

IS THE GOVERNMENT FAILURE THEORY STILL RELEVANT? A panel analysis using US state level data

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ABSTRACT*:** *The purpose of this paper is to empirically examine the robustness of the government failure theory. A core feature of the government failure theory is demand heterogeneity. Previous studies have brought into question the robustness of the government failure theory, due to inconsistent results concerning the explanatory power of demand heterogeneity. Therefore, in this paper we revisit this important research agenda using US state level panel data. We find the two-way fixed effects model a suitable model for testing the government failure theory's robustness and present findings which indicate that observable demand heterogeneity has a positive effect on the size of the nonprofit sector. This paper also empirically examines the relevance of the complementary financing hypothesis in terms of the cooperative nature of the governmental and nonprofit sector relationship; that is where governments delegate the production of quasi-public goods to the nonprofit sector.*

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*** *Résumé en fin d'article; Zusammenfassung am Ende des Artikels; resúmen al fin del artículo.*

1 Introduction

The nonprofit sector has become widely recognized by researchers as having a critical and distinctive role in contemporary society. The nonprofit sector has in the past been treated as a residual of other economic sectors, but has recently with increasing consistency, being thought of as an independent sector in its own right. As countywide data (Gronbjerg and Paarlberg 2001, Ben-Ner and Van Hoomissen, 1992, Marcuello 1998), metropolitan-wide data (Corbin 1999), state-wide data (James 1987), and worldwide data (Salamon and Anheier 1998, Salamon et al. 1999, 2000) about the nonprofit sector were examined, researchers started to realize that there is a unique feature of the nonprofit sector, that is the size of the nonprofit sector varies dramatically according to locality. So, the key question to be addressed is what factors cause such regional variations. This question has increased in importance among nonprofit researchers, nonprofit managers, and policy makers as they hone their understanding of important aspects of the roles that nonprofits play in society, and apply their newfound understanding to create feasible solutions to economic and social problems (Gronbjerg and Paarlberg 2001). Therefore, economists as well as social scientists have devoted enormous attention to aspects of this interesting question and have carried out empirical analyses on the size of the nonprofit sector. Much analysis though has been conducted using data gathered for other purposes, which has limited their ability to generate persuasive arguments on this question (Steinberg 1997).

The dominant theory explaining the size variations of the nonprofit sector by locality is the government failure theory. In particular, demand heterogeneity, a core element of government failure, is considered to be one of the most central demand side factors that influence the size of the nonprofit sector. The message of this theory is that the size of the nonprofit sector will be larger where the degree of demand heterogeneity is higher. Therefore, many researchers engaged in this research area, empirically examined whether demand heterogeneity had explanatory power. However, in many cases it was reported as having either no explanatory power or that the sign on the coefficient was negative. (Abzug and Turnheim 1998, Marcuello 1998, Salamon et al. 2000, Gronbjerg and Paarlberg 2001) Therefore, their results belied what the government failure theory predicts. Consequently, it would not be a surprise if these empirical analyses reinforced the researcher's suspicions in terms of the robustness of this theory and thereby encouraging the development of alternative

explanations. Salamon et al. (2000) introduced the interdependence theory. The interdependence theory focuses on the close cooperative relationship between the nonprofit sector and the governmental sector in addressing public problems. The interdependence theory claims that there exists a positive relationship between government social spending and the size of the nonprofit sector. The government failure theory by contrast predicts a negative relationship due to the underlying assumption that the nonprofit sector and the governmental sector exist within a relationship fundamentally as one of competition (Salamon et al. 2000). Using a 22 cross-country data set, they found that the size of the nonprofit sector grew in proportion to the size of governments (measured by government social expenditures as a share of aggregate GDP across 22 countries) rather than in proportion to the degree of demand heterogeneity. Though their sample size was undoubtedly insufficient, their research paved another path in this research field.

However, it is conceivable that previous studies may have obtained statistically insignificant coefficients for demand heterogeneity, not because the theory was fragile but because the empirical model was misspecified. According to Corbin (1999) a true test of the government failure theory requires the inclusion of both demand heterogeneity and government expenditures on public goods, when modeling the size of the nonprofit sector. Therefore, previous papers which tested only the explanatory power of demand heterogeneity without taking into account the effect of the government expenditures on public goods, can not be considered a true test of the government failure theory. Though Corbin (1999) realized this point, he was unable to perform a true test due to the unavailability of data on government expenditures on public goods. Although other researchers like Marcuello (1998), Gronbjerg and Paarlberg (2001), and Salamon et al. (2000) had access to data on government expenditures on public goods, they failed to obtain the results implied by the theory. Given the gap between the analytical results derived from the theory and the actual empirical results from previous studies in this vein, it is worthwhile revisiting this still core topic, and carrying out a true test on the government failure theory as first proposed by Corbin (1999).

Other theories that provide explanations for size variation of nonprofit sectors by locality are the social cohesion theory, the contract (market) failure theory, and the neo-institutional theory. According to Ben-Ner and Van Hoomissen (1991), social cohesion is one of the key elements required among the nonprofit stakeholders

for the organization to be formed. This theory claims that resources favoring formation and maintenance of nonprofit organizations are believed to be more readily attainable in localities where citizens are socially cohesive or have a common bond based largely on the sharing of social values (Corbin 1999). In short, this theory provides the supply side explanation affecting the size of the nonprofit sector.¹

Conversely, the principal cause of the contract (market) failure is information asymmetry, where producers have more accurate knowledge of the quantity, quality, and cost of services delivered than do consumers (Hansmann 1980, Young 2000b). The formation of nonprofit organizations are considered to be a response to information asymmetries, as consumers believe that nonprofit organizations have less incentive to cheat due to the lack of a profit motive whereby reducing the benefits of misrepresentation. Since it is costly to examine the quality of goods before purchase, or even after purchase, consumers may prefer a nonprofit to a for-profit provider (Rose-Ackerman 1996). A direct test of the contract failure theory requires an analysis of the relative market shares of nonprofit vs. for-profit firms (Corbin 1999, Young 2000b) which provides an explanation why nonprofit organizations exist at all. For example, Ben-Ner (1986) argued that nonprofit organizations may be established when direct consumer control of firms enhances consumer's welfare relative to control through the market. Easley and O'Hera (1983) considered a game between consumers and managers of a firm with asymmetric information and showed that the nonprofit organizations may be superior to for-profits when consumers cannot observe the features of output at no cost. Handy (1997) also applied this theory to explain how nonprofit organizations, for-profit organizations, and public enterprises coexist in the market.

It is beneficial at this point to briefly review the neo-institutional theory, though testing this theory is beyond the scope of our study. In typical economic models, organizational behavior is seen as the sum of individual actions (Zucker 1987), the neo-institutional theory however rejects this view focusing on an alternative theory of individual action. The neo-institutional theory stresses the unreflective, routine, taken-for-granted nature of most human behavior and views interests and actors as themselves constituted by institutions (Powell and DiMaggio 1991). One of the key defining processes of the

1 The time-specific effects of economic and political regime shifting are also considered to be supply side factors affecting the size of the nonprofit sector. This will be discussed more closely in Section 3.

institutionalization of organizations identified by DiMaggio and Powell (1983) is imitative or mimetic. That is adopting other's successful elements when uncertain about alternatives. Lincoln (1977), Corbin (1999), and Gronbjerg and Paarlberg (2001) also claimed that the number of nonprofit organization in the past determines the number in the future. Therefore, one way of testing this process of institutional mimic isomorphism is to empirically examine whether the number of organizations increase in relation to the number of organizations previously similarly incorporated. Stingh et al. (1991) performed this test by regressing all founding patterns of voluntary social service organizations (VSSOs) founded at time t on its first order lag, VSSO deaths and those of VSSOs alive at $t-1$ together with other related institutional variables. As a result, they found that, assuming a fourth-order autocorrelation process, the prior founding, death and institutional changes affect current founding. Abzug and Turnheim (1998), on the other hand, regressed the period increase of 501 (c) (3) organizations by state at time t on the number of 501 (c) (3) organizations at $t-1$ in order to examine this theory. The results from their estimations also revealed that the number of organizations previously similarly incorporated had explanatory power, thereby supporting the institutional mimic isomorphism hypothesis. However, the nature of such ecological dynamic theories demands significant periods of time-series data. This severe data constraint prevents most researchers from performing such tests.

Although the research in this paper follows in the wake of previous empirical studies, the objective of this paper is to carry out a true test of the government failure theory as per Corbin (1999). In addition, this paper focuses on the comparative behavior of nonprofit organizations and governments in terms of the production of quasi-public goods across 50 US states. According to James (1987), Smith and Lipsky (1993), Frank and Salkever (1994), and Kapur and Weisbrod (2000), governments finance production that is performed by nonprofit organizations because governments delegate the production and the supply of public goods to nonprofit organizations, due to the comparative advantage of nonprofits in the provision of public goods for non-median voters. In short, governments are substitutes for nonprofits in the production of quasi-public goods² and are complementary in the financing of such goods. We shall label this hypothesis in terms of the cooperative relationship between nonprofit organizations

2 According to James (1987), quasi-public goods are defined as goods that yield both public and private benefits.

and governments in the production and supply of public goods as the ‘complementary financing hypothesis’. Although this hypothesis is related to the government failure theory, it has received little attention (James 1987, Kapur and Weisbrod 2000), hence its relevance is empirically examined in this paper.

The plan of this paper is as follows. In section 1, we closely review the theories that explain why the size of the nonprofit sector varies according to locality and present previous empirical results in this field of studies. We then propose the empirical model of the nonprofit sector size and perform the true test of the government failure theory in accordance with Corbin (1999).

We then augment the model with two instrumental variables, re-estimate the model using the two-stage least squares estimator, whereby allowing us to test the complementary financing hypothesis.

We test the complementary financing hypothesis and then, re-estimate the nonprofit sector size model using the two-stage least square estimator. Finally, concluding remarks will summarize our findings.

2 The theories of the nonprofit sector

2.1 The government failure theory

Within the scope of our research objectives and data availability, we focus on the government failure theory extensively, although we also examine the social cohesion theory and the contract failure theory.

In general, governmental provision of quasi-public goods is predominantly influenced by the preferences of median voters because governments face the constraint of electoral policies (Weisbrod 1988, Douglas 1983, 1987, Young 2000a, Gronbjerg and Paarlberg 2001). In addition, the scale of government finance also affects the degree to which government supplied quasi-public goods, are heterogeneous. Such constraints on governmental action mean that the quasi-public goods supplied tend to become relatively homogeneous. Consequently, some non-median voters with homogeneous preferences within a heterogeneous population face dissatisfaction from consuming too little of the government provided heterogeneous quasi-public goods, that is those to which their preferences are aligned. The non-median voters, therefore, seek to establish or discover nonprofit organizations that fulfill their unmet demand for quasi-public goods.

Though nonprofit organizations also produce and supply quasi-public goods, unlike governments however, they do not face constraints since their supply targets are non-median voters.³ In addition, nonprofit organizations may have lower labor costs as well as greater access to volunteer labor (James 1987, Kapur and Weisbrod 2000). Consequently, in the presence of demand heterogeneity, the nonprofit sector has a comparative advantage over the government sector in producing and supplying heterogeneous quasi-public goods.⁴ Thus, the nonprofit sector is able to fill-in the areas left un-served by the government sector, and will be most active where the preferences of the non-median voters are at odds with the median voters.⁵

To the extent that the government provides a proportionally small quantity of heterogeneous quasi-public goods, if the government sector is considered to be a substitute for the nonprofit sector in the production of public goods, then the need for nonprofit provisions would decline as the government sector successfully makes a dent in the unmet demand for quasi-public goods. This can happen when government expenditure on quasi-public goods is significant. Thus, in a country or smaller political unit with greater demand inequality for collective goods, the level of private and voluntary sector supplementation of public-sector provision will be larger and public sector will be relatively smaller (Weisbrod 1975, 1986). Consequently, government expenditure on quasi-public goods is, *ceteris paribus*, expected to have a negative effect on the size of the nonprofit sector and, as Corbin (1999) suggested, the following two hypotheses should be examined when we perform a true test of the government failure theory.

Hypotheses 1: Increases in demand heterogeneity will have positive effects on the size of the nonprofit sector.

3 The constraint that both governments and nonprofit organizations face is the 'nondistribution constraint' of profits.

4 Yet, it is quite conceivable that the nonprofit sector will not be able to provide sufficient quasi-public goods. If this occurs, our society faces the nonprofit failure.

5 Weisbrod (1975, 1986) examined the effects of demand heterogeneity on government provisions of public goods. He chose variations in religion, race, urban-ness; the percentage of population that is urban, income, and age as proxies for demand heterogeneity, and regressed them on government non-defense expenditures as a percentage of the GNP. Consequently, he found that each proxy had a negative effect. However, his model had only 24 observations, yet it had 13 independent variables. Since significant numbers of degree of freedom were lost, his empirical results require very careful inspection.

Hypotheses 2: An increase in government expenditures on quasi-public goods will have a negative effect on the size of the nonprofit sector.

The government failure theory provides a noteworthy observation in terms of the contractual relationship between governments and nonprofit organizations. As governments recognize that the nonprofit sector has a significant comparative advantage in supplying quasi-public goods, they will support the nonprofit sector financially in order to stimulate provision of heterogeneous quasi-public goods. The relationship between the two (i.e., the complementary financing hypothesis) is observed by many researchers (James 1987, Salamon 1987, Smith and Lipsky 1993, Frank and Salkever 1994, Salamon et al. 2000, Kapur and Weisbrod 2000, Gronbjerg and Paarlberg 2001). Since public subsidies would be a major source of income for the nonprofit sector, when the government sector delegates the provision of heterogeneous quasi-public goods to the nonprofit sector, the non-profit sector receives subsidy payments thereby stimulating the non-profit sectors growth. We examine the following hypothesis.

Hypothesis 3: An increase in public subsidies will have a positive effect on the size of the nonprofit sector.

2.2 Social cohesion

Although the government failure theory is devoted a lot of attention in this paper, it does not entirely explain why size variation of nonprofit sectors occurs according to location. The secondary theory of focus is the social cohesion theory. The most important prerequisite of social cohesion is social homogeneity (Cohen 1982, Corbin 1999). Ben-Ner and Van Hoomissen (1992) and Marcuello (1998) claimed that members of socially cohesive groups with homogeneous preferences have advantages in forming nonprofit organizations, with social cohesion depending positively on the degree of shared economic, religious, cultural, ethnic and educational background, and depending negatively on the degree of geographic dispersion among stakeholders. In short, socially cohesive groups require homogenous preferences among group members. The level of urbanization measures the level of social cohesion in a community. Urbanization deteriorates socially cohesive activities and hence may interfere with community integration therefore, decreasing the ability of community members to support nonprofit organizations (Lincoln 1997, Gronbjerg and Paarlberg 2001). Likewise, crime rates, measure the level of social cohesion, unsafe living environments are likely to interfere with community

integration and socially cohesive activities. Consequently, the social cohesion theory provides the following two hypotheses.

Hypothesis 4: The level of urbanization has a negative effect on the size of the nonprofit sector because it discourages social cohesion.

Hypothesis 5: An increase in the crime rate has a negative effect on the size of the nonprofit sector because it discourages social cohesion.

2.3 The economic conditions of communities: the ‘contract failure’ and ‘sociological’ lenses

When goods are traded in a competitive market, all information concerning traded goods should be common knowledge between producers and consumers. However, in reality, information of goods tends to be biased towards producers since they know more about quality and quantity of the traded goods (Hansmann 1987). Asymmetric information exists when consumers do not know all that they may care to know in regard to the goods and services they wish to obtain, until after payment has taken place (Ben-Ner 1986, Anheier and Ben-Ner 1997). When consumers face high costs associated with information asymmetry, they will be reluctant to purchase the goods they need, for fear of being cheated by the profit-maximizing behavior of producers, who have incentives to cheat consumers (Young 2001b). Thus, the costs associated with information asymmetry are not negligible for consumers. When consumers cannot detect information asymmetry at low cost, consumers will prefer nonprofit organizations to for-profit organizations. Nonprofit organizations are preferred, as the nondistribution constraint eliminates much of the information asymmetry problem. However, if the consumers are rich, they can cover the high costs associated with detecting asymmetric information and hence do not rely on nonprofit provisions and it is likely that for-profit organizations will be the institutions of choice for such consumers (Easley and O’Hara 1983). Therefore, communities with higher average personal incomes are associated with less nonprofit activities and wealthier communities rely more heavily on the for-profit sector than other communities (Ben-Ner and Van Hoomissen 1992). Consequently, an increase in income per capita is expected to have a negative effect on the size of the nonprofit sector,⁶ that is the demand side effect.

6 Ben-Ner and Van Hoomissen (1991, 1992), Schiff and Weisbrod (1991) and Marcuello (1998) define trust goods as club goods and mixed goods for which there is an asymmetric information disadvantage to stakeholders.

The alternative scenario comes from the sociological lens, where studies have suggested that the rich established many nonprofit organizations such as educational and cultural institutions (Hall 1987, McCarthy 1982, DiMaggio 1987) and continually support them. For example, historically the upper classes employed the nonprofit structure to bring artists under the direct employment of elite patrons, thereby serving as a source of honor and prestige (DiMaggio 1987). Thus, income per capita may also capture the supply side of nonprofits with an increase in income per capita encouraging the establishment of nonprofit organizations. Thus, income per capita may have a positive effect on the size of the nonprofit sector.

Taking into account these two opposing effects of income per capita on the size of the nonprofit sector, we have:

Hypothesis 6: An increase in income per capita will have a negative (positive) impact on the size of the nonprofit sector, when the demand (supply) side effects surpass the supply (demand) side effects.

2.4 Brief review of previous empirical work on the size of the nonprofit sector model

Previous empirical works listed in Table 1 shared a common research goal: searching for factors affecting the size of the nonprofit sector although different papers used different terminology for the dependent variable, such as the size of the nonprofit sector, the level of the nonprofit sector, or the growth of the nonprofit sector. Also, different papers focused on different theories and used different explanatory variables. However, all these studies performed a test of demand heterogeneity as their central test of the government failure theory. Table 1 provides a list of the papers to date that use regression analysis to investigate the effects of demand heterogeneity, dependent variable, data source, explanatory variables, and a few key conclusions.

The third column of Table 1 shows the explanatory variables, which act as proxies for demand heterogeneity. Demand heterogeneity can be measured by a number economic or social factors ranging from religion, race, unemployment rate, educational attainment, urbanization, and poverty rate. However, we see no consistency among the signs or significance levels on the coefficients defining demand heterogeneity, which vary dramatically. Previous research done by Ben-Ner and Van Hoomissen (1992), Gronbjerg and Paarlberg (2001), and Marcuello (1998) suggest that the statistical significance of demand heterogeneity depends not only upon what variables are chosen as proxies, but also upon the field of activities in which the nonprofit organizations are

Table 1 – Empirical results from the previous studies

Author	Dependent Variable	Demand Heterogeneity	Effect	The Size of Governments	Effect	Corbin (1999)'s true test of government failure theory
Corbin (1999)	Number of Nonprofit Social Service	Religion Race	(+) (+)	–	–	No
Ben-Ner and Van Homissen (1992)	Employment in Nonprofits	Education Poverty	(+) ¹ (+) ²	Local government employment State and federal government employment	(–) ⁴ (+) ⁵	Yes
Abzug and Turnheim (1998) ¹¹	The increase in the number of 501 (c)(3) organizations	Race Race Unemployment rate	(#) ³ (o) (o)	Moody's municipal bond ratings	(o)	No
Gronbjerg and Paarbjerg (2001)	Number of nonprofits (County level data for the state of Indiana)	Religion	(–) ⁶	Federal grants and contracts County library expenditures	(o) (–) ⁷	Yes
Marcuello (1998)	Number of nonprofits (county level data for Catalonia, Spain)	Percentage of population with higher education Unemployment	(o) ⁸ (#) ⁹	Local government expenditure Public subsidy	(#) ¹⁰ (o) ¹¹	Yes

Continued

Table 1 – Continued

Author	Dependent Variable	Demand Heterogeneity	Effect	The Size of Governments	Effect	Corbin (1999)'s true test of government failure theory
James (1997)	Percentage of schools that are private	Religion Density and urbanization Urbanization	(+) (+) ¹² (+) ¹²	–	–	No
Salomon, et al. (2000)	Full time equivalent nonprofit employment as a percentage of nonagricultural	Religion	(o)	Government social spending as a percentage of GDP Public payments as a percentage of nonprofit revenues	(+)	No

(+) positive effect, (–) negative effect, (o) not statistically significant (10% or less significant levels), (#): ambiguous.

1: Social service, education, and day care sectors.

2.5: Social service sectors.

3: Social service and education sectors.

4: Health service sectors.

6: Advocacy nonprofits, mutual-benefit nonprofits, and entire nonprofits.

7: Mutual-benefit nonprofits.

8: Welfare services and entire sectors.

9: A positive effect in culture and entire sectors, but a negative effect in welfare services sectors.

10: A positive effect in entire sectors, but not statistically significant in culture.

11: Culture sectors.

12: This effect disappears when income per capita is included.

∇: Though Salomon et al. (2000) had data for demand heterogeneity, the government expenditures on public goods, public subsidies, their estimation cannot be considered as a true test of the government failure theory because they performed three single regression models using each data as an explanatory variable.

engaging. For example, Salamon et al. (2000) examined demand heterogeneity by religion.^{7,8} However, as opposed to what the government failure theory predicts, they found religion had no explanatory power. Gronbjerg and Paarlberg (2001) chose religious diversity as a proxy for demand heterogeneity, and found that demand heterogeneity had a negative effect on the size of the nonprofit sector, specifically those engaging in areas of advocacy and mutual-benefit. Corbin (1999) and James (1997) also examined demand heterogeneity by religion and found that it had a positive effect on the size of the nonprofit sector. In addition to religious diversity, Corbin (1999) examined demand heterogeneity by race and reported a positive effect on the size of the nonprofit sector, just as the theory predicted. Abzug and Turnheim (1998) also examined demand heterogeneity by race, but concluded that it had no explanatory power, questioning the validity of the government failure theory. Ben-Ner and Van Hoomissen (1992) selected educational attainment, poverty rates, and race diversity in New York State as proxies for demand heterogeneity and found that demand heterogeneity by educational attainment had a positive effect on the social service sector, education sector, and day care sector. When the poverty rate was chosen as a proxy, demand heterogeneity had a positive effect on the number of employees in only the social service sectors. They also found that demand heterogeneity by race had a positive effect in education sectors whereas it had a negative effect in the social services sector. Marcuello (1998) examined demand heterogeneity by means of the unemployment rate, and found that it had a positive effect on the size of the nonprofit sector, specifically nonprofits associated with culture, but a negative effect on the size of the nonprofit sector in the welfare service sectors.

However, as Corbin (1999) claimed testing demand heterogeneity alone cannot be considered a true test of the government failure theory.

7 The following example illustrates what they did to obtain their religious fractionalization index: assume a hypothetical population of 10 million people of whom 5 million are Catholics, 4 million Protestants, and 1 million Jews. The percentages of each religious group are, respectively, 50%, 40%, and 10% or 0.5, 0.4 and 0.1. Consequently, the fractionalization index is $1 - \sqrt{0.5^2 + 0.4^2 + 0.1^2} = 0.352$.

8 Matsunaga and Yamauchi (2002) also used cross-country data gathered by the Johns Hopkins Comparative Nonprofit Sector Project to examine the statistical significance of demand heterogeneity measured by religious fractionalization and found that demand heterogeneity was statistically significant in culture and social service sectors, and the coefficient of demand heterogeneity is positive in these sectors.

Corbin's (1999) true test requires the sign of both demand heterogeneity and government expenditures on quasi-public goods to be tested in a joint manner. Recently several empirical studies have examined the explanatory power of both variables in this joint fashion. The far right column of Table 1 shows which previous studies possessed sufficient data sets to perform Corbin's (1999) true test of the government failure theory. The empirical studies of Ben-Ner and Van Hooymissen (1992), Gronbjerg and Paarlberg (2001), and Marcuello (1998) can be regarded as true tests of the government failure theory, although all of them fail to statistically support Hypotheses 1 through to 3. Gronbjerg and Paarlberg (2001) regarded county library expenditures in Indiana State as an adequate proxy for the size of government, and found that the size of the nonprofit sector was smaller where county library expenditure was large. Marcuello (1998) found that the size of the nonprofit sector was large where local government expenditure was large across the different welfare categories (culture, education, and welfare services sectors). However, the coefficient on local government expenditure on culture was found to be statistically insignificant.

As is clear from previous studies, there are no consistent findings in terms of the statistical significance of both demand heterogeneity and the size of governments. This fact stimulates our re-examination of this research area in order to determine what causes such inconsistencies in these empirical results. It is conceivable that the following three cases could lead to such a paradox. First, demand heterogeneity has in fact no explanatory power. Second, demand heterogeneity has explanatory power, but due to small sample issues, the model fails to capture such effects correctly. Third, results from previous studies not finding a relationship between the size of the nonprofit sector and demand heterogeneity, and the relationship between the size of the nonprofit sector and the size of governments, that is a joint test such as Corbin (1999), are based on models with specification errors. If the second case is true, then expanding sample size will solve the problem. If the third cause is true, then previous empirical results require careful attention, and it is worth re-examining this research topic applying a more appropriate model, which correctly reflects the features of the nonprofit sector. This is our intention in the next section.

3 The nonprofit sector size model

Our panel data analysis is carried out in order to clarify whether the government failure theory provides an empirically supportable

explanation for nonprofit sector size variations in different localities. We regard the panel data analysis to be well suited for our research target because it can control unobservable state specific effects that are not included as explanatory variable effects.⁹ Potential examples of unobservable state specific effects are colonial history, religious affiliations, and political regimes, which are all state-specific characteristics and are difficult to measure. Time-series and cross-section studies not controlling for unobservable heterogeneity run the risk of obtaining biased results (see Moulton 1986, 1987). Panel data is able to control for these state- and time-invariant variables whereas a time-series study or a cross-section study cannot. Thus, the empirical results of previous studies shown in Table 1 may be based on an empirical model with specification error if unobservable heterogeneity is an indispensable factor for the model, otherwise known as heterogeneity bias. If so, not only observable demand heterogeneity but also the unobservable demand heterogeneity is a key element in the examination of the robustness of the government failure theory. Previous studies demonstrated that demand heterogeneity by religious diversity, racial diversity, poverty rates, and education standards did not produce consistent statistical results; in some cases, demand heterogeneity had no explanatory power. In other cases demand heterogeneity had explanatory power, but its coefficient has the wrong sign. As a result, we expect that this inconsistency might have occurred not because the government failure theory is fragile but because each of the nonprofit sector size models applied in previous papers had heterogeneity bias.

We derive the nonprofit sector size model specification from the government failure theory as described in section 2. Here, we follow Weisbrod (1975, 1986) and assume that the preferences of the non-median voter segment can be proxied by demand for quasi-public goods. In other words, HET_{hit} is proxied by DPG_{hit} , where HET_{hit} is a preference of group h in region i at time t and DPG_{hit} is the demand for quasi-public good h in region i at time t .

We further assume that demand heterogeneity in region i at time t , $DHET_{it}$ is a function of HET_{hit} . For instance, the Coefficient of Variation, the Herfindahl-Hirschman Index (HHI), the Entropy index, and the Interquartile range may provide an appropriate functional form by which to measure demand heterogeneity.

9 For technical details of panel data analysis, see Greene (2000) and Baltagi (2001).

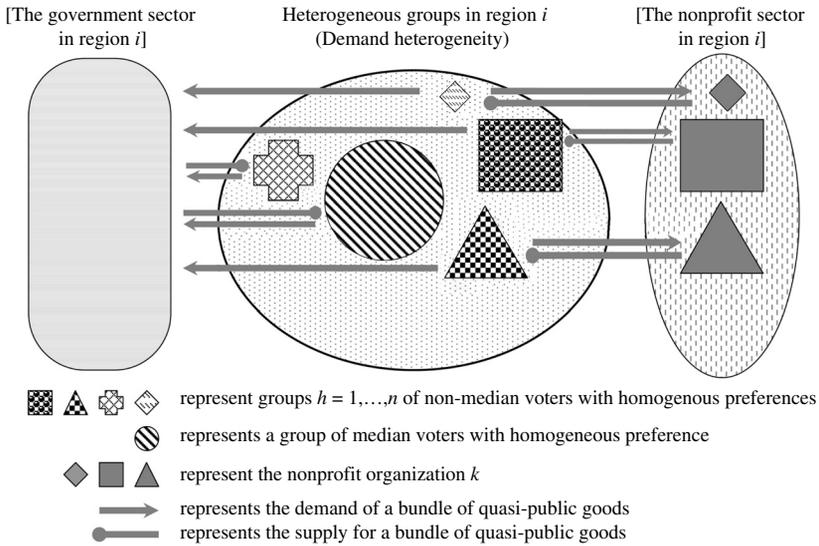


Figure 1 – Graphical explanations of the government failure theory

We also assume that one variety of quasi-public goods is produced and supplied by a single nonprofit organization. Then this correspondence can be expressed as the identity $NPO_{kit} = SPG_{kit}$, where NPO_{kit} is the nonprofit organization k in region i at time t and SPG_{kit} is the supply of quasi-public good k in region i at time t .¹⁰ Following this assumption, the size of the nonprofit sector can be expressed as a function of heterogeneous nonprofit organizations, each of which produces a unique quasi-public good. In particular, we define the size of the nonprofit sector in region i at time t , SNS_{it} by

$$SNS_{it} = \frac{\sum_{k=1}^K NPO_{kit}}{POP_{it}},$$

where POP_{it} is the population in the region i at time t . Here, the summation of the nonprofit organizations is divided by population, in order to eliminate any scale effect. Figure 1 shows graphical explanations of our scenario implied by the government failure theory.

Here we observe a median voter group, which seeks to have its quasi-public good preferences satisfied by the government. We also

10 This assumption comes in the light of the social cohesion theory.

observe non-median voter groups, which will be unsuccessful in their lobbying activities to have their quasi-public good preferences satisfied by the government. This scenario also allows for the satisfaction of quasi-public good preferences by non-median voter groups with preferences close to those of the median voter group.

Without formal specification derived from the government failure theory as described above, Corbin (1999), Abzug and Turnheim (1988), Gronbjerg and Paarlberg (2001), Marcuello (1988), and James (1997) in Table 1 utilized this definition for their empirical model.¹¹ The drawback of using this definition to measure the size of the nonprofit sector is that nonprofit organizations with a budget of \$100,000 and those with a budget of \$2,000,000 are regarded as similar organizations. An alternative proxy for the size of the nonprofit sector is the number of people employed in the nonprofit sector. Ben-Ner and Van Hoomissen (1992) measured the size of the nonprofit sector, the government sector, and the for-profit sector by the level of employment across the sectors. Salamon et al. (2000) measured the size of the nonprofit sector by paid full-time equivalent employment in the nonprofit sector as a percentage of nonagricultural employment. However, their measurement method is also not perfect because this captures only one aspect of the size of the nonprofit sector, that is the size of the nonprofit labor market. The fact that no other reliable panel data of the proxies for the size of the nonprofit sector such as revenue and expenditure are available is one of the reasons that we too have utilized this definition described. A more important reason however, is that the definition utilized reflects the government failure theory, and is particularly well suited to our primary objective, the empirical examination of the government failure theory's robustness.

Based on our definition of the size of the nonprofit sector, the nonprofit sector size (*SNS*) model in this paper is denoted as

$$SNS_{it} = \delta + \beta' X_{it} + u_{it} \quad i = 1, \dots, 50; \quad t = 1992, \dots, 1999 \quad (1)$$

where i subscript denotes the cross-section dimension and t denotes the time-series dimension. δ is a scalar, β is a $k \times 1$ vector, and SNS_{it} and X_{it} are the it th observations of the size of the nonprofit sector and that of k explanatory variables, respectively. The disturbance term could be either $u_{it} = \mu_i + e_{it}$ (one-way error component disturbances) or $u_{it} = \mu_i + w_t + e_{it}$ (two-way error component disturbances).

11 They justified the use of this definition with data availability problems.

In our SNS model, the μ_i captures the unobservable group-specific effect which relates to demand heterogeneity. w_t captures the group-invariant unobservable time effect and accounts for any time-specific effect, w_t can be considered effects of economic or political regime shifting, that influence the characteristics of the nonprofit stakeholders. For example, it could account for the effects of the Omnibus Reconciliation Act of 1993, the federal welfare reform legislation in 1996, the Small Business Tax Bill of 1996, removing the cap on tax exempt borrowing in 1997, and so on. The expansion of government spending in a particular field where nonprofit organizations are active creates an important opportunity for the nonprofit sector. The e_{it} is the remainder stochastic disturbance term¹² and is independently identically distributed with mean zero and variance σ_e^2 (ie: $IID(0, \sigma_e^2)$). Panel data analysis implies that the unobservable effects of heterogeneity can be captured by either fixed parameters or by random parameters. In one-way error component disturbance model, the μ_i , which are independent of e_{it} , are either ‘fixed effects’ or ‘random effects’. More precisely, in the former case, one is allowing for arbitrary correlation between μ_i and X_{it} , in other words the assumption $Cov(X_{it}, \mu_i) = 0, t = 1992, \dots, 1999$ does not need to hold. In the latter case, μ_i is assumed to be uncorrelated with X_{it} , that is the assumption $Cov(X_{it}, \mu_i) = 0, t = 1992, \dots, 1999$ which must hold. A similar argument is applied to the two-way error component disturbance model (see Wooldridge, 2002).

The data for the number of nonprofits from 1992 to 1999 by state is drawn from the CD-ROM available from The National Center for Charitable Statistics (NCCS) at The Urban Institute. This CD-ROM contains the NCCS Core Files that are created from both the IRS Business Master Files (BMF)¹³ and the Return Transaction Files of The Internal Revenue Service (IRS). They contain approximately 100 variables that include geographical identifier¹⁴ and extensive financial information on more than two hundred thousand 501 (c) (3) organizations that have been filed in the IRS Form 990 or 990-EZ.

12 e_{it} is often referred to as the idiosyncratic error term or an idiosyncratic disturbance, because these change across regions as well as time.

13 The BMF is a cumulative file that contains basic information drawn from IRS Forms 1023 and 1024 for all active and registered tax-exempt organizations. Note that since some organizations are in active, the BMF could be overstated. See the National Center for Charitable Statistics (1998)

14 Nonprofit organizations with no geographical identifier (the abbreviations of states) are excluded from our sample.

From the NCCS Core Files, we found that the District of Columbia exhibits the highest number of nonprofits among states in each year from 1992 to 1999. In 1999, the density of nonprofits in the District of Columbia was 60.12 organizations for every 10,000 residents. Vermont had the second highest density with 18.74 for every 10,000 residents, and Nevada had the lowest density with 4.68. According to Stevenson et al. (1997), the density of nonprofits in the District of Columbia is exceptionally high because a significant number of national and international headquarters of nonprofits are located there. Thus, this paper regards the number of nonprofits in the District of Columbia as an outlier and excludes it from the sample for estimation. Consequently, the sample size in this paper is 400.

Appendix I lists the sources of the data used in estimation. It is noted that all variables excluding dummy variables are expressed in a natural logarithmic form.

This paper assumes that there are three types of observable demand heterogeneity: demand heterogeneity by age, AGE_{it} , demand heterogeneity by race, $RACE_{it}$, and demand heterogeneity by unemployment rate, $UNEMP_{it}$. These three variables are the only available panel data that can be regarded as measuring the different kinds of demand heterogeneity. The coefficient of variation (CV) is employed to measure demand heterogeneity by race and age. CV^2 is proportional to the normalized Herfindahl-Hirschman Index ($NHHI$).¹⁵ We define the demand heterogeneity, $DHET_{it}$ by age, expressed as

$$AGE_{it} = \frac{\sqrt{\frac{1}{H_1-1} \sum_{h_1=1}^{H_1} (AGE_{h_1it} - \bar{x}_{it})^2}}{\bar{x}_{it}}, \quad \bar{x}_{it} = \frac{1}{H_1} \sum_{h_1=1}^{H_1} AGE_{h_1it},$$

where the numerator is the standard deviation and the denominator is the mean value. h_1 denotes demographic groups: under 5 years old, 5–17 years old, 18–24 years old, 25–44 years old, 45–64 years, and 65 years and over. If population diversity by age group increases in a state, its observable demand heterogeneity becomes more significant, and the population of that region demands a large variety of quasi-public goods, indicating the demand for the nonprofit provisions of quasi-public goods has increased.

15 The $NHHI$ is defined as $NHHI = \frac{H_o \times HHI - 1}{H_o - 1}$, where H_o is the number of demographic groups. Then $NHHI \times H_o = CV^2$ holds. The proof is trivial.

The demand heterogeneity, $DHET_{it}$ by race can also be defined as:

$$RACE_{it} = \frac{\sqrt{\frac{1}{H_2-1} \sum_{h_2=1}^{H_2} (RACE_{hit} - \bar{y}_{it})^2}}{\bar{y}_{it}}, \quad \bar{y}_{it} = \frac{1}{H_2} \sum_{h_2=1}^{H_2} RACE_{h_2it},$$

where h_2 denotes demographic groups: white, black, American Indian and native Asian, Asian and Pacific Island racial groups. As the racial melting pot becomes bigger, demand becomes more heterogeneous. Consequently, the population demands a larger variety of quasi-public goods and hence the demand for nonprofit provisions of quasi-public goods increases. Thus, both coefficients AGE_{it} and $RACE_{it}$ are also expected to be positive according to *Hypothesis 1*.

$UNEMP_{it}$ is the unemployment rate in state i at time t , and its coefficient is expected to be positive. Following Marcuello (1998), we treated the unemployment rate as a proxy for demand heterogeneity, due to unemployment as being a social problem that some nonprofit organizations serve, and demand for nonprofit organizations may also be stimulated by the unemployed, to whom such nonprofit organizations provide job training. Marcuello (1998) found that the unemployment rate had a positive effect on all sectors, specifically the cultural sector, just as the theory predicted. However the unemployment rate showed a negative effect on the welfare services sector, which the government failure theory failed to predict. Abzug and Turnheim (1998) on the other hand, treat unemployment as a proxy for social problems that stimulate the demand for nonprofits. However, they found that the rate of unemployment was not statistically significant.

$SLGEXP_{it}$ signifies direct state and local government expenditures per gross state product, which indicates the size of state and local governments. The government failure theory predicts that the coefficient on $SLGEXP_{it}$ is negative, because the larger the amount of direct expenditures by state and local governments, the more heterogeneous bundles of quasi-public goods, thereby satisfying more groups of non-median voters.

$PUBSUB_{it}$ is public subsidies for every 10,000 residents in each state. Hypothesis 3 states that the coefficient on $PUBSUB_{it}$ is expected to be positive. The variable acting as a proxy for public (government) subsidy is public support. The NCCS Core Files, however, did not allow us to isolate the data for public subsidies

from other public support measures, which included individual giving.¹⁶

$URBAN_{it}$ is a share of the population in metropolitan areas of state i at time t of the state's total population, and is an index of urbanizations. This index predicts that urbanizations will be negatively related to the size of the nonprofit sector (*Hypothesis 4*). This is so because urbanization may cause the demise of social cohesions (Lincoln, 1977). Following Lincoln's claim in terms of urbanization, Gronbjerg and Paarlberg (2001) created a dummy variable for small communities (1 if a county population in Indiana State is less than 10,000, and 0 if this is not the case). However, they found that urbanization has a negative effect on the size of the nonprofit sector.

$CRIME_{it}$ is the state crime rate including violent and property crime. The crime rate is expected to have a negative effect on the size of the nonprofit sector (*Hypothesis 5*) because it is likely that an increase in the crime rate modifies people's social activities, such as volunteer work, which becomes more dangerous and discourages social cohesion. Abzug and Turnheim (1998) also predicted a positive effect from the crime rate on the size of the nonprofit sector. In their model, the crime rate reflects social problems and therefore social needs for goods and services as provided by the nonprofit organizations. However, they found that the coefficient on the crime rate was not statistically significant in contrast to what they predicted.

$PINCOME_{it}$ is personal income for every 10,000 residents in each state. The empirical work by Ben-Ner and Van Hoomissen (1992) focuses on the feature of goods produced and supplied by nonprofit organizations and it was found that the class of goods supplied depends upon the types of services. Ben-Ner and Van Hoomissen (1992) claimed that the personal income variable captures both the effect of income and market size, and found that personal income has a negative effect on the size of the nonprofit health service sector, thereby supporting the notion that wealthier communities rely more heavily on the for-profit sector than other communities. Marcuello (1998) found that personal income had a negative effect on the size of the nonprofit sector but specifically the nonprofit education sector. James (1997), on the

16 We note that this proxy may be a cause of measurement error. However, we expect that the error should be small given the extent and distribution of government reliance on nonprofit organizations in supplying quasi-public goods. Governments are the single largest source of support for the nonprofit sector, outdistancing the other sources of support (Salamon 1987).

Table 2 – Descriptive Statistics

Variables	Mean	Standard Deviation	Minimum	Maximum	Samples
SNS_{it}	6.7197	3.4353	1.1145	18.7456	400
$SLGEXP_{it}$	0.1605	0.0241	0.1195	0.2706	400
$PUBSUB_{it}$	3286914.6500	2342403.9300	326871.0910	14569586.3000	400
AGE_{it}	52.9328	4.1572	43.6475	71.6495	400
$RACE_{it}$	164.4134	21.6455	117.3778	196.4864	400
$UNEMP_{it}$	0.0529	0.0153	0.0255	0.1139	400
$PINCOME_{it}$	23658.9650	3634.2634	16057.0000	37452.0000	400
$CRIME_{it}$	47.6313	12.1643	22.8168	83.4786	400
$URBAN_{it}$	1.0476	2.1165	0.1957	16.6514	400

Computed by *LIMDEP 7.0*

other hand, regarded income per capita as an indicator of excess demand and/or the financial ability of purchasing a private education, and found that the income per capita variable had a positive effect on the public/private division of responsibility for education provision, which was used as a proxy for the size of the nonprofit educator sector.

4 Empirical results

We turn now to the empirical examination of the robustness of the government failure theory using US state level panel data. Table 2 shows descriptive statistics for the variables used in our empirical model. Table 3 shows the results of the five tests, which were carried out as a part of the model selection process.

The hypothesis tests HT[1] and HT[2] are the Lagrange multiplier tests (*LM-tests*) for the one-way random effects model (OWR) and the two-way random effects model (TWR), respectively. The results of these tests reject the null hypotheses H_{01} and H_{02} shown in Appendix II. We therefore conclude that the pooling model¹⁷ (Pool) is inappropriate for our data and either the one-way or the two-way random effects model are a suitable model. The hypothesis tests HT [3] and HT [4], on the other hand, are *Hausman tests* for fixed and

17 The pooling model is the ordinary least squares regression of the dependent variable on a single constant and the repressors. Output consists of the standard results for least squares regression. Intuitively, when we estimate the pooling model, we regard the panel data as if it were cross-sectional data. In our case, 400 observations (50 states \times 8 years) is simply treated as if it were 400 cross-sectional observations.

Table 3 – Test statistics to choose the SNS model

HT[1]: OWR vs. Pool
 $LM\text{-statistic}^{(1)} = 642.14^{***}$
 Choice of the model \Rightarrow OWR

HT[2]: TWR vs. Pool
 $LM\text{-statistic}^{(2)} = 657.00^{***}$
 Choice of the model \Rightarrow TWR

HT[3]: OWR vs. OWF
 $Hausman\text{-statistic}^{(3)} = 32.06^{***}$
 Choice of the model \Rightarrow OWF

HT[4]: TWR vs. TWF
 $Hausman\text{-statistic}^{(3)} = 123.72^{***}$
 Choice of the model \Rightarrow TWF

HT [5]: TWF vs OWF
 $F\text{-statistic}^{(4)} = 162.68^{***}$
 Choice of the model \Rightarrow TWF

OWF: One-way fixed effects model

TWF: Two-way fixed effects model

OWR: One-way random effects model

TWR: Two-way random effects model

Pool: Pooling model

*** 1% significance level

(1) $LM\text{-statistic}$ is distributed as chi-square with one degree of freedom.

(2) $LM\text{-statistic}$ is distributed as chi-square with two degrees of freedom.

(3) $Hausman\text{-statistic}$ is asymptotically distributed as chi-square with nine degrees of freedom.

(4) Seven degrees of freedom for the numerator and 335 degrees of freedom for the denominator.

Computed by *LIMDEP 7.0*

random effects. The results of these tests reject the null hypotheses H_{03} and H_{04} in Appendix II, suggesting that either a one-way fixed effects model (OWF) or a two-way fixed effects model (TWF) are suitable models. The hypothesis test HT [5] is the F -test for the OWF and TWF models. The null hypothesis H_{05} in Appendix II is firmly rejected, which suggests that the one-way fixed effects model is inappropriate for our data. Consequently, this series of hypothesis tests suggests that the most suitable model for our data is the two-way fixed effects model.

The results from the estimation of the two-way fixed effects model (the Pooling, OWR, OWF, and TWR models are not shown) is shown in the left column of Table 4.

The hypothesis test supporting the two-way fixed effects model as the best choice means that there exists unobservable demand heterogeneity effects by state μ_{i_j} , which is expressed as 50 intercepts in equation (1). Also, effects of the antecedent group attitudes on SNS_{it} are captured by a group-invariant unobservable time effects

Table 4 – Results from the estimations

Dependent variable: SNS_{it}		
Independent variables	Equation (1) (2way fixed effects) standard errors in parentheses	2SLS of Equation (1) (2way fixed effects) asymptotic standard errors in parentheses
<i>CONSTANT</i>	7.0336* (3.9186)	-1.8578 (6.4856)
<i>AGE_{it}</i>	0.4418*** (0.1417)	0.7439*** (0.1890)
<i>RACE_{it}</i>	-0.3273 (0.6713)	1.7651 (1.3573)
<i>UNEMP_{it}</i>	0.0778*** (0.0296)	0.3089*** (0.1147)
<i>SLGEXP_{it}</i>	-0.2192*** (0.0830)	-1.1800** (0.4832)
<i>PUBSUB_{it}</i>	0.1384*** (0.0198)	0.1176** (0.0569)
<i>URBAN_{it}</i>	-0.2235 (0.2915)	0.0693 (0.3120)
<i>CRIME_{it}</i>	-0.0929* (0.0509)	-0.2441*** (0.0763)
<i>PINCOME_{it}</i>	-0.7261*** (0.1762)	-1.0303*** (0.3047)
R^2	0.9944	0.9937

* 10% significance level, ** 5% significance level, *** 1% significance level

Computed by LIMDEP 7.0

constant w_t , which is expressed as 8 intercepts. Therefore, the data suggests that unobservable demand heterogeneity by state as well as unobservable effects of economic or political regime shifts affect the size of the nonprofit sector. In particular, μ_i represent an important feature of the government failure theory. This means that one can allow for correlation between the unobservable demand heterogeneity and the explanatory variables. In particular, since both $SLGEXP_{it}$ and $PUBSUB_{it}$ are elements of X_{it} , we allow for $Cov(SLGEXP_{it}, \mu_i) \neq 0$ and/or $Cov(PUBSUB_{it}, \mu_i) \neq 0$, implying that unobservable demand heterogeneity could be correlated with the direct state and local government expenditures on quasi-public goods, and/or that unobservable demand heterogeneity could be correlated with public subsidies to the nonprofit sector. These correlations are interpretable as the influences of the median and non-median voter preferences on governmental spending policies.

The coefficients on both AGE_{it} and $UNEMP_{it}$ are statistically significant and are positive as the theory predicts, thereby supporting

Hypothesis 1. Our analysis shows that, *ceteris paribus*, a 1% increase in demand heterogeneity by age leads to about a 0.44% increase in the size of the nonprofit sector. Likewise, a 1% increase in the unemployment rate leads to about a 0.08% increase in the size of the nonprofit sector, indicating that unemployment stimulates nonprofit activities. The coefficient on $RACE_{it}$, on the other hand, is not statistically significant and its sign is different from what the government failure theory predicts. Our findings and previous studies (Ben-Ner and Van Hoomissen 1992, Abzug and Turnheim 1998) implies that the explanatory power of observable demand heterogeneity by race may be weak. The coefficient on $SLGEXP_{it}$ is negative and supports *Hypothesis 2*. A 1% decrease in governmental provisions of quasi-public goods causes an increase in the size of the nonprofit sector by about 0.22%. The coefficient on $PUBSUB_{it}$ is positive, and therefore, supports *Hypothesis 3*. We find that a 1% increase in public subsidies to the nonprofit sector increases the size of the nonprofit sector by about 0.14%. The coefficient on $CRIME_{it}$ is statistically significant, and its sign is negative. Hence, we accept *Hypothesis 5*. We find that a 1% increase in the crime rate, *ceteris paribus*, decreases the size of the nonprofit sector by approximately 0.09%. However, by contrast the coefficient on $URBAN_{it}$ is not statistically significant and hence *Hypothesis 4* is rejected. The coefficient on $PINCOME_{it}$ is statistically significant and its sign is negative, indicating that the demand effect surpasses the supply effect (See *Hypothesis 6*). Table 4 shows that a 1% increase in personal income for every 10,000 people, *ceteris paribus*, leads to about a 0.7% decrease in the size of the nonprofit sector.

The negative sign on $SLGEXP_{it}$ implies that the quasi-public goods supplied by nonprofit organizations are substitutes for those provided by the government, just as the government failure theory predicts. The positive sign on $PUBSUB_{it}$, on the other hand, implies that government subsidies promote the growth of the nonprofit sector as nonprofits fill the niche of providing quasi-public goods to the non-median voter groups.

With the expanding recognition of the nonprofit sector's comparative advantage in supplying heterogeneous quasi-public goods to heterogeneous groups of the non-median voter variety, it is likely that governments will cut direct expenditures on quasi-public goods and entrust nonprofit organizations to provide them.¹⁸ Following this

18 The direct expenditures not spent for the governmental provision of quasi-public goods can be transferred to the nonprofit sector as public subsidies.

scenario, as implied by the government failure theory and the complementary financing hypothesis, we now turn to a re-estimation of the nonprofit sector size model, examining the complementary financing hypothesis theory. From a statistical point of view, testing the complementary financing hypothesis corresponds to the testing of conventional simultaneity among SNS_{it} , $SLGEXP_{it}$, and $PUBSUB_{it}$, in other words, the examination of correlations between $SLGEXP_{it}$, $PUBSUB_{it}$ and the error term e_{it} . Having applied the method of two stage least squares (2SLS) to re-estimate equation (1), with both $SLGEXP_{it}$ and $PUBSUB_{it}$ as now being treated as endogenous, identification will require at least two instruments.¹⁹ These instruments must be exogenous variables and uncorrelated with the error term. As an instrumental variable for $SLGEXP_{it}$, we use high school educational attainment rate, $HEDUATT_{it}$,²⁰ as it is widely accepted that higher education is a vital engine of the economic growth. Thus, it is likely that state and local governments will increase expenditures on governmental provisions of quasi-public goods, for instance, public high schools. The instrumental variable for $PUBSUB_{it}$ is state and local government tax revenue for every 10,000 people in every state TAX_{it} . The rationale for our choice is that public subsidies mainly come from state and local government tax revenue, and hence we expect a positive relationship between TAX_{it} and $PUBSUB_{it}$. Before we move on to the 2SLS estimation, we first must test for the adequacy of the instrumental variables. We assume the following two conditions: assumption [1] $Cov(z_{it}, e_{it}) = 0$, where z_{it} denotes the instrument, and assumption [2] the first stage F -statistic, which tests the hypothesis that the instruments do not enter the first stage regression, which must exceed the critical value of 10. This is because when the instruments are weakly correlated with the endogenous regressors, conventional asymptotic results fail even if the sample size is large (Staiger and Stock 1997).²¹ Although we are unable to examine if our two instrumental variables meet assumption [1], we can

19 There are two classified methods of instrumental variables estimation. One is the limited-information method, and the other is the full information method. This paper applied the limited-information method, and therefore, we did not focus on the model specifications for TAX_{it} and $PUBSUB_{it}$. So, these two models were used, though not to estimate but to check identification.

20 Since the data for the high school educational attainment rate in 1992 are not available, we created them using the average rate of change from 1991 to 1999.

21 In this study, the first stage regression was that we regressed each endogenous variable ($SLGEXP_{it}$ or $PUBSUB_{it}$) on all exogenous variables in the model and the instrumental variables.

determine whether assumption [2] is met. After regressing $SLGEXP_{it}$ on all exogenous variables in equation (1) and the two instrumental variables in the framework of the two-way fixed effects model, we found that the F -statistic for the hypothesis, that the coefficients on both instruments are jointly zero, is 27.33, which exceeds the critical value of 10. Likewise, we regress $PUBSUB_{it}$ on all exogenous variables in equation (1) and the two instrumental variables in the framework of the two-way fixed effects model.²² We found that the F -statistic for the hypothesis that the coefficients of two instruments are jointly zero is 12.52, which also exceeds the critical value of 10. Therefore, we conclude that the instrumental variables are adequate. To test whether $SLGEXP_{it}$ and $PUBSUB_{it}$ are uncorrelated with e_{it} , we first regress $SLGEXP_{it}$ on all other independent variables together with the two instrumental variables in the framework of the two-way fixed effects model and we define \hat{v}_{1it} as the residuals from the regression. Similarly, regressing $PUBSUB_{it}$ on all other independent variables together with two instrumental variables also in the framework of the two-way fixed effects model and retain the residuals \hat{v}_{2it} . Adding \hat{v}_{1it} and \hat{v}_{2it} to equation (1) to test the null hypothesis, $\hat{v}_{1it} = \hat{v}_{2it} = 0$, we compute the joint F -test, which yields $F = 3.69$ and $p\text{-value} = 0.026$; thus we must reject the exogeneity of $SLGEXP_{it}$ and $PUBSUB_{it}$. Since we have empirically verified the validity of the two instrumental variables $HEDUATT_{it}$ and TAX_{it} and established the endogeneity of $SLGEXP_{it}$ and $PUBSUB_{it}$, we can confirm the 2SLS is the appropriate estimator.²³

The two-way fixed effects of 2SLS estimates are reported in the right-hand column of Table 4. The coefficients on AGE_{it} , $SLGEXP_{it}$, and $PUBSUB_{it}$ are again statistically significant and their signs support *Hypothesis 1* to 3. The negative coefficient on $SLGEXP_{it}$ estimated by 2SLS is larger than that estimated by ordinary least squares (OLS), indicating that the size of the nonprofit sector is more sensitive to government direct expenditures on quasi-public good when we treat both $SLGEXP_{it}$ and $PUBSUB_{it}$ as endogenous variables. The sign of the coefficient on $RACE_{it}$ is now positive as the government failure theory predicts, although it is still not statistically significant. It is quite conceivable, however, that an increase in the

22 This first stage regression was similar to that which Weisbrod (1975) estimated. Unlike his result, our estimation showed that observable demand heterogeneity had no explanatory power in the first stage model. This might be consistent with what the government failure theory implies; the state and local governments fail to respond to the demand for quasi-public goods by the non-median voters groups.

23 See Wooldridge (2002) for more technical details.

sample size could solve the problem of the insignificant coefficient on $RACE_{it}$ since its p -value is relatively small (p -value is 0.25). Therefore, we conclude that the government failure theory is still a robust theory that explains why the size of the nonprofit sector varies from one place to another. The coefficient on $URBAN_{it}$ is not statistically significant at all (p -value is 0.84) and in contrast with what the social cohesion theory predicts, the sign of the coefficient of $URBAN_{it}$ is now positive. Thus, *Hypothesis 5* is again not statistically supportable. The estimation results by both *OLS* and *2SLS* implies that the social cohesion theory could be fragile.

In summary, the properties of this empirical study are (1) unobservable demand heterogeneity is an important factor affecting the size of the nonprofit sector, (2) the complementary financing hypothesis is relevant, and (3) it is likely that the government failure theory is robust.

6 Concluding remarks

Using a panel data set of US 50 states, this paper has performed Corbin's (1999) true test of the government failure theory. Most previous papers that focused on the estimation of the nonprofit sector by size were based on cross sectional data. This paper showed that the empirical results from previous papers require careful interpretation because standard estimation procedures for cross sectional data cannot control for unobserved demand heterogeneity. Our analysis also showed the statistical validity of unobserved demand heterogeneity, obtaining positive signs of coefficients on observable demand heterogeneity by age and unemployment, and a negative sign of the coefficient on state and local government direct expenditures as a share of gross state product, as implied by the government failure theory. In addition, we found that the complementary financing hypothesis, the government as a substitute for nonprofits in the production of quasi-public goods while a complement in financing is empirically supported. From an empirical point of view, this hypothesis is equivalent to treating state and local government direct expenditures on quasi-public goods and public subsidies for the nonprofit sector as endogenous variables. We re-estimated the nonprofit sector size model using the method of *2SLS*. This study showed that *2SLS* estimation is well suited to our research agenda and the estimation results have garnered support for the notion that the government failure theory is a robust one.

This study also indicated that the explanatory power of demand heterogeneity by race is unstable, and hence requires further investigation, which is beyond the scope of this paper. Three possible causations for the inconsistent results found from the explanatory power of demand heterogeneity by race. First, demand heterogeneity by race may have a 'lumpy' distribution by its nature. Second, the measurement method of demand heterogeneity by race may not be appropriate to capture the variations of population preferences. Different papers in Table 1 utilized different measurement methods for demand heterogeneity. For example Corbin (1999) utilized Entropy index, whereas Chang and Tuckman (1996) and Abzug and Turnheim (1998) utilized Herfindahl-Hirschman Index. Third, the empirical models of nonprofit sector size may suffer from specification errors. If the specification error comes from either the exclusion of government expenditures on quasi-public goods or ignorance of unobservable demand heterogeneity, then it can be considered a settled matter in this paper. The first and second causations could still present hurdles to researchers in this field.

We note that our analysis does not exclude the possibility that the dependent variable may suffer from measurement errors. Such measurement error may occur due to religious organizations and other nonprofit organizations with less than \$25,000 in gross receipts as not being required to file Form 990, and therefore as being excluded from the core file (The National Center for Charitable Statistics 1998). However, measurement error in the dependent variable is not as problematic as measurement errors in explanatory variables.

Although the same caveats in previous works are also caveats in this paper, our findings in this paper certainly highlight that future study should no longer disregard unobservable demand heterogeneity as a potential source of specification error. Our key findings provide evidence supporting the complementary financing hypothesis as being relevant as well as providing evidence for the robustness of the government failure theory.

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La théorie des échecs de l'Etat est-elle toujours pertinente? Une analyse de données en panel d'Etats américains

Le but de cet article est d'examiner de façon empirique la robustesse de la théorie des échecs de l'Etat. Un point central de cette théorie réside dans l'hétérogénéité de la demande. Des études antérieures ont conduit à mettre en question la robustesse de cette théorie sur base de résultats inconsistents concernant le pouvoir explicatif de l'hétérogénéité de la demande. Les auteurs réexaminent dès lors cet important domaine de recherche à partir de données en panel relatives aux Etats américains. Ils utilisent le modèle à double effet fixe pour tester la robustesse de la théorie des échecs de l'Etat et obtiennent des résultats qui indiquent qu'une hétérogénéité observable de la demande a un effet positif sur la taille du secteur sans but lucratif. L'article examine aussi empiriquement la pertinence de l'hypothèse de financement complémentaire sur base des relations de coopération entre les secteurs public et sans but lucratif. Il s'agit des cas où l'Etat délègue au secteur sans but lucratif la production de biens quasi publics.

Ist die Staatsversagenstheorie noch relevant? Eine Feldanalyse unter Verwendung von US-Daten auf der Ebene der States

Das Ziel dieses Beitrags ist, die Robustheit der Staatsversagenstheorie empirisch zu prüfen. Ein Kernmerkmal der Staatsversagenstheorie ist die Nachfrageheterogenität. Frühere Untersuchungen haben die

Robustheit der Staatsversagenstheorie aufgrund inkonsistenter Ergebnisse bezüglich des Erklärungswerts von Nachfrageheterogenität in Zweifel gezogen. Deshalb überprüfen wir in diesem Beitrag diesen wichtigen Forschungsergebnis unter Verwendung von US-Felddaten auf der Ebene der States. Wir sind zu dem Ergebnis gelangt, dass das Two-way fixed effects-Modell ein brauchbares Modell zum Testen der Robustheit der Staatsversagenstheorie darstellt, und präsentieren Ergebnisse, die anzeigen, dass die feststellbare Nachfrageheterogenität einen positiven Effekt auf die Größe des Nonprofit-Sektors hat. Dieser Beitrag untersucht auch empirisch die Relevanz der Complementary Financing-Hypothese hinsichtlich der kooperativen Natur der Beziehung von staatlichem und Nonprofit-Sektor, d.h. wo Regierungen die Produktion von quasi-öffentlichen Gütern an den Nonprofit-Sektor delegieren.

¿Es siempre pertinente la teoría de los fallos del Estado? Un análisis de datos de panel de los Estados americanos

El objetivo de este artículo es examinar de manera empírica la robustez de la teoría de los fallos del Estado. Un punto central de esta teoría reside en la heterogeneidad de la demanda. Algunos estudios anteriores conducen a poner en cuestión la robustez de esta teoría sobre la base de resultados inconsistentes relativos al poder explicativo de la heterogeneidad de la demanda. Los autores reexaminan, por lo tanto, este importante campo de investigación a partir de datos de panel relativos a los Estados americanos. Utilizan el modelo de doble efecto fijo para testar la robustez de la teoría de los fallos del Estado y obtienen resultados que indican que la heterogeneidad observable de la demanda tiene un efecto positivo sobre la dimensión del sector sin fines lucrativos. El artículo examina, también empíricamente, la pertinencia de la hipótesis de financiación complementaria sobre la base de las relaciones de cooperación entre los sectores público y sin fines lucrativos. Se trata del caso en que el Estado delega en este sector la producción de bienes ‘cuasi’ públicos.

Appendix I: Panel Data Source

Number of nonprofit organizations	The Core Files, The Urban Institute, CD-ROM.
Population by age group	Population Estimates for the U.S., Regions, and States by Selected Age Groups and Sex, U.S. Census Bureau, (http://eire.census.gov/popest/archives/1990.php#state) 1/15/2002.
Population by race	1990 to 1999 Annual Time Series of State Population Estimates, U.S. Census Bureau (http://eire.census.gov/popest/archives/1990.php#state) 1/15/2002.
State and local government general Direct Expenditures	State and Local Government Finances by Level of Government, U.S. Census Bureau, (http://www.census.gov/govs/www/state.html) 1/5/2002.
Gross state product	Gross State Product data is available from (http://www.bea.doc.gov/bea/regional/gsp/) 2/1/2002.
Public subsidies	The Core Files, The Urban Institute, CD-ROM.
Unemployment rate	Local Area Unemployment Statistics, Bureau of Labor Statistics, (http://www.bls.gov/lau/) 1/24/2002.
Personal income	U.S. Bureau of Economic Analysis, Survey of Current Business, Survey of Current Business, May 2000, and unpublished data. (http://www.bea.doc.gov/bea/regional/data.htm) 1/31/2002.
Crime rate	Bureau of Justice Statistics – Data Online, (http://www.ojp.usdoj.gov/bjs) 2/28/2002.
Urbanization	Metropolitan Area Population Estimates for July 1, 1999 and Population Change for April 1, 1990 to July 1, 1999 (includes April 1, 1990 Population Estimates Base) Population Estimates Program, Population Division, U.S. Census Bureau, (http://eire.census.gov/popest/archives/1990.php#metro) 1/31/2002.
State and local Government tax revenue	State and Local Government Finances by Level of Government, U.S. Census Bureau, (http://www.census.gov/govs/www/state.html) 1/5/2002.
High school educational attainment	Table 13. Educational Attainment of the Population 25 years and Over, By State, (http://www.census.gov/population/www/socdemo/educ-attn.html) 1/24/2002.
Population	State Population Estimates: Annual Time Series, July 1, 1990 to July 1, 1999, (http://www.census.gov/population/estimates/state/st-99-3.txt) 1/31/2002.

Appendix II

HT[1] $H_{01} : \sigma_u^2 = 0, H_{a1} : \sigma_u^2 \neq 0$

$$LM\text{-statistic} = \frac{NT}{2(T-1)} \left[\frac{\sum_{i=1}^N \left[\sum_{t=1}^T e_{it} \right]^2}{\sum_{i=1}^N \sum_{t=1}^T e_{it}^2} - 1 \right]^2$$

HT[2] $H_{02} : \sigma_u^2 = 0$ and $\sigma_w^2 = 0, H_{a2} : \sigma_u^2 \neq 0$ and $\sigma_w^2 \neq 0$

$$LM\text{-statistic} = \frac{NT}{2} \left[\frac{1}{T-1} \left[\frac{\sum_{i=1}^N \left[\sum_{t=1}^T e_{it} \right]^2}{\sum_{i=1}^N \sum_{t=1}^T e_{it}^2} - 1 \right]^2 + \frac{1}{N-1} \left[\frac{\sum_{t=1}^T \left[\sum_{i=1}^N e_{it} \right]^2}{\sum_{i=1}^N \sum_{t=1}^T e_{it}^2} - 1 \right]^2 \right]$$

HT[3] $H_{03} : \text{Both } \hat{\beta}_{OWF} \text{ and } \hat{\beta}_{OWR} \text{ are consistent but } \hat{\beta}_{OWF} \text{ is not efficient}$

$H_{a3} : \hat{\beta}_{OWF}$ is consistent but $\hat{\beta}_{OWR}$ is inconsistent

Hausman-statistic

$$= \left(\hat{\beta}_{OWF} - \hat{\beta}_{OWR} \right)' \left(\text{Var} \left[\hat{\beta}_{OWF} \right] - \text{Var} \left[\hat{\beta}_{OWR} \right] \right) \left(\hat{\beta}_{OWF} - \hat{\beta}_{OWR} \right)$$

HT[4] $H_{04} : \text{Both } \hat{\beta}_{TWF} \text{ and } \hat{\beta}_{TWR} \text{ are consistent but } \hat{\beta}_{TWF} \text{ is not efficient}$

$H_{a4} : \hat{\beta}_{TWF}$ is consistent but $\hat{\beta}_{TWR}$ is inconsistent

Hausman-statistic

$$= \left(\hat{\beta}_{TWF} - \hat{\beta}_{TWR} \right)' \left(\text{Var} \left[\hat{\beta}_{TWF} \right] - \text{Var} \left[\hat{\beta}_{TWR} \right] \right) \left(\hat{\beta}_{TWF} - \hat{\beta}_{TWR} \right)$$

HT[5] $H_{05} : w_t = 0$ for all t assuming unobservable group-specific effects exist

$H_{a5} : w_t \neq 0$ for at least one t assuming unobservable group-specific effects exist

$$F\text{-statistic} = \frac{(RSSR - USSR)/(T - 1)}{USSR/(NT - (N - 1) - (T - 1) - k - 1)},$$

$$N = 50, T = 8, k = 8;$$

RSSR: Restricted Sum Square Residual; *USSR*: Unrestricted Sum Square Residual

