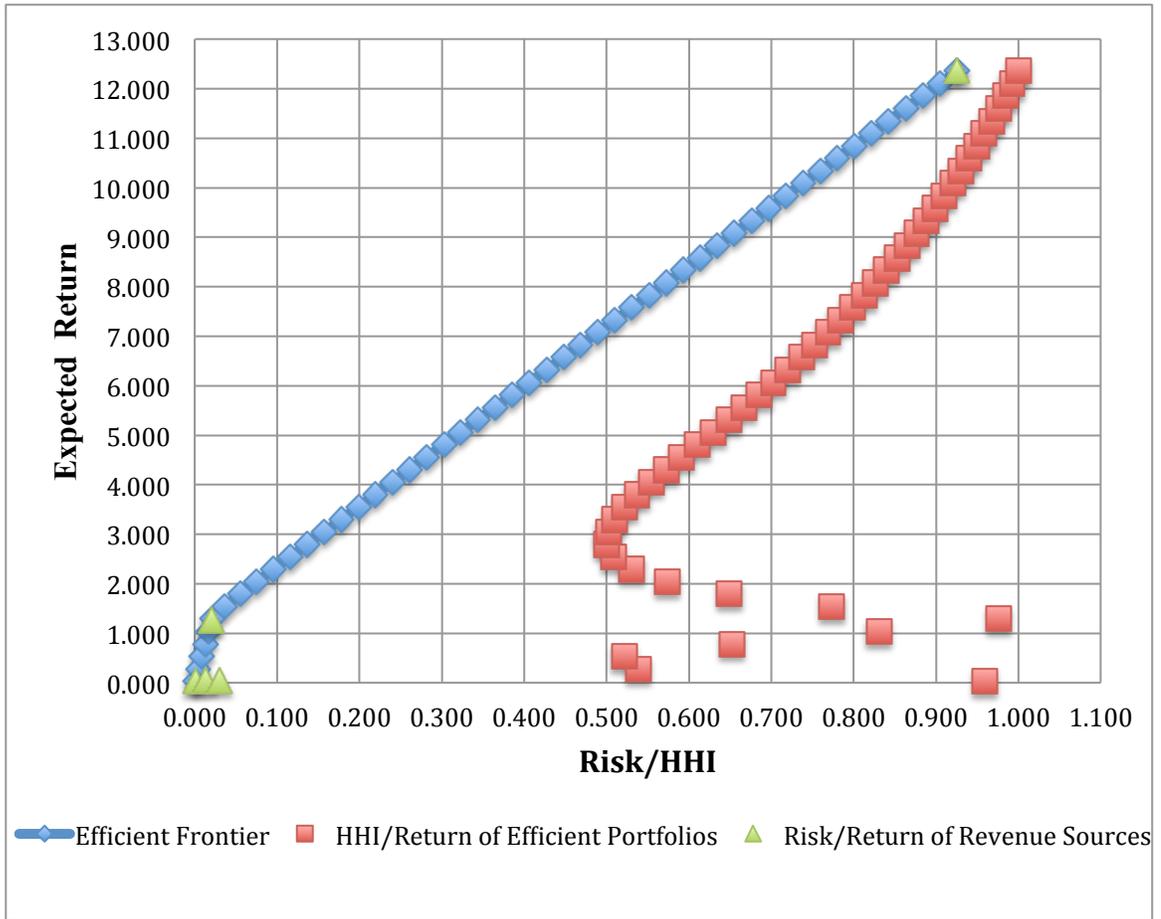
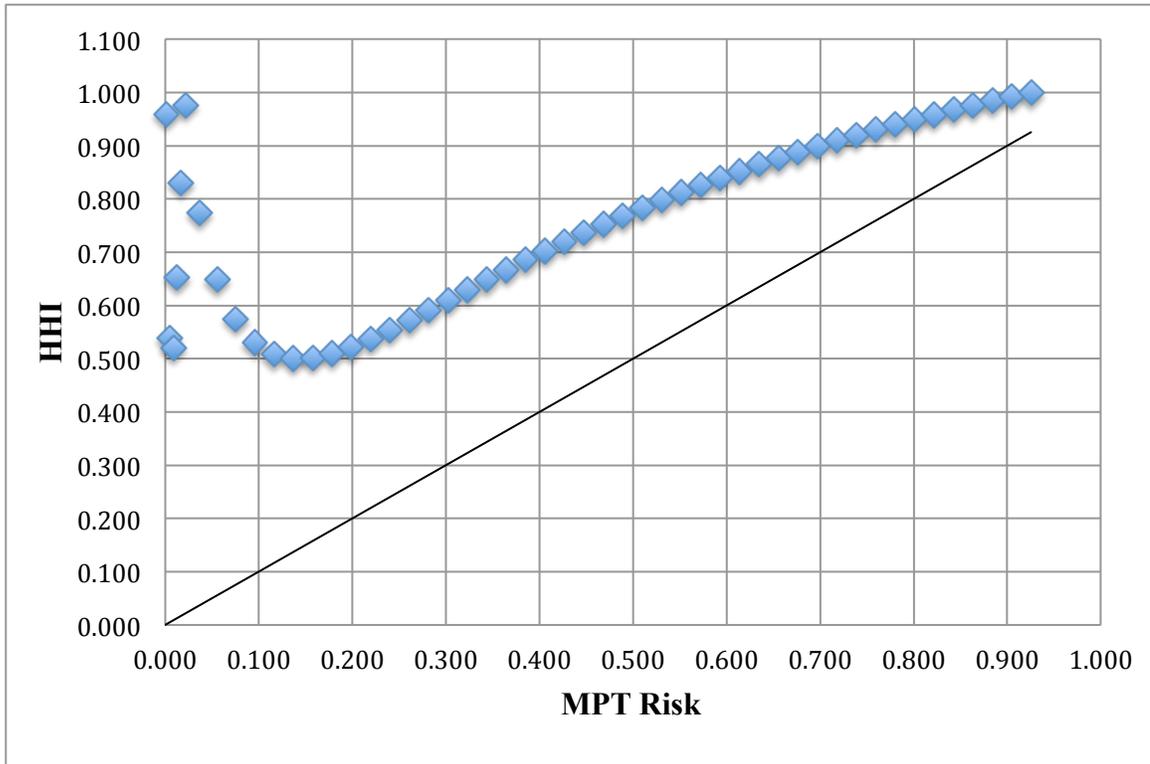


Figure I-11. HHI vs. MPT Risk of Efficient Portfolios, Whole Sample



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Essay II Charitable Giving in Nonprofit Service Associations: Identities, Incentives, and Gender Differences

Heng Qu and Richard Steinberg

Abstract

Service clubs, like the Lions Clubs, Rotaries, and Kiwanis, provide collective goods. Membership in a service club involves by two essential elements: members' shared interest in the club's charitable mission; and private benefits stemming from social interactions with other members, such as networking, fellowship, and fun. We report results from a laboratory experiment designed to test whether membership in a service club makes a person more generous. We find that female individuals are the least generous when they are reminded of the socializing aspect of service-club membership. Male individuals in the social treatment donated more than those in the mission treatment mathematically, although the difference is not statistically significant. Results are consistent with a variant of social identity theory we develop, as well as motivational crowding-out from psychology and economics.

Keywords: service clubs, nonprofit membership associations, motivation for charitable giving, social identity, motivational crowding-out, gender differences in charitable giving

Introduction

Service clubs, such as Lions Clubs, Rotary, and Kiwanis, provide a space where members get together to satisfy their self-interest and social needs, as well as to solve their community concerns (Charles, 1993). Giving circles, where groups of individuals donate their time and money to a pooled fund and collectively allocate their funds to other charities and community projects, are similar (Eikenberry, 2006). This paper is concerned with the effectiveness of service clubs and other similar types of organizations in fostering members' generosity and support for collective goods. A common belief is that the higher the level of member commitment, the more successfully a service club can pursue its mission. We argue that this analysis is too simple, that the way in which member commitment is built matters. Indeed, we find that one approach to building commitment is counterproductive, that member donations decline relative to other approaches. We explain this by noting two broad categories of benefits to members. First, "service benefits"—members benefit from their association with an organization that helps nonmembers and from their personal role in helping the club to do so. Members may want that association to enhance their charitable reputation or meet psychological needs, but the intended effect is the provision of a charitable service to nonmembers. Second, "socializing benefits"—members benefit from their interactions with other members, such as gaining networking opportunities, making friends, or having fun.

The dual goals of providing service and socializing benefits may have conflicting effects on members' charitable behavior. On the one hand, service clubs assemble like-minded individuals to support the provision of collective goods. This reduces free riding through self-selection, repeated interactions with other members, and community

enforcement (Kandori, 1992). Joiners also develop identities with their service clubs and behave according to the social norms associated with the identities (e.g., Akerlof & Kranton, 2000). Regular participation in club meetings and service projects fosters heightened levels of member identification with the club, resulting in greater member support for club mission attainment. On the other hand, service clubs are complex institutions satisfying both self-regarding and other-regarding member motivations. The theory of motivational crowding-out argues that the provision of extrinsic incentives undermines member's intrinsic motivation for charitable behaviors under certain circumstances (e.g., Frey & Jegen, 2001; Deci, Koestner, & Ryan, 1999). To the extent that socializing benefits are framed and perceived as extrinsic, intrinsic generosity may decline.

This paper reports a laboratory experiment that examines the effect of service club membership—stressing either the service or socializing aspects—on individual support for collective goods. We were motivated by the then surprising results of a pilot experiment, which found that a treatment designed to increase members' identity with the service club reduced donations. That led us to this experiment, in which we provide alternative treatments designed to activate either the service or socializing aspect of membership. We find that emphasizing the social benefits reduces donations.

In the next section, we summarize relevant literature from economics and social psychology, and present our model, a variant of the economic model of social identity. We also discuss other theories that make predictions consistent with our results. Next, we describe our experiment in detail and report the results, followed by a concluding discussion.

Theory

Background

Before presenting our model, we first discuss the two strands of literature from economics and social psychology that provide insights to our model: the theory of collective goods and social identity theory.

Collective Goods. Collective goods are defined as nonrival in consumption – that is, it costs nothing to let an additional person enjoy them once they are provided (Samuelson, 1954). Like many nonprofits, service clubs provide collective goods and such provision is enshrined in their mission statements. For example, Lions Club International lists its mission as “To empower volunteers to serve their communities, meet humanitarian needs, encourage peace and promote international understanding through Lions clubs.” (Lions Clubs International, 2015). An additional member, as well as nonmembers, can benefit from the fact that Lions provide these services to others without diminishing existing members’ enjoyment of the same benefits. The service club in our experiment provides access to higher education, which is collectively enjoyed by people valuing others’ access to education.

A well-known problem with voluntary support for collective goods is free riding, enjoying service provision without personally contributing. This leads to under-provision of collective goods relative to the social optimum. Andreoni’s (1988, 1989) impure altruism model provides a framework that predicts the observed distribution of charitable giving and free riding. In his model, potential donors care about both the level of collective good provision (labeled “altruism”) and their personal contribution to the

collective good (“warm glow”), Variation in the relative importance of these two motivations explains why some people free ride, others do not, and still others take an easy ride (less extreme free-riding).

Social Identity. We model the mutability of individual preferences for collective goods using social identity theory. This theory was originally developed by social psychologists (Tajfel and Turner, 1979), and was modified by economists Akerlof and Kranton (2000) to explain economic behavior. Social identity theory highlights the importance of social contexts to decisionmaking, explaining why the same person makes different decisions from otherwise identical choice sets. In the original formulation, Tajfel and Turner (1979) define social identity as a person’s sense of who she is based on the groups to which she belongs. People divide the world into the in-group (us) and out-group (them) in order to enhance self-image and achieve a positive social identity. Following this categorization, people adopt the identity and conform to the norms of the in-group, and also compare with and discriminate against the out-group to achieve superiority (Tajfel and Turner, 1979).

Many studies in social psychology and behavioral economics use experimental methods and find significant effects of group membership and identity on individual behavior. Some experiments use “priming”—reminding subjects of their natural social identities (e.g. gender, ethnicity, race), and find that people behave in accord with the stereotypes associated with the salient identity. For example, Shih, Pittinsky, and Ambady (1999) report that Asian-American women scored higher on a math test when their Asian identity is salient than when female identity is salient. Other experiments find that inducing artificial group identities in labs triggers a favorable bias to the in-group.

This was first observed in “minimal groups:” group memberships are ostensibly established based on trivial tasks (e.g. preferences for paintings), but participants actually are assigned randomly and anonymously to complete seemingly irrelevant tasks when no direct self-interest or interactions with others are involved (Tajfel et al., 1971). Early social psychology studies using the minimal group paradigm generally found that even “trivial, ad hoc intergroup categorization leads to ingroup favoritism and discrimination against the outgroup.” (Tajfel & Turner, 1979, p.39).

Economics experiments are particularly concerned with the effects of group identities when there is a tradeoff between self-interest and collective interest, breaking one condition of the minimal group paradigm. Chen and Li (2009) show that the ingroup favoritism persists even when minimal groups include a link between subject decisions and self-interest. Eckel and Grossman (2005) find that just being identified with a group alone is insufficient to solve the conflicts between self- and collective interest; only higher levels of identity can restrain self-interest and lead to higher degrees of group cooperation.

In our experiment, we attempt to induce group identities in a fictitious service club using various treatments. Members and nonmembers donate to an education fund that advances the organization’s mission, so the design presents subjects with a potential tradeoff between self- and collective interest.

The Model

Our model shows how context effects can be introduced into an economics model that incorporates the theories of impure altruism and social identity. It provides a way to

interpret empirical results, although as we shall discuss, there are other theories allowing interpretation. The starting point is the economic model of social identity developed by economists Akerlof and Kranton (2000). In their model, individuals define themselves as members of certain social categories that constitute their social identities. Each social identity comes with exogenously determined expectations and norms of behavior, labeled “prescriptions.” The saliency of each identity depends on the perceived context in which decisions are made. When an identity is made salient, individuals increase utility by following closely to that identity’s prescription.

We adapted the economic model of social identity by adding explicit terms for altruism and warm glow as in the impure altruism model. In our model, individuals (indexed by i) choose an amount to donate (d_i) in support of the collective good “access to education,” and retain the rest of their endowment (e_i) for private consumption (x_i). We assume that the collective good is produced with constant returns to scale and measure the quantity of the collective good in units such that \$1 donated produces 1 unit of educational access. In treatments where membership is not an option, a nonprofit organization simply collects the donations (costlessly) and provides $D = \sum_{j=1}^N d_j$ units of the collective good. In treatments where membership is mandated, we assume that member services are costless. Then a nonprofit service club costlessly collects donations and provides D units of the collective good.

We assume that there are two distinct member identities – socializing (subscript S) and collective service providing (subscript C) to capture the two features of service clubs. The socializing identity is salient when the club provides a setting for hobnobbing and mingling, and the collective service identity is salient when the club organizes

members to provide charitable service. Member's utility depends on the salience of each member identity times "prescription functions," denoted P_S (P_C), and on the difference between i 's donation and the prescribed donation for members in each category.

Akerlof and Kranton (2000) assume that prescriptions arise from shared cultural norms and appropriate behavior for various social roles. Here, we assume that there is an exogenously specified prescribed donation for the collective service identity (socializing identity) denoted D_C (D_S). We assume that D_C is greater than the amount that each individual would give if neither identity is made salient, but we do not make the same assumption about D_S . We also assume D_C is greater than D_S .

Following Akerlof and Kranton (2000), departures in either direction from prescribed donations reduce utility stemming from the socializing identity. It is clear why giving less than the prescribed amount lowers utility, less clear why giving more than the prescribed amount does so. Giving too much may be as alienating as giving too little because the generous donor will lose some identification with other club members. We therefore speculate that the overly generous will face a bigger penalty in the socializing identity term than in the service identity term. We note that there is no need for the prescription functions to be symmetric about the prescribed amount.

The importance of each identity is a function of exogenous personal preferences and the level of specific induction applied to each. We denote the level of induction by $\sigma_j \in \{0, 1\}, j = S, C$. The salience of the induced socializing identity, $a(\sigma_S)$ takes values \underline{a} when $\sigma_S = 0$ and \bar{a} when $\sigma_S = 1$, with $0 \leq \underline{a} < \bar{a}$. Similarly, the salience of the induced collective service identity is $b(\sigma_C)$ which takes values \underline{b} and \bar{b} respectively. The combined identity function, $I_i(d_i, \sigma_S, \sigma_C)$, takes the form:

$$I_i = -a(\sigma_S)P_S(d_i - d_S) - b(\sigma_C)P_C(d_i - d_C)$$

Where: $P_j' > 0$ and $P_j'' < 0$ if $d_i < d_S$ or d_C ; $P_j' \leq 0$ and $P_j'' \leq 0$ otherwise,

$$P_j(0) = 0; \text{ for } j = S, C,$$

and d_S and d_C are the prescribed donations for each identity, with

$$d_S > d_C.$$

Putting this all together, utility takes the following form:

$$U_i = U[d_i, x_i, D, I_i(d_i, \sigma_S, \sigma_C)]$$

$$\text{Where: } D = \sum_{j=1}^J d_j.$$

U is assumed concave and increasing in all its arguments. When i becomes a member, she maximizes utility by choosing a level of donations and private consumption subject to a budget constraint and non-negativity constraints. One non-negativity constraint recognizes that D is mostly outside the control of i, and that d_i can add to, but not subtract from the gifts of others. The individual is also constrained by σ_S and σ_C , which are chosen by the experimenters for each subject. The solution to this problem gives i's best response function, and the solutions to the system of best response functions gives the Nash equilibria to the simultaneous moves game for each combination of induction levels. We restrict attention to symmetric Nash equilibria.

Our model is identical to the impure altruism model (Andreoni, 1989; 1990) with two twists. First, agents receive utility from their membership identities. This does not change the nature of individual equilibrium because identities are exogenously activated.¹ Second, we add norm prescriptions to the impure altruism model, and introduce a way to manipulate the salience of alternative preference elements in an impure altruism

framework. This change is a restriction on the functional form of impurely altruistic utility, and so results that hold for the general case also hold for our particularization.

Our model produces three predictions cast as the following hypotheses:

H₁: Many people will make positive donations when they are asked to, regardless of whether they are members.

Existing proofs suffice for this proposition (Cornes and Sandler, 1985). This is mainly due to the warm-glow term in donor utility, which seems to be a naturally present intrinsic motivation in a variety of other experiments (Andreoni & Payne, 2013).

H₂: Members whose collective-service identity is salient will make larger contributions than nonmembers, who receive only basic information about the charitable cause.

This comes from our assumption that the prescribed amount of donations exceeds the nonmember-identity equilibrium for each person. If the induction of service identity is successful, each individual will find that their marginal benefit of donating increases at each level of donations whereas marginal costs remain the same. This induces a rightward shift in each member's reaction function, which shows optimal individual donations at each level of giving by others. Because these reaction functions are downward sloping (Andreoni, 1989), this implies that individual and collective donations increase for a pool of members with salient collective-service identity in symmetric Nash equilibrium.

H₃: Service club members donate less when their socializing identity is salient than when their collective service identity is salient.

We believe that the norm prescribed by the socializing identity is to be an active participant in the club's social activities, whereas the norm for the service identity is

to be an altruistic member who support the club's charitable. Hence, focusing subjects' attention on the socializing aspect would frame the context of giving decisions as a social club rather than an altruistic service club. Members with salient service identity would gain utility by making appropriate amount of donations, while those with salient socializing identity would not gain utility by making donations.

Alternative Theory

Our model is not the only way to rationalize the behavior observed in our experiment. According to Clark and Wilson (1961), organizations generally provide three broad categories of incentives – material, solidary, and purposive – in order to increase donations. Material incentives are tangible benefits with a monetary value, like savings on car rentals. Solidary incentives are intangible rewards “derived from the act of associating” (p.134), including socializing, having fun, providing a sense of belonging, and sometimes obtaining elite status. Purposive incentives are intangible rewards associated with the goals and values of organizations. Although service clubs offer all the three types of incentives, they primarily rely on solidary incentives (Clark & Wilson, 1961). This attracts members more responsive to solidary than purposive and material benefits. In contrast, nonprofit organizations without members rely more on purposive incentives, attracting donors who are more motivated by mission attainment. So we can interpret results as answering “Which organizational form collects more donations: contributor- or membership-based? A purposive or a solidary group?”

The theory of motivational crowding-out provides another way to interpret our results (Deci, 1971; Ryan & Deci, 2000; Bénabou and Tirole, 2006). This literature

distinguishes between two types of motivation for behavior: extrinsic incentives (externally-supplied rewards) and intrinsic incentives (naturally-present; doing something for the inherent satisfaction and enjoyment of the activity itself (Deci, 1971; Ryan & Deci, 2000). Many studies find that the provision of extrinsic incentives at any level crowds out intrinsic motivations, so that sometimes providing extrinsic incentives is counterproductive to promoting pro-social behavior (e.g., Deci, Koestner, & Ryan, 1999; Frey & Goette, 1999; Gneezy & Rustichini, 2000). Other studies find that monetary rewards differ from other extrinsic incentives. Noncash incentives, like lottery tickets or T-shirts, increased blood donations (Goette & Stutzer, 2008; Lacetera, Macis, & Slonim, 2012), but cash incentives significantly decreased blood donations among female donors (Mellström & Johannesson, 2008). Diverse theories explain motivational crowding-out. Extrinsic incentives can be perceived as controlling, offending psychological needs for autonomy and competence (Deci & Ryan, 1985). When people are rewarded for performing an intrinsically motivating activity, they no longer attribute their behavior as representing desirable traits but to the external rewards (Lepper, Greene, & Nisbett, 1973).

People have intrinsic motives for charitable giving, that is, they give anyway without extrinsic incentives. Some extrinsic incentives are providing through tax breaks and other sources when people give regardless of membership status, but membership in a service club might alter the balance. The socializing benefits of membership may provide a reason to increase donations while crowding out intrinsic generosity. On balance, either effect could dominate so that the sign of the membership effect becomes an empirical question. This leads to our last hypothesis:

H₄: Members focusing on the socializing benefits give less than those focusing on collective service provision—members or nonmembers.

It is reasonable to conjecture that a service club member has a combination of both intrinsic (altruistic) and extrinsic motivations for giving. When focusing on the socializing aspect, a member is made to focus on the extrinsic incentives (e.g. networking, fellowship, fun) that may crowd out her altruistic motivation and thus becomes more generous. In either case, we would expect people focusing on socializing benefits give less than those who are not made to focus on any external rewards, whether they are members of a service club or contributors of a nonprofit organization.

Experiment

Design and Participants Assignment

We used a between-subject design, consisting of one control (no club membership) and two treatments with club membership (salience of service vs. socializing identity) (Table 1). 113 students at a midwestern university participated in our experiment and received an average compensation of \$7.60. Our final sample includes 93 good observations (35% men, 65% women). Subjects were assigned to 18 single-treatment sessions based on their availability, and each participated in the experiment only once.² Subjects did not know in advance which treatment they would receive, so there is no self-selection into treatment. Moreover, each treatment had multiple sessions, on different days and times, so that selection based on unobservable attributes correlated with time should not be a problem.

[Table II-1]

Procedure

Subjects proceeded through five stages. First, they chose an organization they would like to be associated with from a list of two options. Second, subjects participated in a practice round, practicing a neutrally framed decisionmaking task. Third, subjects in the treatment groups were welcomed to membership in the fictitious Education Service Club (ESC), and then completed a task intended to make either the service or socializing member identity salient. Subjects in the control group skipped this step. Fourth, subjects in all groups were read a fundraising message and asked to allocate their tokens. Fifth, subjects designated a real-world charity to receive their donations and filled out questionnaires. Subjects were privately compensated in cash before leaving. During the whole time, subjects were instructed to finish their tasks independently without interacting with others during the experiment—they sat behind black paper shields without seeing others' activities and were not allowed to talk with others.

Membership Manipulation. We used the following procedure to prevent subjects from framing themselves as forced into membership. Upon arrival, subjects were asked to choose an organization they would “like to get involved with” from a list of two organizations, with a one-sentence vague mission statement for each. One of the organizations was always the fictitious Education Service Club (ESC) (or Education Service Association (ESA) in the control group). The other was a fictitious organization, either the Society of Accounting Standards (SAS) or the Society of Warehousing Standards (SWS) depending on the session, which we intentionally described in a way

that led very few subjects to make this choice. Those subjects picking the ESC (ESA) continued with the experiment. Those choosing the SAS/SWS were taken to another room and completed the questionnaires. Because they did not experience the rest of the experiment, they were omitted from the analysis sample.³

Following the practice round, subjects in the treatment groups were told: “You have chosen the Education Service Club, and are now being granted the membership in the Education Service Club.” The experimenter then read a new member welcome letter orally while subjects read the printed version. Those in the control group heard nothing about membership. They were told instead: “You have chosen the Education Service Association and here is more information about it.”

Club Identity Induction. The welcome letter was also used to induce the two club identities and make them salient. It included not only the welcoming message, but also basic information about the ESC’s mission, service projects and social activities, and membership obligations. Immediately after reading the welcome letter, subjects in the mission treatment were asked to highlight in the letter “at least 3 phrases that are directly related to the ESC’s *charitable mission*,” in order to raise the salience of the service identity. In contrast, subjects in the social treatment were asked to highlight “at least 3 phrases that are directly related to the ESC’s *social activities*,” in an effort to raise the salience of the socializing identity.

Decision Task. All subjects received a short and neutral fundraising message from the ESC (or ESA in the control group). For the control group, the fundraising message, which was only four sentences long, introduced the charity’s mission and its scholarship fund, and then requested donations by asking “please make a donation to the

ESA Scholarship Fund.” The message also stated “100% of your donation will benefit students because an anonymous donor is covering all of the administration and fundraising costs associated with this campaign” in an effort to remove heterogeneity resulting from subjects making diverse assumptions about these matters. The message for the treatment groups was identical, except that the organization was called ESC and the charity’s mission statement was omitted (as it was presented already in the new member welcome letter). The message was read aloud to subjects by the experimenters.

After reading the fundraising message, subjects were asked to complete the allocation task, that is, to divide their 600-token endowment between a personal account and the scholarship fund. They were told: “At the end of each session, tokens are converted to real money at the rate of 100 tokens to \$1. Your token donations will become real donations to a scholarship fund you will choose from a list of real-world charities.”⁴ The money that a subject kept for herself was added to her \$5 show-up fee to determine her monetary compensation. Subjects were presented with multiple examples and the opportunity to ask questions in an effort to minimize misunderstandings and miscalculations. Then subjects were told to “place the tokens you wish to keep for yourself in the envelope labeled ‘Personal Account,’ and place the tokens you wish to donate in the envelope labeled ‘Charity.’” The envelopes were sealed by subjects and then processed by an assistant in another room to preserve the anonymity of subject decisions.

Questionnaires. Subjects completed questionnaires post-treatment. The first was a psychometric scale designed to check whether those in the treatment group identified as ESC members, adopted from Ellemers, Spears, and Doosje (1997).⁵ The second

contained 14 questions used to construct the Empathic Concern (EC) and Perspective Taking (PT) scales (Davis, 1983). The EC and PT scales respectively allow us to control for individual differences in the level of empathy with unfortunate others and tendency to spontaneously adopt others' psychological point of view.

Then, subjects completed the Unlikely Virtues (UV) scale (Patrick et al., 2002), which allowed us to control for social desirability bias. Although anonymity is guaranteed and explained to subjects, this scale serves as an additional check for any subjects who do not understand or trust the anonymity procedure. The UV scale is the sum of "true" responses to 14 true-false items that describe socially desirable behaviors that are rarely true, such as "My opinions are always completely reasonable," or "I have never felt that I was better than someone else."

Finally, a socio-demographic questionnaire asks about subjects' basic socio-demographic characteristics, including gender, age, ethnicity and race, educational level, academic major, marital and parental status, and frequency of religious activities. In addition, subjects were asked if they had made donations to any charities before, and if they have/had membership in any public service clubs. Table II-2 provides summary statistics.

[Table II-2]

Results

Our final sample includes 93 observations: 30 for the control group, 32 for mission treatment, and 31 for social treatment.⁶ We report treatment effects in panel A of Table II-3. Average token donations were 353.33 out of 600 in the control group.

Subjects in the mission treatment donated the largest average amount of tokens (365.63), while those in the social treatments made the least (275.81). The corresponding median tokens are 300, 400, and 200, showing similar patterns. Another measure of the treatment effect is by the share of subjects who donated all their 600 tokens. 27% of participants in the control group donated all, 38% in the mission treatment, and only 19% in the social treatment.

[Table II-3]

Panel C of Table II-3 reports the nonparametric Wilcoxon–Mann–Whitney tests to examine whether the amounts of donations between each pair of treatments come from the same population.⁷ Results from independent sample t-tests, not displayed, are quite similar. The difference between the two treatments is marginally significant at the 10% level. However, the differences between mission and control and between social and control are not statistically significant. While statistical difference tells whether the results are likely to be due to chance, effect size helps understand the magnitude of the difference between groups. Panel D of Table II-3 reports the effect size (Cohen’s d) of the differences between conditions. Cohen (1988) interprets the effect size as small ($d = 0.2$), medium ($d = 0.5$), and large ($d \geq 0.8$). The Cohen’s d effect size suggests a small practical difference between mission and social ($d = 0.426$) and between social and control ($d = 0.386$). There is no effect for the difference between mission and control ($d = 0.059$).

Panel B of Table II-3 reports results for gender subsamples. Women in the control group donated an average amount of 372.73 (median = 300). The average amount of

tokens donated increased to 423.68 (median = 500) in the mission treatment and decreased to 268.42 (median=200) in the social treatment. The difference between the mission and social treatments is significant at the 5% level, and the difference between the social treatment and control group is marginally significant at the 10% level. According to Panel D of Table II-3, there is a medium effect for the difference between mission and social ($d = 0.726$) and that between social and control ($d = 0.506$). The effect size is small for the difference between mission and control ($d = 0.255$). The pattern for men was starkly different, with the largest mean donations for the social treatment (309.09), followed by the control group (300). Those in the mission treatment donated the lowest amount (280.77). There are no statistically significant or practical differences between the groups.

Although random assignment obviates the need for covariates, we estimated regressions to control for sampling variations that lead to departures from “all else held equal” and report results in Table II-4. We used Tobit to account for the censoring of the dependent variable at 0 and 600 tokens. The baseline specification includes treatment dummies for social and control (mission was the omitted category), a female dummy, and empathy measured as the sum of the empathic concern and perspective taking scores.⁸ Columns 1 and 2 of Table II-4 report the raw coefficients and unconditional average marginal effects in the baseline specification. Compared with the mission treatment, the social treatment has a negative average marginal effect on donations (-88.5 tokens), which is statistically significant at the .10 level. This suggests that emphasizing personal benefits leads to lower donations than stressing charitable missions. The difference in donations between the control and mission treatments was not significant. The sum of

empathic concern and perspective taking scores has a small positive effect: a one standard deviation increase in the combined score increases tokens donated by 37.90 (significant at the .10 level).⁹ This indicates that people with higher level of empathic concern and perspective taking scores tend to be more generous. The gender effect is not statistically significant in the baseline model.

Next, we allow treatment effects to vary with gender by adding interaction terms, reporting results in columns 3 and 4 of Table II-4. A likelihood ratio test does not reject the nested baseline model, but results of the less parsimonious specification are sufficiently interesting to warrant their display. The social treatment, compared with the mission treatment, still has a negative average marginal effect (-97.45 tokens) and is now significant at the .05 level. The treatment effects between the control and mission treatments are still not significantly different. Although the total effect of Female is not significant, the partial effect of gender being female is large and positive (201.32 tokens) and significant at the .10 level, whereas the interaction effect between Female and social treatment is large and negative (-266.6 tokens) and significant at the .10 level. We can interpret this as saying that females are more generous than males in the mission and control groups, but have such a large negative reaction to the social treatment that they become less generous than males in this group. The sum of the empathic concern and perspective taking scores is not significant in this specification.¹⁰

We also conducted corresponding OLS and median regressions as robustness checks and find similar patterns. Social treatment was equally significant in all three estimations. However, the point estimate for the effect of the social treatment on mean (median) donations ranges from -97.45 in tobit to -162.87 in OLS to -195 in

median regression. And the total effect of gender is significant for OLS, but not the other two.

[Table II-4]

Although there are no significant difference of empathic concern and perspective taking scores across conditions, we find that men ($M = 38.16$, $SD = 7.60$) and women ($M = 43.08$, $SD = 6.27$) in our sample are significantly different in their empathic concern and perspective taking scores ($t = -3.1365$, $p = 0.0028$). This leads us to examine donations separately for the female and male subsamples respectively (Table II-5). For women, the social treatment, compared with the mission treatment, has a large negative average marginal effect on donations (-157.44 tokens), which is statistically significant at the .05 level. There is still no significant difference between the control and mission treatment. The sum of the empathic concern and perspective taking scores is not significant. For men, the treatment effects are not significant. Although the size of the subsamples is small, the results further signify plausible gender differences in our experiment.

[Table II-5]

Discussion

Our results show that the way a person identifies with her club matters. Our two treatments represent different ways of building members' identity with the club – focusing on the club's charitable mission or private membership benefits. Consistent with our hypothesis, subjects receiving the mission treatment gave significantly more than the social treatment. Our model rationalizes this result in terms of context activating distinct

identities with different norm prescriptions. A service club setting where charitable purposes are emphasized frames a contextual norm of altruism. When personal benefits are emphasized, selfish behavior becomes more acceptable.

Our results are also consistent with motivational crowding-out theory. Donations in the control and mission treatments were costly and fully anonymous, reinforcing the conclusion of hundreds of studies that giving is, in part, intrinsically motivated. The social treatment leads subjects to anticipate extrinsic rewards, such as having fun, making friends, and building professional networks and career opportunities. Hence, motivational crowding-out is the greatest under the social treatment. As explained by attribution theory, when extrinsic rewards are introduced to an intrinsically motivated task, people are likely to attribute their behavior to extrinsic rewards and discount their intrinsic motivation (Lepper, Greene, & Nisbett, 1973). In our social treatment, subjects might think that making donations is in exchange for those benefits and hence decrease their donations.

On the other hand, we did not find that those in the mission treatment gave significantly more than the control group, although average donations were 38.83 tokens higher in the mission treatment. This could be due to insufficiently strong induction of new club members, and strong induction of group identification has been found necessary when self-interest is added to the minimal group paradigm (Eckel and Grossman, 2005). Or the fundraising letter given post-induction to the mission group may have interacted with or superseded the induction of service identity. It may also be because the subjects in the control group were mission-primed by a simple reminder of the mission of the association. In any case, we suggest future researchers experiment with alternative

induction tasks that manipulate the strength of identity and a more sophisticated manipulation check to test the mechanisms.

An unexpected result from our experiment is the gender difference in donations. We find that women have a significantly higher level of empathic concern and perspective taking than men in our sample. Women in the social treatment donated significantly less than those in the mission treatment. We did not find statistically significant treatment effects for a small sample of men in our study. However, men in the social treatment donated a larger amount than those in the mission treatment. The findings are consistent with a recent study reporting that men are less willing to give to poverty relief because of their low levels of empathic concern. When giving is framed as consistent with self-interest, women are generally less motivated to give whereas men are the opposite (Willer, Wimer, & Owens, 2015). It would be interesting for future research to further explore the gender differences in charitable giving.

Conclusion

Service clubs support the private provision of collective goods, yet we know little about their effectiveness in securing donations relative to non-membership based nonprofit organizations. We find no evidence that soliciting donations from new members offers advantage over soliciting donations from the general public. Our most compelling finding is that focusing members' attention on private membership benefits is counterproductive, particularly for female members. Service club members build connections with the club in different settings, which may lead to distinct club identities and norm prescriptions. Reminding members of the networking opportunities and social

events may help build initial buy-in and attachment, but this may come at the cost of identification with the club's charitable mission. In contrast, although it may be difficult in the short run, emphasizing mission-related projects may foster and certainly does not hinder the altruistic mindset that leads to increased donations. Along this line, research is needed to see whether social events and private membership benefits have large positive impacts on the recruitment and retention of members. If so, lower donations per member can be overcome by the resulting increase in the number of members.

The complex mixture of member benefits is behind our differing treatment effects, that some aspects of membership oppose other aspects in determining member generosity. We develop an identity-theory-based model that is consistent with our findings, but point out that other theories are also consistent with results – motivational crowding out, or the simple focusing of attention. Our model is testably distinct from these other theories, providing an opportunity for further research on the mechanism behind member generosity. Finally, future researchers can use this approach to study more complicated funding structures. For example, when a service club structures campaigns specific to members as well as seeking donations from the general public, how do the two revenue streams interact? Do identity theory and/or motivational crowding out help us to understand these interactions? How does gender affect charitable giving in service clubs?

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Notes

1. In the full Nash Equilibrium, it matters whether we increase the salience of each identity for one member or for all members, but aside from this, the twist has no impact on the nature of equilibrium.
2. The sessions were conducted in the summer and fall semesters of 2014. For each week of experiments, students could sign up for morning, noon, or afternoon sessions. Students were asked to list all their available times, and we later blindly assigned them to certain sessions based on their availability and session capacity. Sessions were cancelled if only one subject arrived as scheduled. That person was assigned to another session upon her agreement.
3. Only 12 out of 113 participants chose SAS or SWS, a reasonably low ratio. The majority of them were male actuarial science or accounting or economics students, with only one female participant choosing SAS/SWS. The combined empathic concern and perspective taking score on average (31.3) were lower than that in the full sample (41.3) and male subsample of our experiment (38.2).
4. Subjects did not see the list of real-world charities until they completed their allocation tasks. This order ensures that subjects' allocation decisions are not influenced by their feelings about the real-world charities on the list.
5. The average identity score is 4.88 (SD = 1.93) in the mission treatment and 5.68 in the social treatment (SD = 2.17). There was not a significant difference in the scores between the two treatments ($t = -1.56, p = 0.13$). The scale is reliable (Cronbach's $\alpha = .96$) in measuring subjects' identity with the club in each setting, but it lacks construct validity for comparing our treatments and inapplicable to our control group.
6. The 12 participants who did not choose to get involved with the ESC/ESA and were filtered out in the initial membership manipulation process, as well as 8 additional participants who did not complete or misunderstood the identity-induction task. The final sample was further adjusted because there were subjects who did not highlight the letter appropriately according to the instructions. For example, some highlighted both mission-aspect phrases and friends (or fun) in the mission treatment. Others highlighted fundraising and peer mentoring in the social treatment without highlighting anything regarding social events. It could be because: 1) they did not pay attention to the instructions; or 2) they had different ideas about mission/social aspects. Either way, these cases may suffer from induction failure so we need to deal with these observations carefully. We first exclude 3 subjects because they did not complete the identity-induction task. We then excluded 4 subjects in the mission treatment because they highlighted social aspects of membership. Another subject highlighted the entire paragraphs concerning both mission and social aspects and so was excluded. 4 subjects in the social treatment highlighted all the mission aspects and none of the social aspects of membership. Hence, contrary to directions, they actually experienced the mission treatment. We re-assigned these subjects to the mission treatment in our main analysis, but also check robustness by excluding them from the analysis.
7. Without adjusting problematic observations, average donations in the social treatment are still lower than the mission treatment (297.14 vs. 313.64), but this difference is not statistically significant ($p=0.76$) in t-tests. The mission treatment has a lower mean (313.64) than the control group (353.33), but this difference is not significant

- ($p=0.46$). The social treatment mean is still lower but not significantly different from the control group ($p=0.27$). If the problematic observations are dropped instead of being re-categorized, the mission and social treatment means are 351.79 and 275.81 (the difference is only significant at $p=0.18$). The control mean is not significantly different from the mission mean ($p=0.98$), although it is nearly significantly higher than the social mean ($p=0.14$). Nonparametric tests (the Mann-Whitney rank-sum test and Kruskal-Wallis equality-of-populations rank test) provide similar patterns.
8. We ran a variety of alternative specifications, not reported here, with additional controls including the Unlikely Virtue score (as a level or as a dummy equaling 1 when the score was very high), a dummy equaling 1 for the majors of philanthropic studies, social work, and nursing, and a dummy representing membership experience in any real-life service clubs. We also ran variants with interaction terms between these additional variables and the treatment variables. None of these additional variables were robustly significant, and inclusion of these variables had small effects on our baseline coefficients, although the p values for the treatment effects sometimes varied by a percentage point or two.
 9. We also ran a regression with empathic-concern and perspective-taking scores as two separate independent variables, and found that the latter was positive and significant at the 10% level.
 10. Similarly, we find that neither empathic concern nor perspective taking scores were significant when entered separately.

Tables

Table II-1. Experimental Design

Treatment	Group Assignment	Initial Selection	Organization Name	Membership Manipulation	Club Identity Induction	Solicitation
Mission	Member	Choose an organization	Education Service Club (ESC)	New Member Welcome Letter	Collective-Service Dimension	Fundraising Message
Social	Member	Choose an organization	Education Service Club (ESC)	New Member Welcome Letter	Socializing Dimension	Fundraising Message
Control	Nonmember	Choose an organization	Education Service Association (ESA)	No	None	Fundraising Message

Table II-2. Summary Statistics

Variables	N	Median	Mean	Std. Dev.	Min	Max
Empathic Concern (EC)	92	23	21.99	4.45	6	28
Perspective Taking (PT)	92	19	19.27	4.37	9	28
EC and PT Combined	92	42	41.26	7.14	20	54
Unlikely Virtue (UV)	90	1	2.11	2.35	0	10
Age	90	20	22.38	6.65	18	60

Variables	N	Percent	
Gender	Female	60	65
	Male	32	35
Race	White	64	70
	Black	8	9
	Asian	9	10
	Other	10	11
Education	Some College/College Graduate	57	96
	Some Postgraduate	4	4
Major	Economics/Business/Engineering	30	32
	Philanthropic Studies/Social Work/Nursing	20	22
	Other	43	46
Religious Activities	Frequent (once a week or more)	20	23
	Less frequent (once a month)	11	12
	Seldom (once or twice a year)	33	37
	Do Not Attend	25	28
Marital Status	Single/Separated	81	92
	Married/Living with a partner	7	8
Parental Status	No Children	81	92
	Have Children	7	8
Membership in any service clubs	No	45	51
	Yes/Not now, but used to	44	49
Made donations before	No	4	4
	Yes	86	96

Table II-3. Treatment Effects
Panel A Whole Sample

	Control	Mission	Social
Average donations	353.33	365.63	275.81
Std.Dev	199.54	218.29	202.43
Median	300	400	200
Bottom 25%	200	125	100
Top 25%	600	600	450
Number of 0 donations	1	2	2
Number of 600-token donations	8	12	6
Number of subjects	30	32	31

Panel B Gender Difference

<i>Treatment</i>	<i>All</i>			<i>Women</i>			<i>Men</i>		
	Mean	Median	N	Mean	Median	N	Mean	Median	N
Control	353.33	300	30	372.73	300	22	300	300	8
Mission	365.63	400	32	423.68	500	19	280.77	300	13
Social	275.81	200	31	268.42	200	19	309.09	300	11

Panel C Wilcoxon-Mann-Whitney tests (p values)

<i>Treatment</i>	<i>All</i>	<i>Women</i>	<i>Men</i>
Mission vs. Social	0.0982	0.0349	0.5928
Mission vs. Control	0.7295	0.3723	0.941
Social vs. Control	0.1315	0.0844	0.8658

Panel D Effect Size

<i>All</i>	Effect Size (Cohen's d)	95% Confidence Interval	
Mission vs. Social	0.426	-0.073	0.926
Mission vs. Control	0.059	-0.44	0.557
Social vs. Control	0.386	-0.892	0.121
<i>Women</i>			
Mission vs. Social	0.726	0.069	1.382
Mission vs. Control	0.255	-0.361	0.871
Social vs. Control	0.506	-0.118	1.129
<i>Men</i>			
Mission vs. Social	0.145	-0.659	0.949
Mission vs. Control	0.089	-0.792	0.97
Social vs. Control	0.047	-0.958	0.864

Table II-4. Tobit Regressions on Donations, Full Sample

	(1)		(2)	
	Coefficients	Unconditional Average Marginal Effects	Coefficients	Unconditional Average Marginal Effects
Social	-128.537* (74.620)	-88.502* (50.821)	28.099 (113.604)	-97.452** (49.768)
Control	-38.829 (76.550)	-25.930 (51.067)	27.022 (126.373)	-33.401 (50.029)
Empathic Concern & Perspective Taking	7.823* (4.624)	5.316* (3.070)	6.565 (4.612)	4.468 (3.087)
Female	65.579 (67.584)	45.154 (46.824)	201.319* (108.404)	47.608 (46.975)
Female×Social			-266.605* (149.541)	
Female×Control			-125.962 (155.010)	
<i>N</i>	91	91	91	91
pseudo <i>R</i> ²	0.010		0.013	

Regressions estimated by double tobit with truncation at 0 and 600 tokens.

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table II-5. Tobit Regressions on Donations, Female vs. Male

	Female		Male	
	Coefficients	Unconditional Average Marginal Effects	Coefficients	Unconditional Average Marginal Effects
Social	-241.672** (103.992)	-157.441** (65.264)	28.256 (103.196)	21.787 (79.546)
Control	-99.600 (99.997)	-60.310 (59.722)	24.811 (116.536)	19.135 (89.774)
Empathic Concern & Perspective Taking	7.327 (6.526)	4.635 (4.071)	5.460 (6.302)	4.208 (4.767)
<i>N</i>	59	59	32	32
pseudo <i>R</i> ²	0.014		0.002	

Regressions estimated by double tobit with truncation at 0 and 600 tokens.

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Appendices

Appendix A The Membership Manipulation Question (All Groups)

Out of the following two organizations, which one would you like to get involved with?
Please circle ONE.

A. The Education Service Club (ESC)¹: The ESC is a nonprofit organization believing that education is not only a learning opportunity, but also helps develop the whole person in body, mind, and social skills. The mission of the ESC is to support students of all educational levels to make the most of their educational experiences and reach their full potential.

B1. The Society of Warehousing Standards (SWS)²: The SWS is a nonprofit organization promoting a rigorous process to ensure that warehousing and storage standards prescribed are of a consistent high quality. The mission of the SWS is to provide support for developing high-quality warehousing standards and promoting the use and application of these standards.

B2. The Society of Accounting Standards (SAS)²: The SAS is a nonprofit organization promoting a rigorous process to ensure that the accounting standards prescribed are of a consistent high quality. The mission of the SAS is to provide support for developing high-quality accounting standards and promoting the use and application of these standards.

Notes:

1. Subjects in both control and treatment groups are presented with the same question. There is only one difference—the organization's name is in Option A is the Education Service Association (ESA) for control group while the Education Service Club (ESC) in treatment groups.
2. Option B1 and B2 are used alternatively.

Appendix B . Instructions for Practice Decision (All Groups)

You are asked to participate in a study of individual decision-making. This study has been designed to maintain the anonymity of each participant’s decision. To preserve this anonymity, we ask that from this point on, there be NO TALKING among the participants and that all participants take precautions to maintain the confidentiality of their materials.

The instructions are simple and please follow them carefully. You will be paid in cash in private at the end of the session. We will first explain the allocation problem, and conduct a practice decision round to familiarize you with the process. Then we will proceed to the actual decision round.

Your Packet for Practice Decision Round. Before we begin, please verify that you have the following items before you on your desk.

- Instructions sheets
- 600 tokens
- An empty envelope named “Charity for Practice”
- An empty envelope named “Personal Account for Practice”

Do you have any questions about your packet?

The Allocation Problem. You have been given 600 tokens to use in this study in place of money. You can keep any share of these tokens for yourself or donate any share of these tokens to a charity named ABC. At the end of the study, tokens will be converted to real money at the rate of 100 tokens to \$1. Your token donations will become real donations to a charitable organization that you will choose from a list of real-world charities.

For example, if you keep 250 tokens for yourself and donate 350 tokens to ABC in this study, you will receive \$2.50 in addition to your \$5 show-up fee, and a real scholarship fund will receive \$3.50. More examples are specified in the following table, please take a minute to read the table:

	Tokens to Yourself	Your Additional Cash Payment	Tokens to ABC	Donations to a Real-World Charity
Example 1	0	0	600	\$6
Example 2	100	\$1	500	\$5
Example 3	200	\$2	400	\$4
Example 4	300	\$3	300	\$3
Example 5	400	\$4	200	\$2
Example 6	500	\$5	100	\$1
Example 7	550	\$5.5	50	\$0.5
Example 8	600	\$6	0	0

These are only examples. You may allocate any amount of your tokens to yourself and to charity. The only restriction is that the sum of your allocation to yourself plus your allocation to charity must equal to 600 tokens; you must allocate all 600 tokens between yourself and charity.

Do you have any questions about the allocation problem?

Practice Round. To illustrate your decision tasks, we will go through a practice round of the allocation problem. We will not practice choosing a real-world charity in this round. Nothing you do in this practice round will affect your payment in this study.

Now decide how many tokens you how many you wish to keep for yourself, and how many you want to donate. You must allocate all 600 tokens. Use the tokens and envelopes for practice:

1. Please place the tokens you wish to keep for yourself in the envelope labeled “Personal Account for Practice,” and
2. Place the tokens you wish to donate to the charity ABC in the envelope labeled “Charity for Practice.”

(In the actual decision round, you will seal the envelopes. However, you are not asked to seal them in this practice round, because we want to save some envelopes for future use.)

Do you have any questions about the decision making process?

(Now put your packet aside. Our assistant will collect the used packet except for the instructions, and give you a new packet for actual decision round. Please DO NOT open the new packet until I ask you to. While our assistant is working on your packets, let us observe the anonymity procedure together.)

Anonymity. This study has been designed to maintain the anonymity of each participant’s decision. The researchers and assistants will not know how many tokens you donate and how many you keep for yourself. We keep track of your payments without knowing your identity by the following procedure.

1. Nobody in the room will see how many tokens you place in your Personal Account envelope or your Charity envelope. Both will be sealed by yourself.
2. Your envelopes will be brought by our first assistant to our second assistant in another room. The second assistant will see your Claim Check Number, but does not meet you or see your name (you will receive your Claim Check Number shortly). After the first assistant leaves the room, the second assistant will open the envelopes and process them. The second assistant will count the tokens in your Personal Account envelope, calculate your payment, and place the appropriate amount of money in an envelope labeled with your Claim Check Number, but not your name.

This envelope is sealed before the first assistant returns to pick up the envelopes and bring them back to your room.

3. You claim your payment envelope by matching your Claim Check Number with that on the payment envelopes delivered to your room.
4. In the actual decision round, if you decide to donate, you will be asked to choose a real-world charity from a list, and sign a Delegation of Authority form. The former contains a Claim Check Number, while the latter does not. The researchers will record donations to each charity on the list by matching your Claim Check Number, and see confirmation that someone with your Number has signed a Delegation of Authority form. The Delegation of Authority form is prepared for IUPUI's Finance and Administration. The researchers will not open the Delegation of Authority form until finishing all recording, so not be able to match your Number on the charity list with your signature on the Delegation of Authority form.
5. After receiving your payment, you will also be asked to sign a payment receipt. The payment receipt is for accounting purpose only. No one else except for the accountant will open the sealed envelope.

In short, no one will be able to tie your name with your decision made in this study.

Do you have any questions about the anonymity procedure?

Your Packet for Actual Decision Round. Now please verify that you have the following items before you on your desk. Please DO NOT open any envelopes until I ask you to.

- A small envelope named "Charity"
- A small envelope named "Personal Account"
- A small envelope named "Real-World Charity"
- A small envelope named "Delegation"
- A small envelope named "For Accountant Only"
- A big envelope named "Questionnaires"
- A big envelope named "Instructions"
- 600 tokens attached to the "Instructions" envelope

Your Claim Check # is tagged on top of your "Questionnaires" envelope, also at the back of your "Charity" and "Personal Account" envelope. Please check if the Claim Check # is the same for all these three envelopes. If not, raise your hand.

Please take the tokens from your "Instructions" envelope, and count if there are 600 tokens in total. If not, raise your hand.

Do you have any other questions about your packet?

Appendix C . Instructions for Actual Decision (Control Group)

Now we are ready to begin the actual decision round, in which you will apply what you just learned in the practice round. The only difference between the practice and actual decision round is that you will be asked to fill out some forms and questionnaires in addition to the allocation task. Now, open the Instructions envelope in your new packet. Please DO NOT open any other envelopes at this point.

About the Education Service Association (ESA). You have chosen the Education Service Association and here is more information about it. The Education Service Association is a charity whose mission is to enhance the educational experiences of students from elementary school to college. In particular, the **ESA Scholarship Fund** provides support for minority, disabled, as well as first-generation college students. Please make a donation to the ESA Scholarship Fund. 100% of your donation will benefit students because an anonymous donor is covering all of the administration and fundraising costs associated with this campaign.

The Allocation Problem. As in the practice round, you have been given 600 tokens to use in place of money. You can keep any share of these tokens for yourself or donate any share of the tokens to the ESA Scholarship Fund. At the end of the study, tokens will be converted to real money at the rate of 100 tokens to \$1. Your token donations will become real donations to a scholarship fund you will choose from a list of real-world charities.

For example, if you keep 350 tokens for yourself and donate 250 tokens to the ESA Scholarship Fund, you will receive \$3.50 in addition to your \$5 show-up fee, and a real scholarship fund will receive \$2.50. More examples are specified in the following table:

	Tokens to Yourself	Your Additional Cash Payment	Tokens to the ESA Scholarship Fund	Donations to a Real-World Charity
Example 1	0	0	600	\$6
Example 2	100	\$1	500	\$5
Example 3	200	\$2	400	\$4
Example 4	300	\$3	300	\$3
Example 5	400	\$4	200	\$2
Example 6	500	\$5	100	\$1
Example 7	550	\$5.50	50	\$0.50
Example 8	600	\$6	0	0

These are only examples. You may allocate any amount of the tokens between yourself and the ESA Scholarship Fund. The only restriction is that the sum of the allocation to yourself plus the allocation to the ESA Scholarship Fund must equal to 600 tokens.

Decision Making. Now decide how many tokens you wish to keep for yourself, and how many tokens you want to donate to the ESA Scholarship Fund. The illustration chart attached is to guide you through all the steps. Please follow my instructions step by step.

Step 1: Please place the tokens you wish to keep for yourself in the envelope labeled “Personal Account,” and place the tokens you wish to donate in the envelope labeled “Charity.”

Make sure you have put all 600 tokens into these two envelopes, and then seal the envelopes. Our first assistant is collecting all your sealed envelopes and bring them to our second assistant who is waiting in another room. The second assistant will calculate your payment according to the tokens in your envelopes. Everyone will receive a payment envelope, whether or not they designate tokens for themselves.

Step 2: Please open the envelope named “Real-World Charity.” There is a form labeled “Make a Donation on My Behalf to this Charity.” Use this form to choose a real-world charity if you put tokens in your Charity envelope. Be sure to check the box on the bottom of the page confirming your willingness to delegate authority to make this donation. If you don’t, we cannot make a donation for you. Also, please double check if the Claim Check Number on top of the form is right; if not, please let us know. Then place the completed form back in the Real-World Charity envelope and seal it.

Step 3: Please open the envelope labeled “Delegation.” There is a form named “Delegation of Authority to Donate” in the envelope. Please sign the form if you put tokens in your Charity envelope (you are the person authorizing). Then put the completed form back to the Delegation envelope and seal it.

Step 4: Please open the envelope labeled “Questionnaires.” There are four short questionnaires in the envelope. Please fill out the questionnaires. **Three out of the four questionnaires are double-sided, so please turn over to complete the questionnaires.** After completing all the questionnaires, put them back to the Questionnaires envelope and seal it.

Step 5: Our first assistant comes back with payment envelopes. You can claim your payment by matching your Claim Check Number with that on the payment envelope. Please check if the payment amount is right. If not, let us know.

Step 6: Now, please open the envelope labeled “For Accountant Only.” There is a form named “Payment Receipt” in the envelope. After confirming that your payment amount is correct, sign the form and put it back in the For Accountant Only envelope. The sealed envelope will then be brought to the accountant. No one else except for the accountant will see your receipt.

*This ends the experiment, please leave on the desk all your materials except for your payment envelope, and you are free to leave. **Please do not discuss what you did in this experiment with your classmates who have not participated.** Let them make their decisions independently in their sessions. Thank you very much for your participation!*

Appendix D . Instructions for Actual Decision (Treatment Groups)

Now we are ready to begin the actual decision round, in which you will apply what you just learned in the practice round. The only difference between the practice and actual decision round is that you will be asked to fill out some forms and questionnaires in addition to the allocation task. Now, open the Instructions envelope in your new packet. Please DO NOT open any other envelopes at this point.

About the Education Service Club (ESC). You have chosen the Education Service Club, and are now being granted the membership in the Education Service Club. In your Instructions envelope, there is a letter from the Education Service Club. Let us read the letter together.

Mission treatment: In the letter, there is a section subtitled “Projects and Activities” (the third and fourth paragraphs). It provides detailed information about both the ESC’s service projects and social activities. In this section, please find and **highlight at least 3 phrases** that are directly related to the ESC’s **charitable mission**.

Social treatment: In the letter, there is a section subtitled “Projects and Activities” (the third and fourth paragraphs). It provides detailed information about both the ESC’s service projects and social activities. In this section, please find and **highlight at least 3 phrases** that are directly related to the ESC’s **social activities**.

About the ESC Scholarship Fund. It provides support for minority, disabled, as well as first-generation college students. Please make a donation to the ESC scholarship fund. 100% of your donation will benefit students because an anonymous donor is covering all of the administration and fundraising costs associated with this campaign.

The Allocation Problem. As in the practice round, you have been given 600 tokens to use in place of money. You can keep any share of these tokens for yourself or donate any share of the tokens to the ESC Scholarship Fund. At the end of the study, tokens will be converted to real money at the rate of 100 tokens to \$1. Your token donations will become real donations to a scholarship fund you will choose from a list of real-world charities.

For example, if you keep 350 tokens for yourself and donate 250 tokens to the ESC Scholarship Fund in this study, you will receive \$3.50 in addition to your \$5 show-up fee, and a real scholarship fund will receive \$2.50. More examples are specified in the following table:

	Tokens to Yourself	Your Additional Cash Payment	Tokens to the ESC Scholarship Fund	Donations to a Real-World Charity
Example 1	0	0	600	\$6
Example 2	100	\$1	500	\$5
Example 3	200	\$2	400	\$4
Example 4	300	\$3	300	\$3
Example 5	400	\$4	200	\$2
Example 6	500	\$5	100	\$1
Example 7	550	\$5.5	50	\$0.5
Example 8	600	\$6	0	0

These are only examples. You may allocate any amount of the tokens between yourself and the ESC Scholarship Fund. The only restriction is that the sum of the allocation to yourself plus the allocation to the ESC Scholarship Fund must equal to 600 tokens.

Decision Making. Now decide, as an ESC member, how many tokens you wish to keep for yourself, and how many tokens you want to donate to the ESC Scholarship Fund. The illustration chart attached is to guide you through all the steps. Please follow my instructions step by step.

Step 1: Please place the tokens you wish to keep for yourself in the envelope labeled “Personal Account,” and place the tokens you wish to donate in the envelope labeled “Charity.”

Make sure you have put all 600 tokens into these two envelopes, and then seal the envelopes. Our first assistant is collecting all your sealed envelopes and bring them to our second assistant who is waiting in another room. The second assistant will calculate your payment according to the tokens in your envelopes. Everyone will receive a payment envelope, whether or not they designate tokens for themselves.

Step 2: Please open the envelope named “Real-World Charity.” There is a form labeled “Make a Donation on My Behalf to this Charity.” Use this form to choose a real-world charity if you put tokens in your Charity envelope. Be sure to check the box on the bottom of the page confirming your willingness to delegate authority to make this donation. If you don’t, we cannot make a donation for you. Also, please double check if the Claim Check Number on top of the form is right; if not, please let us know. Then place the completed form back in the Real-World Charity envelope and seal it.

Step 3: Please open the envelope labeled “Delegation.” There is a form named “Delegation of Authority to Donate” in the envelope. Please sign the form if you put tokens in your Charity envelope (you are the person authorizing). Then put the completed form back to the Delegation envelope and seal it.

Step 4: Please open the envelope labeled “Questionnaires.” There are four short questionnaires in the envelope. Please fill out the questionnaires. **Three out of the four questionnaires are double-sided, so please turn over to complete the questionnaires.** After completing all the four questionnaires, put them back to the Questionnaires envelope and seal it.

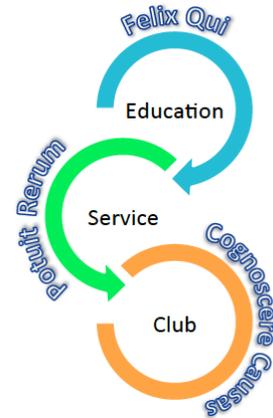
Step 5: Our first assistant comes back with payment envelopes. You can claim your payment by matching your Claim Check Number with that on the payment envelope. Please check if the payment amount is right. If not, let us know.

Step 6: Now, please open the envelope labeled “For Accountant Only.” There is a form named “Payment Receipt” in the envelope. After confirming that your payment amount is correct, sign the form and put it back in the For Accountant Only envelope. The sealed envelope will then be brought to the accountant. No one else except for the accountant will see your receipt.

*This ends the experiment, please leave on the desk all your materials except for your payment envelope, and you are free to leave. **Please do not discuss what you did in this experiment with your classmates who have not participated.** Let them make their decisions independently in their sessions. Thank you very much for your participation!*

Appendix E . Welcome Letter to New Members (Treatment Groups)

Welcome to the Education Service Club



Ladies and Gentlemen,

On behalf of the officers and members of the Education Service Club (ESC), I want to express our sincere pleasure at your presence here. You have been invited to become members and it is my privilege and honor today to welcome you into membership in the ESC. You are now uniting with other ESC members who share a dedication to our common mission.

Mission: The mission of the ESC is to enhance the educational experiences of students from elementary school to college. Your membership in the ESC will help us carry on this legacy and share in this effort.

Projects and Activities: Becoming an ESC member gives you the opportunity to help improve education by participating in a variety of projects. For example, you can assist students in need by making contributions to our scholarship fund, providing adult or peer mentoring, and organizing and attending fundraising activities to solicit support from other people in the community.

Being an ESC member is also fun. There are numerous social activities for our members and guests, through which you will make new friends and build professional connections. In recent years, activities have included monthly luncheons and dinner gatherings, annual picnic and holiday party, outings to the Shakespeare Festival, and college sporting events.

Membership Obligations: By holding membership in the ESC, you agree to accept the obligations of membership to:

- Promote the mission of the ESC;
- Participate in club service projects and meetings;
- Attend social activities.

Welcome to the Education Service Club! We are all extremely proud and happy to have you as a fellow ESC member!

Appendix F . Forms and Questionnaires

Claim Check Number _____

Make a Donation on My Behalf to this Charity (All Groups)

The following is a list of real world charities with scholarship funds. First, please choose ONE charity you wish to donate. Next, check the box to confirm your willingness to delegate the Principal Investigators authority to donate. After completing this form, put it into the Real-World Charity envelope and seal it. In order to maintain your anonymity, you will not receive individual receipts for donations so your donations today may not be deductible.

1. Indiana University Foundation

The IU Foundation was established in 1936 “to fulfill a dream of educational opportunity for all.” You can donate to a student scholarship fund by specifying a school, unit, or program on the Indianapolis campus that you wish to support

2. Central Indiana Community Foundation Scholarship Funds

“Central Indiana Community Foundation (CICF) is committed to college success for students through the power of scholarships.” CICF’s Indianapolis Foundation Community Scholarship Fund and the Legacy Fund Community Scholarship Fund were established to support students from Marion County and Hamilton County pursuing higher education respectively.

3. Rotary International

Rotary International is an international public service club with a commitment to “service, fellowship, diversity, integrity, and leadership.” Education is one of its areas of focus. Rotary clubs support “basic education and literacy, reduce gender disparity in education, and increase adult literacy.”

4. Scholarship America Scholarships

Scholarship America’s mission is to “mobilize America, through scholarships and educational support, to make postsecondary success possible for all students.”

I am willing to delegate the Principal Investigators of this study the authority to donate on my behalf to the charity that I choose above. The amount I authorize for donation is determined by my decisions in the study, as specified in the instructions.

Questionnaire I (Treatment Groups)

The following statements inquire about your thoughts about the Education Service Club (ESC) you are assigned to. Please indicate to what extent you agree with the following seven statements by choosing the appropriate score from the **scale of 1 to 9 (1 = not at all, 9 = very much)**. When you have decided your answer, fill (or mark) in the circle that corresponds with the score you choose for each of the statements.



Not at all Very much

1. After reading the letter from the ESC, I identified with the ESC.
 1 2 3 4 5 6 7 8 9

2. After reading the letter from the ESC, I saw myself as an ESC member.
 1 2 3 4 5 6 7 8 9

3. After reading the letter from the ESC, I was happy to belong to the ESC.
 1 2 3 4 5 6 7 8 9

4. After reading the letter from the ESC, I felt committed to the ESC.
 1 2 3 4 5 6 7 8 9

5. After reading the letter from the ESC, I felt solidarity with the ESC.
 1 2 3 4 5 6 7 8 9

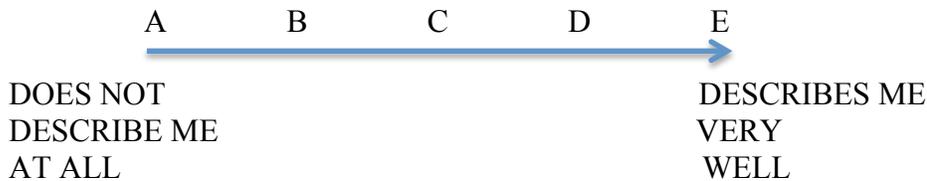
6. After reading the letter from the ESC, I felt I fit into the ESC.
 1 2 3 4 5 6 7 8 9

7. After reading the letter from the ESC, I felt I was similar to other ESC members.
 1 2 3 4 5 6 7 8 9

Questionnaire II (All Groups)

The following statements inquire about your thoughts and feelings in a variety of situations. For each item, indicate how well it describes you by choosing the appropriate letter on the scale: **A, B, C, D, or E** (**A = does not describe me at all, E = describes me very well**). When you have decided your answer, fill (or mark) in the circle that corresponds with the letter you choose for each statements. Please read each item carefully before responding. Answer as honestly as you can. Thank you.

ANSWER SCALE:



1. I often have tender, concerned feelings for people less fortunate than me.
 A B C D E

2. I sometimes find it difficult to see things from the "other guy's" point of view.
 A B C D E

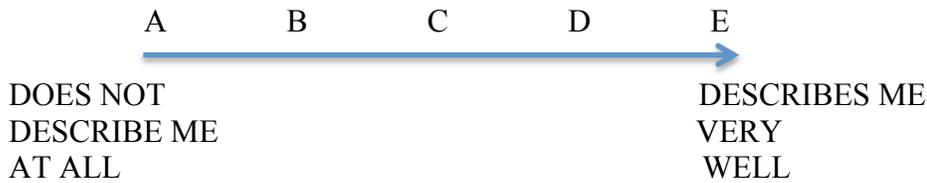
3. Sometimes I don't feel very sorry for other people when they are having problems.
 A B C D E

4. I try to look at everybody's side of a disagreement before I make a decision.
 A B C D E

5. When I see someone being taken advantage of, I feel kind of protective towards them.
 A B C D E

PLEASE TURN OVER AND COMPLETE THE OTHER SIDE.

ANSWER SCALE:



6. I sometimes try to understand my friends better by imagining how things look from their perspective.

- A B C D E

7. Other people's misfortunes do not usually disturb me a great deal.

- A B C D E

8. If I'm sure I'm right about something, I don't waste much time listening to other people's arguments.

- A B C D E

9. When I see someone being treated unfairly, I sometimes don't feel very much pity for them.

- A B C D E

10. I am often quite touched by things that I see happen.

- A B C D E

11. I believe that there are two sides to every question and try to look at them both.

- A B C D E

12. I would describe myself as a pretty soft-hearted person.

- A B C D E

13. When I'm upset at someone, I usually try to "put myself in his shoes" for a while.

- A B C D E

14. Before criticizing somebody, I try to imagine how I would feel if I were in their place.

- A B C D E

Questionnaire III (All Groups)

For each of the following statements, please indicate if it describes you accurately. If the statement is true, circle a) on your answer sheet; if the statement is false, circle b) on your answer sheet. Please read each item carefully before responding. Answer as honestly as you can. Thank you.

1. I have occasionally felt discouraged about something.
 - a) True
 - b) False

2. My table manners are not always perfect.
 - a) True
 - b) False

3. I have always been extremely courageous in facing difficult situations.
 - a) True
 - b) False

4. At times I have been envious of someone.
 - a) True
 - b) False

5. My opinions are always completely reasonable.
 - a) True
 - b) False

6. I have at times eaten too much.
 - a) True
 - b) False

7. I have always been completely fair to others.
 - a) True
 - b) False

8. I have at times been angry with someone.
 - a) True
 - b) False

9. I always tell the entire truth.
 - a) True
 - b) False

PLEASE TURN OVER AND COMPLETE THE OTHER SIDE.

10. Sometimes I'm a bit lazy.
- a) True
 - b) False
11. Never in my whole life have I taken advantage of anyone.
- a) True
 - b) False
12. I have sometimes felt slightly hesitant about helping someone who asked me to.
- a) True
 - b) False
13. I have never felt that I was better than someone else.
- a) True
 - b) False
14. Never in my whole life have I wished for something that I was not entitled to.
- a) True
 - b) False

Questionnaire IV (All Groups)

The questionnaire asks questions about you. We are asking these questions because we wish to understand the correlations between demographic characteristics (e.g. gender or education) and decision making. We will not be able to match these characteristics to your name. All the information is reported in aggregate form only, and no personally identifiable information is released. When you have decided your answer, fill (or mark) in the circle that corresponds with the choice (or write down the answer directly for some questions).

1. Are you:
 - Male
 - Female

2. In what year you were born? _____

3. Do you identify yourself as Hispanic or Latino?
 - Yes
 - No

4. Are you:
 - White
 - Black or African American
 - American Indian or Alaska Native
 - Native Hawaiian or Other Pacific Islander
 - Asian
 - Other

5. What is the highest level of education you have completed?
 - Some high school or high school graduate or passed the GED tests
 - Some college
 - Trade/technical/vocational training
 - College graduate
 - Some postgraduate work
 - Post graduate degree

6. What is your major?
 - Economics/Business
 - Philanthropic Studies/Social Work/Nursing
 - Other (please specify) _____
 - Haven't decided

PLEASE TURN OVER AND COMPLETE THE OTHER SIDE.

7. How often do you attend religious activities/services?
- Do not attend
 - About once every year
 - About once every six months
 - About once every month
 - Once a week
 - More than once a week
8. What is your marital status?
- Single/Never been married
 - Married/Living with a partner in long-term committed relationship
 - Separated/Divorced/Widowed
 - I prefer not to say
9. Do you have children?
- Yes
 - No
 - I prefer not to say
10. Are you a member of any public-service clubs (e.g. Lions Clubs, Rotary Clubs, Kiwanis, BEAN, DoSomething. org., etc.)?
- Yes
 - Not now, but I used to be
 - No, I never was
11. Have you made donations to any charities before?
- Yes
 - No

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- Ryan, R. M., & Deci, E. L. (2000). Intrinsic and Extrinsic Motivations: Classic Definitions and New Directions. *Contemporary Educational Psychology* , 25, 54-67.
- Samuelson, P. A. (1954). The Pure Theory of Public Expenditure. *The Review of Economics and Statistics* , 36 (4), 387-389.
- Shih, Margaret, Todd L. Pittinsky, and Nalini Ambady. 1999, "Stereotype Susceptibility: Identity Salience and Shifts in Quantitative Performance." *Psychological Science*, 10: 80-83.
- Tajfel, H., & Turner, J. (1979). An Integrative Theory of Intergroup Conflict. In W. Austin, & S. Worchel (Eds.), *The Social Psychology of Intergroup Relations* (pp. 33-47). Monterey, CA: Brooks/Cole.
- Tajfel, H., Billig, M. G., Bundy, R. P., & Flament, C. (1971). Social Categorization and Intergroup Behaviour. *European Journal of Social Psychology* , 1 (2), 149-178
- Willer, R., Wimer, C., Owens, L.A.. (2015). What Drives the Gender Gap in Charitable Giving? Lower Empathy Leads Men to Give Less to Poverty Relief, Social Science Research. doi: <http://dx.doi.org/10.1016/j.ssresearch.2014.12.014>.

Curriculum Vitae

Heng Qu

Education

Ph.D. in Philanthropy Studies Indiana University Minor: Nonprofit Finance and Economics	July 2016 Indianapolis, IN
M.A. in Political Science School of Government, Sun Yat-Sen University Concentrations: Public Policy and Non-Governmental Organizations	June 2009 Guangzhou, China
B.A. in Political Science School of Government, Sun Yat-Sen University	June 2006 Guangzhou, China

Research Interests

- Nonprofit finance and organizational capacity
- Motivations for individual charitable giving and nonprofit resource development
- Social innovation and impact investing/mission investing/program-related investments
- Effects of pro-social behavior on psychological well-being
- Nonprofit financial reporting and accountability

Awards and Honors

Science of Philanthropy Initiative Ph.D. Grant Award (\$5,000) The University of Chicago, University of Wisconsin-Madison, and John Templeton Foundation	2013-14
Doctoral Fellow Association for Research on Nonprofit Organizations and Voluntary Action (ARNOVA)	2015
Diversity Scholars and Leaders Award Association for Research on Nonprofit Organizations and Voluntary Action (ARNOVA)	2014
Doctoral Fellow International Society for Third-Sector Research (ISTR)	2014
Emerging Scholars Award Association for Research on Nonprofit Organizations and Voluntary Action (ARNOVA)	2013

Awards and Honors, cont'd

Distinction on Ph.D. Qualifying Exams Indiana University Lilly Family School of Philanthropy	2013
The Anne Donchin Graduate Research Award Indiana University-Purdue University Indianapolis Women's Studies Program	2012
National Fellowship for Distinguished Graduate Students Sun Yat-Sen University	2006-08
Distinguished Graduate Honor Sun Yat-Sen University	2006
Outstanding Undergraduate Thesis Award Sun Yat-Sen University	2006
First-Class Scholarship Award for Distinguished Students (Top 5%) Sun Yat-Sen University	2003-05

Grants and Scholarships

Graduate Assistantships and Scholarships Indiana University Lilly Family School of Philanthropy	2009-16
Grant for Workshop in Multidisciplinary Philanthropic Studies USA Funds	2014-15
Graduate Student Research Fund Indiana University Lilly Family School of Philanthropy	2015
Travel Grant Association for Research on Nonprofit Organizations and Voluntary Action (ARNOVA)	2014
Travel Fellowship Indiana University Purdue University Indianapolis	2014
Travel Grants Indiana University Lilly Family School of Philanthropy	2014
Summer Internship Grant Indiana University Lilly Family School of Philanthropy	2013

Publications

Manuscripts

Qu, Heng, & Osili, Una. (2016). Beyond Grantmaking: An Investigation of Program-Related Investments by U.S. Foundations. Accepted in *Nonprofit and Voluntary Sector Quarterly*.

Manuscripts Under Review

Qu, Heng, & Steinberg, Richard. (2015). Charitable Giving in Nonprofit Service Associations: Identities, Incentives, and Gender Differences. Revise for Resubmission to *Nonprofit and Voluntary Sector Quarterly*.

Practitioner-Oriented Writing

Qu, Heng. (2013). Giving by Foundations. In *Giving USA 2013: The Annual Report on Philanthropy for the Year 2012* (pp. 81-90). A publication of Giving USA Foundation™, researched and written by the Indiana University Lilly Family School of Philanthropy.

Qu, Heng. (2013). Giving to Foundations. In *Giving USA 2013: The Annual Report on Philanthropy for the Year 2012* (pp. 165-170). A publication of Giving USA Foundation™, researched and written by the Indiana University Lilly Family School of Philanthropy.

Indiana University Lilly Family School of Philanthropy. (2013). *Leveraging the Power of Foundations: An Analysis of Program-Related Investing*.

Work in Progress

Qu, Heng. Modern Portfolio Theory and the Optimization of Nonprofit Revenue Mix.

Duffy, B., **Qu, Heng,** & Gupta, S. The Impact of Charitable Giving on Donors' Psychological Well-being.

Conference Presentations and Guest Lectures

Panel Organized

Qu, Heng & Burger, Ronelle. (2016). "Detecting Nonprofit Fraud in Three Continents." The 12th International Conference of the International Society for Third-Sector Research (ISTR). June 28-July 1, 2016. Stockholm, Sweden.

Qu, Heng & Duffy, B. (2015). "Joy of Giving and Volunteering." The Annual Conference of Association for Research on Nonprofit Organizations and Voluntary Action (ARNOVA). November 19-21, 2015. Chicago, IL.

Papers Presented

Qu, Heng; Steinberg, Richard; & Burger, Ronelle. (2016). "Dirty data, done dirt cheap? Nonprofit financial reporting in the U.S." The 12th International Conference of the International Society for Third-Sector Research (ISTR). June 28-July 1, 2016. Stockholm, Sweden.

Qu, Heng. (2015). "Which is a Better Approach to Nonprofit Revenue Diversification: Modern Portfolio Theory or Herfindahl-Hirschman Index?" Paper to be presented at the Annual Conference of Association for Research on Nonprofit Organizations and Voluntary Action (ARNOVA). November 19-21, 2015. Chicago, IL.

Duffy, B. & **Qu, Heng**. (2015). "Does Charitable Giving Have Mental Health Benefits for Donors?" Paper to be presented at the Annual Conference of Association for Research on Nonprofit Organizations and Voluntary Action (ARNOVA). November 19-21, 2015. Chicago, IL.

Qu, Heng. (2014). "Revenue Diversification and Portfolio Optimization of Nonprofit Organizations." Paper presented at the Annual Conference of Association for Research on Nonprofit Organizations and Voluntary Action (ARNOVA). November 20-22, 2014. Denver, CO.

Steinberg, Richard, & **Qu, Heng**. (2014). "Does Membership in a Public-Service Club Make a Person More Generous?" Paper presented at the 11th International Conference of the International Society for Third-Sector Research (ISTR). July 22-25, 2014. Muenster, Germany.

Qu, Heng. (2014). Financing Nonprofit Membership Associations. The Second Ph.D. Seminar of the International Society for Third-Sector Research (ISTR). July 20-22, 2014. Muenster, Germany.

Qu, Heng, & Richard Steinberg. (2013). "Does Membership in a Public-Service Club Make a Person More Generous?" Paper presented at the Annual Conference of Association for Research on Nonprofit Organizations and Voluntary Action (ARNOVA). November 21-23, 2013. Harford, CT.

Kou, X., Kim, S., & **Qu, Heng**. (2013). "It Matters to Ask Where the Dollars Come From: Source of Household Financial Resources and High Net Worth Philanthropy." Paper presented at the Annual Conference of Association for Research on Nonprofit Organizations and Voluntary Action (ARNOVA). November 21-23, 2013. Harford, CT.

Osili, U., & **Qu, Heng**. (2013). "Private Aid for International Issues: Evidence from Million Dollar Donations." Paper presented at the Annual Conference of Association for Research on Nonprofit Organizations and Voluntary Action (ARNOVA). November 21-23, 2013. Harford, CT.

Qu, Heng. (2013). "The Framing Effects of Public-Service Club Membership." The Science of Philanthropy Initiative (SPI) Annual Summit Subaward Recipients Presentation. October 18-19, 2013. Chicago, IL.

Qu, Heng. (2013). "International Players and China's Nonprofit and Philanthropic Development." Paper presented at the Doctoral Student Research Seminar of the Framing the Global Conference. September 26-28, 2013. Bloomington, IN.

Osili, U., **Qu, Heng,** & McKittrick, M. A. (2012). "Leveraging the Power of Foundations: Program- and Mission-Related Investments." Paper presented at the Annual Conference of Association for Research on Nonprofit Organizations and Voluntary Action (ARNOVA). November 15-17, 2012. Indianapolis, IN.

Qu, Heng. (2012). "The Membership Development of Kiwanis International." Poster presentation at the Annual Conference of Association for Research on Nonprofit Organizations and Voluntary Action (ARNOVA). November 15-17, 2012. Indianapolis, IN.

Guest Lectures

"Nonprofits and Philanthropy in China" in *Introduction to Philanthropic Studies* (Undergraduate). Indiana University Lilly Family School of Philanthropy. 2012-2015.
"NGOs, Philanthropy, and Civil Society in China" in *Civil Society and Philanthropy* (Graduate). Indiana University Lilly Family School of Philanthropy. 2015.

Teaching Experience

Instructor	<i>Giving and Volunteering in America</i> (Undergraduate) Indiana University Lilly Family School of Philanthropy	Fall 2014; Spring 2015
Mentor	IUPUI Service Learning Assistant Scholarship Program	Fall 2014; Spring 2015

Research Experience

The Research Department, IU Lilly Family School of Philanthropy Indianapolis, IN
Feb 12 – July 14

Research Assistant

Researched and coordinated multiple research projects on philanthropy and nonprofits organizations, including: *Program-Related Investments; High Net Worth Philanthropy; Giving USA; Global Giving by U.S. Corporations; Million Dollar Gifts;* and *Giving in Chicago.*

International Programs, Center on Philanthropy at IU Indianapolis, IN
Research Assistant Jan 11 – May 11

Researched and composed a report on the practice of fiscal sponsorship by U.S. universities and form recommendations to nonprofit development in China.

Women’s Philanthropy Institute, Center on Philanthropy at IU Indianapolis, IN
Research Assistant Sep 10 – Dec 10

Completed an awarding-winning research project on women’s philanthropy in China.

School of Public and Environmental Affairs, IUPUI Indianapolis, IN
Research Assistant Aug 09 – May 10

Worked for the Performance Measurement and Citizen Engagement Project for Indianapolis.

School of Government, Sun Yat-Sen University Guangzhou, China
Project Coordinator Dec 07 – Dec 08

Led Grassroots NGOs in Guangzhou research project.

Institute for Civil Society, Sun Yat-Sen University Guangzhou, China
Research Assistant Sep 05 – Dec 07

Researched on two research projects, including: Grassroots NGOs and the Provision of Public Service for Migrant Workers, and the Status of NGOs in Southern China.

Professional Experience

Academic Programs, IU Lilly Family School of Philanthropy Indianapolis, IN
Research Assistant Aug 15 – Present

Facilitate undergraduate internship program and Undergraduate Faculty Learning Community.

Global Philanthropy, Council on Foundations Arlington, VA
Summer Associate May 13 – Aug 13

Composed an *Introductory Guide to Grantmaking and Social Investing* in China; assisted in the *Impact Investing Toolkit for Community Foundations* project; and helped build a database of the Council’s about 200 U.S.-based members with global activities.

The Fundraising School, Center on Philanthropy at IU Indianapolis, IN
Research Assistant Jan 11 – May 11

Facilitated course participant database management and course evaluation reports.

Indianapolis Mayor’s Office Indianapolis, IN
Research Assistant May 10 – Aug 10

Performed research to form the City’s performance measurement and citizen engagement strategies.

Service

Co-director, Workshop in Multidisciplinary Philanthropic Studies Indiana University Lilly Family School of Philanthropy	2015-2016
Member, Undergraduate Faculty Learning Community Indiana University Lilly Family School of Philanthropy	2013-2016
Member, Philanthropic Studies Academic Program Committee Indiana University Lilly Family School of Philanthropy	2013-2015

Professional Affiliations

Association for Research on Nonprofit Organizations and Voluntary Action (ARNOVA)	2012-present
International Society for Third-Sector Research (ISTR)	2014-present

Skills

Language: English, Mandarin Chinese

Statistical software: Stata