Dipartimento di Scienze Economiche
Università degli Studi di Firenze

Working Paper Series

Nonprofits are not alike: The Role of Catholic and Protestant Affiliation

Lapo Filistrucchi and Jens Prüfer

Working Paper N. 07/2013
May 2013

DISEI, Università degli Studi di Firenze
Via delle Pandette 9, 50127 Firenze, Italia
www.dse.unifi.it

Stampato in proprio in Firenze dal DISEI
(Via delle Pandette 9, 50127 Firenze) nel mese di Maggio 2013,
Esemplare Fuori Commercio Per il Deposito Legale
agli effetti della Legge 15 Aprile 2004, N.106

Nonprofits are not alike: The Role of Catholic and Protestant Affiliation*

Lapo Filistrucchi† and Jens Prüfer‡

April 26, 2013

Abstract

There are no generally accepted results regarding the objectives, decisions, and economic outcomes of nonprofit organizations, as compared to for-profit or public firms. We posit that this inconclusiveness is due to a too broad definition of nonprofits and that different types of nonprofits exist. This conjecture is investigated by constructing a model in which nonprofits differ by religious affiliation and testing the resulting hypotheses on the observed behavior of German nonprofit hospitals. We find that Catholic and Protestant nonprofits adopt significantly different strategies in the market. This confirms our conjecture and the importance of religion for economic outcomes.

JEL Classification: L31; L21; Z12; D64; I11

Keywords: Nonprofits; Governance; Owner Objectives; Religious Organizations; Catholicism and Protestantism; Hospitals

---

*Thanks to Cansu Aslan, Jan Boone, Katie Carman, Eline van der Heijden, Jï¿½rgen Maurer, Stefan Trautmann, and Xu YiLong for helpful comments on an earlier draft of the paper and to Alerk Amin, Fatih Cemil Ozbugday, and Pauline Affeldt for great research assistance. Martin Salm deserves special thanks for collaboration on the data collection. We acknowledge financial support from a grant of the Dutch Health Care Authority (NZa) to TILEC. Lapo Filistrucchi acknowledges financial support from the Netherlands Organization for Scientific Research (NWO).

†Department of Economics and Management; University of Florence and CentER, TILEC; Tilburg University

‡*Corresponding author*: CentER, TILEC; Tilburg University; P.O. Box 90153; 5000 LE Tilburg, The Netherlands; e-mail: j.prufer@uvt.nl.

1 Introduction

"Nonprofit organizations are all around us."
Burton Weisbrod (1988:1)

Two main factors distinguish nonprofit firms from for-profit organizations: They have tax privileges and they operate under a nondistribution constraint.[1] While tax privileges give nonprofits a financial advantage over competing for-profits, the nondistribution constraint makes it unlawful that nonprofit managers or other decision makers appropriate the profits generated by this advantage (Hansmann, 1980).[2] Hence, rational nonprofit decision makers will not maximize profits but pursue another objective. It has not been settled in the theoretical literature, however, which one. Empirical studies comparing the economic outcomes and strategic decisions of nonprofit, for-profit, and public organizations do not find a clear pattern of behavior distinguishing organizational forms (Sloan, 2000; Malani et al., 2003; Horwitz and Nichols, 2007).

We propose that the inconclusiveness of the empirical literature and the indecisiveness of the theoretical literature stem from the fact that the definition of nonprofits, as stated above, is too broad. Organizational entities that were set up by founders with different objectives, that use different governance mechanisms, and that serve different kinds of consumers are all treated equally under the nonprofit label. In this paper, we posit—and verify—that different types of nonprofits exist, that we can distinguish among them by using observable criteria, and that they produce different measurable economic outcomes. This serves as the basis of a theory that can explain and predict nonprofit behavior.

Because the health care sector is the economically most important industry with significant market shares of nonprofits (Hansmann, 1980, 1996; Sloan, 2000), we test our conjecture by studying a dataset covering all German hospitals for

[1] Glaeser (2003:1) adds a third feature, that nonprofits do not have owners. That notion applies Hansmann's (1996) definition of ownership, whereby an owner is a person having both residual control rights *and* residual income rights in a firm. As decision makers in nonprofits have no income rights, due to the nondistribution constraint, they are not regarded owners. In contrast, in the Grossman and Hart (1986) and Hart and Moore (1990) framework, to qualify as an owner it is sufficient to hold residual control rights. Hence, nonprofits *do* have owners in this framework, usually the managers or board members. We follow Grossman, Hart, and Moore in this issue.

[2] Note that public organizations and cooperatives are not only different from for-profits but also from nonprofits because they are not subject to a nondistribution constraint.

the years 2006 and 2008 and including both input and output indicators for various clinical areas and information on organizational form. The data allow to distinguish between nonprofits with Catholic and with Protestant affiliation.[3]

To generate hypotheses about the strategic behavior of Catholic and Protestant nonprofit hospitals, we first construct a model of a health care market with nonprofit providers. Due to the absence of close managerial control via shareholders or the market for corporate control, we model nonprofit boards as the main decision makers in those organizations. Given the nondistribution constraint, profit maximization is no reasonable goal of governing boards. Instead, building on insights from the literature on the economic effects of Catholicism and Protestantism, we assume objective functions with the following characteristics:[4] First, both Catholic and Protestant decision makers get spiritual rewards from altruistic behavior and, hence, maximize patient benefits (lat. *caritas*). Second, Protestantism has an individualist emphasis. Therefore, we assume Protestant decision makers to maximize the benefit of an individual patient who is up for treatment. In contrast, Catholicism has a communal emphasis, which suggests that Catholic decision makers focus on the group benefit of the community of all patients. Third, a Protestant believer obtains relatively high reward from observable measures of worldly success. This suggests that Protestant decision makers will be oriented more towards productive efficiency and attracted by complex procedures and technologies, two economic and intellectual measures of success.

Our model predicts that a Catholic provider serves relatively more patients and makes higher total revenues but that a Protestant provider makes higher average revenues per patient and treats relatively more complex cases in equilibrium. It also produces testable hypotheses on providers' choice of diversification vs. specialization.

We then test the hypotheses generated by our model with the data on German hospitals. Our empirical findings suggest that Christian hospitals, which form 63 percent of all nonprofit hospitals in Germany, indeed make different strategic choices: Catholic hospitals serve more patients and more treatment ar-

[3]In contrast to many other countries, both the Protestant and the Catholic theologies are relatively homogenous in Germany. In our dataset, all Catholic hospitals are a member of the *Caritas* organization, all Protestant hospitals are a member of *Diakonisches Werk*.

[4]The fact that the preferences of (elite) workers are important for nonprofits' decisions is shown by Glaeser (2003) and Francois (2007). Horwitz (2007:22) finds evidence for "the influence of employee altruism" on decision making.

eas and produce higher total revenues. Instead, Protestant hospitals focus on more complex cases, generate higher revenues per patient, and are active in less treatment areas. We also find evidence that a higher share of Protestant than Catholic hospitals has links to universities and that Protestant hospitals use more generalist doctors and more specialized doctors per patient than Catholic hospitals.

These results suggest that Catholic hospitals follow a strategy of horizontal diversification and maximization of the number of patients treated. By contrast, Protestant hospitals specialize horizontally and focus on vertical differentiation, putting in more sophisticated inputs and producing more complex services.

The results are consistent with the predictions of our model, which supports the differences between Catholic and Protestant values identified in the literature. The findings also support our conjectures about the impact of these values on the governance of nonprofit hospitals affiliated with churches, and the impact of nonprofit governance on their strategic choices in markets.[5] This may be surprising because religious values have been formed over hundreds of years, some hospitals were also founded hundreds of years ago but our data are modern. Finally and most importantly, the findings suggest that different types of nonprofits do exist and that we can distinguish among them by using objective, verifiable criteria.[6] Thereby, we can improve the prediction power of models of nonprofit behavior.

The next section elaborates on our argumentation and gives an account of the literatures on nonprofits and on the differential economic effects of Catholicism and Protestantism. Section 3 studies a simple model of a nonprofit health care provider and derives testable hypotheses from it. Section 4 describes the dataset on German hospitals and the results of our hypotheses testing. Section 5 discusses our main findings, limitations, and contributions. Model proofs are in the appendix.

[5]Thereby, we pick up the call of Levy and Razin (2012:140), who speculate, "A possible direction of future research may be an attempt to link theological differences with governance structure."

[6]Weisbrod (1988:3) already argued: "It is also widely believed that all nonprofits are essentially the same, [...] Nonprofits, however, are varied a lot." This insight, however, has not been picked up by researchers in the way performed in this paper.

2 Nonprofit governance and religion

2.1 Related literature on nonprofits

It is commonly accepted in the academic literature to assume that for-profit firms maximize profits. Clearly, managerial opportunism and other agency problems exist but the general idea is that, at least for publicly held corporations, a governance structure with shareholders supervising managers and the market for corporate control mitigate deviations from profit maximization (Jensen and Ruback, 1983).

This common ground of the literature on for-profits does not exist regarding nonprofit organizations. Given the difficult market for corporate control and the illegality of many incentive schemes for nonprofit managers, nonprofit decision makers have more discretion than managers in other organizational forms (Glaeser, 2003).[7] This underlines the importance of the manager's objectives for strategic decisions in nonprofits.[8] The objectives of appointed managers, in turn, depend on the organization's governance structure because it determines the rules for managerial selection, for instance the requirement to belong to a certain social or religious group.

The subsequent question, what do nonprofits maximize, has been asked many times and received many different answers. Sloan (2000), Horwitz (2007), and Gertler and Kuan (2009) provide recent overviews of the literature.[9] Malani et al. (2003) conclude, "[t]here is no accepted theory of NFP behavior, and little of the empirical work is connected to—let alone compares—existing theories" (181/2). This negative statement is confirmed by Horwitz and Nichols (2007:3) writing, "there is no generally accepted theory of the nonprofit firm". In a meta-study on US hospitals, Eggleston et al. (2008:1345) conclude: "Whether studies find for-profit and government-controlled hospitals to have higher mortality rates or rates

[7] See Gertler and Kuan (2009) for an analysis of nonprofit takeovers. Because of the nondistribution constraint, nonprofit managers cannot be incentivized by stock option plans, for instance.

[8] Horwitz's (2007) empirical findings confirm the importance of decision makers' objectives for nonprofits' strategic decisions.

[9] Malani et al. (2003) cluster the available papers along three strands: altruism models (e.g. Newhouse, 1970; Francois, 2003; Lakdawalla and Philipson, 2006, Castaneda et al., 2007; Ghatak and Mueller 2011), physician cooperative models (e.g. Pauly and Redisch, 1973), and noncontractible quality models (e.g. Hansmann, 1980; Glaeser and Shleifer, 2001; Herbst and Prï¿½fer, 2007; Vlassopoulos, 2009).

of adverse events than their nonprofit counterparts depends on data sources, time period, and region covered. [...] The 'true' effect of ownership appears to depend on institutional context, including differences across regions, markets, and over time."

We argue that the indecisiveness of the theoretical literature and the inconclusiveness of the empirical literature are due to the fact that the definition of a nonprofit organization, focusing on tax privileges and the nondistribution constraint, is too broad to yield consistent testable predictions and measurable results. To understand the behavior of nonprofits better, we have to subdivide the organizations operating under the nonprofit label in smaller, more homogenous groups. Prï¿½fer (2011) discusses such an approach but only studies one subgroup, so-called consumer-dominated nonprofits. However, he also does not connect the theoretically existing organizational form with observable organizational characteristics, which makes it hard to test predictions on the behavior of consumer-dominated nonprofits empirically.

Therefore, the challenge we are facing is to operationalize our theory of nonprofits, which posits that several types of nonprofits exist and which regards the objectives—and hence the identity—of the pivotal decision maker as crucial.[10] To do that we first need to identify an observable characteristic of subgroups of nonprofits, which allows us to infer the objectives of the pivotal owner in each nonprofit subgroup (without claiming that the line of distinction we identify is the only one possible). Based on these objectives, we then have to come up with a model how nonprofits with different pivotal owners behave differently in the market. Finally, we have to test the predictions generated by the model empirically.

To tackle the first task, it is helpful to have a closer look at the time horizon that nonprofit decision makers may have in office. If a nonprofit was founded by an individual, it seems natural that the organization's mission specified by the founder gets less weight in the decision making process after the founder retired or passed away. Instead, the objectives of other stakeholders, for instance donors, consumers, or elite workers, are likely to become more important. The balance of powers within such a nonprofit is likely to fluctuate over time, however, depend-

[10]Levy and Razin (2012:122) underline the link between the objectives of individuals and organizations they are affiliated with by putting forward a model where it is one of two "inseparable consequences" of being affiliated with a religious organization that "participation endows the individual with some religious beliefs".

ing on the wealth of the organization and the outside options of the individual stakeholders.[11] As it is hard to specify at a given point in time who is the pivotal decision maker in a specific nonprofit, it is even harder to hypothesize this or that objective function governing important decisions in such an organization independent of time.

In contrast, if a nonprofit was founded by another organization, in particular a long-lasting one, and is under constant supervision by the parent organization, we may expect that the parent's mission has a persistent impact on the nonprofit's objective function. One example for such long-lasting parent organizations is given by churches. Hansmann et al. (2003:48/9) write: "Like public hospitals, religiously affiliated hospitals have an owner of sorts, [...] the church, that both exercises control over them and stands to benefit from economies achieved in the hospitals' operation."

2.2 On the economic effects of Christian religions

Empirical studies distinguishing between religious and secular nonprofit organizations could identify significant differences in behavior. Hansmann et al. (2003) find that for-profit hospitals are the most responsive to reductions in demand, followed by public and religiously affiliated nonprofit hospitals, while secular nonprofit hospitals are the least responsive of the four ownership types.[12] Gertler and Kuan (2009:296) find that, when entire nonprofits are sold in the US hospital industry, "religious nonprofits discount only to other religious nonprofits while nonreligious nonprofits discount to all nonprofits."[13]

[11] See Glaeser (2003) for a model along these lines.

[12] If we interpret "responsiveness to reductions in demand" as market-orientation, this finding is intuitive. Profit maximizers' behavior is dictated by markets. Public firms and religiously affiliated nonprofits are somewhat cushioned against market conditions by their parent organizations—some governmental or church authority, respectively—as they serve other goals, too; e.g. serving the community/electorate or following the religion's mission. Yet, both public firms and churches benefit from economies achieved in the daughter nonprofit's operation and hence cannot be expected to be completely mission-oriented, disregarding all profits. Finally, secular nonprofits, including many foundations, which often lack a long-lasting organization as founder, should be expected to maximize the objectives of the pivotal owner/individual founder regardless of the profitability of operations.

[13] The authors explain their finding with the significance of decision makers' objectives, where the discount on the price of a nonprofit that a nonprofit buyer, as compared to a for-profit buyer, gets represents the value of the nonprofit's mission.

These studies suggest that one reasonable line of distinction between subsets of nonprofit organizations is along the religious-secular dimension. But we can go further. In particular, given that both Hansmann et al. and Gertler and Kuan treat religious nonprofits as a group, it is hard for them to speculate about *one* objective function for the entire group. If we zoom into the spectrum of religious nonprofits, however, this is possible.[14] Among Christian denominations, Catholic and Protestant doctrines differ in key aspects, which we expect to be reflected in the behavior of nonprofit organizations affiliated with each congregation.[15]

The economic consequences of Christian doctrines have gained great attention since at least Max Weber's "work ethic" hypothesis, that the Protestant Reformation was instrumental in facilitating industrial capitalism—and economic prosperity with it—in Western Europe (Becker and Woessmann, 2009). Recent literature has studied the channels through which differences between the Protestant and Catholic doctrines led to the observed economic differences between regions with this or that dominant denomination. Glaeser and Glendon (1998) model the costs and benefits of the Calvinist belief in predestination and find that under many conditions predestination is a more socially efficient belief system. Van Hoorn and Maseland (2013) report that, in their sample of almost 150,000 individuals from 82 societies, they find strong and robust support for the hypothesis that both individual Protestants and historically Protestant societies appear to value work much more than Catholics and Catholic societies.

Arrunada (2009) confronts the work ethic hypothesis with an alternative "social ethic" hypothesis, according to which Protestant values shape individuals to be more active in mutual social control, more supportive of institutions, less bound to close circles of family and friends, and to hold more homogeneous values. He finds no support for the hypothesis that Catholics work less or less effectively

[14]Rennhoff and Owens (2012) show that churches in their dataset, which covers all Christian churches in two suburban Nashville, Tennessee counties, employ different strategies in the market, which are affected by the decisions of other churches.

[15]Focusing on these two denominations and neglecting other Christian congregations is reasonable in the context of Germany, where our data come from. Baumann (2007) explains: "Due to historical reasons and specific privileges for the main churches, i.e. Protestantism and Roman Catholicism, it certainly is justified to speak of a 'limited pluralismï¿½ in both Germany and Switzerland (Daiber 1995: 172). In numerical terms, in 2003 two thirds of the 82.5 million inhabitants of Germany were members of the two main Christian churches. The second largest group, so to say, was constituted by people with no formal religious adherence, comprising some 26 percent."

than Protestants but identifies that education has a differential impact in both denominations: "[F]or Protestants education complements religion whereas for Catholics education substitutes for religion" (891).[16] This result gives rise to the hypothesis—which we will test with our data below—that the share of decision makers with an affinity to education, educational institutions and to highly sophisticated techniques is lower in Catholic than in Protestant organizations. The differential interaction of education and the two denominations is underlined by Glaeser and Glendon (1998:442), who find in their study of U.S. General Social Survey data "that there is a greater connection between education, which we use as a proxy for worldly success, and church attendance among Protestants, especially Presbyterians, than among Catholics."

Going further, in their test of Weber's work ethic hypothesis Becker and Woessman (2009:581) show that Weber was right in his observation that Protestant regions were economically more affluent than Catholic regions (across countries in 1900 and within Prussia in the second half of the nineteenth century). However, they reject the hypothesis that the higher economic development of Protestant regions was based purely on differential work ethics. Instead, they postulate and test a "human capital theory," according to which an unintended side effect of Martin Luther's 16th century call that everyone be able to read the Bible, Protestants acquired literacy skills that functioned as human capital in the economic sphere. Consequently, "a simple economic model predicts that when optimizing individual utility, in equilibrium Protestants will have more education on average than Catholics because they have lower costs and higher benefits of schooling" (541). Underlining the differential role of education in the Catholic and Protestant congregations, their results provide empirical support for the fact that Protestantism led to a better educated population than Catholicism.

We hold that the results presented above indicate that nonprofits founded and managed by Protestant organizations can be expected to have a higher inclination towards *education* (and therefore to institutions of education) and to the use of modern, more complex technologies than those managed by Catholic

[16]This result is related to Glaeser and Sacerdote (2008), who provide evidence and an explanatory model for the empirical finding that education in the US is positively correlated with church attendance at the individual level but negatively across denominations. This means that the less educated Christian denominations attract more believers to church but that, within each denomination, the more educated believers are more often at church than the less educated ones.

organizations.

On the other hand, in their careful meta-study on nonprofit objectives, Malani et al. (2003:182/3) conclude , "if forced to choose among existing theories, we would select theories which argue that the distinctive behavior of nonprofit firms can be explained by the *altruistic* motives of these firms' principals as most consistent with available evidence" (italics added). The role of altruism and prosocial preferences—especially by workers—in the delivery of social services in nonprofits has been well documented and studied in a series of recent papers.[17] Prosocial motivation of decision makers can lead to the overproduction of services, which may be at odds with efficiency (Francois, 2007).

Lam (2006:179) summarizes research from religious studies: "Although both Catholicism and Protestantism promote altruism and the pursuit of the common good, the value orientation of each religion might favor a different course of action." She contrasts "the individualist emphasis of Protestantism" and "the communal emphasis of Catholicism" and confirms that the "Catholic-Protestant difference in value orientation has been documented in the cross-national research on the support of social welfare" (179). This is in line with Arrunada (2009:908): "Catholic moral standards may increase transaction costs in impersonal trading but also make personal trade easier, [...] With its relatively more homogeneous standards, Protestantism seems, however, better adapted for impersonal trading between anonymous parties."

Summarizing the studies presented above, the following relative impact of Catholicism and Protestantism evolves, which we will use in the theoretical model in the subsequent section: First, both Catholicism and Protestantism value altruistic behavior (*caritas*). Hence, the objective function of health care decision makers of either congregation should increase in patient benefits. Second, whereas Protestantism has an individualist emphasis and, thereby, a Protestant decision maker can be expected to maximize the benefit of an individual patient, the communal emphasis of Catholicism suggests that Catholic decision makers focus on the group benefit of all patients. Third, a Protestant believer obtains high reward from measures of worldly success, such as high education. This suggests that Protestant decision makers will be oriented more towards productive efficiency and attracted by complex procedures and technologies, two economic

[17]See Francois (2003, 2007), Besley and Ghatak (2005), Francois and Vlassopoulos (2008), Delfgaauw et al. (2011), and Dur and Zoutenbier (2011).

and intellectual measures of success. These differences are the key drivers of our theoretical model.

3 The Model and Empirical Hypotheses

3.1 A caring monopolistic provider

Patients are characterized by a severity of illness, $s \in \{1, 2\}$.[18] There is a unit mass of patients at each severity level. Each patient demands one unit of services. Without treatment, a patient gets zero utility. If treated, a patient gets utility $B = B(X(s))$, where $X(s)$ is the level of services received at severity level s and:

$$B(0) = 0, \frac{\partial B(\cdot)}{\partial X(s)} > 0, \frac{\partial^2 B(\cdot)}{\partial^2 X(s)} < 0 \tag{1}$$

Patients are assumed to be fully insured, such that they do not take treatment costs into account when deciding about whether to seek treatment, or not.[19] However, patients bear a travel cost to reach the provider. Hence, the market may not be completely covered. Demand is an increasing function in patient benefits:

$$N = N(B(X(s))); \frac{\partial N(\cdot)}{\partial B} > 0 \tag{2}$$

Because of (1), demand also increases in the level of services provided:

$$N_X \equiv \frac{\partial N}{\partial B}\frac{dB}{dX} > 0 \tag{3}$$

Each patient knows her own type s. The provider learns a patient's type during treatment.

There is one provider offering services to the patients. We assume that the production of a higher intensity of services gets more and more expensive and that a higher severity level increases the marginal treatment cost. To produce service intensity $X(s)$, the provider incurs a per patient cost $C(s, X(s))$, where:[20]

$$C(s, 0) = 0, \frac{\partial C(\cdot)}{\partial X(s)} > 0, \frac{\partial^2 C(\cdot)}{\partial^2 X(s)} \geq 0, C(1, X(s)) < C(2, X(s)) \forall X > 0 \tag{4}$$

[18] The model is inspired by Ellis (1998).

[19] This assumption reflects the situation of nearly all patients in Germany.

[20] In an extension, Section 3.3, we introduce economies of scale.

We assume a fully prospective payment system, where the provider receives a lump sum payment, $R(s)$, from an insurer for each patient that depends upon the patient's diagnosis s at time of discharge but does not depend on the level of services received:[21]

$$R(s=1) < R(s=2) \tag{5}$$

The provider's profit per patient of severity level s is:[22]

$$\pi = R(s) - C(X(s)) \tag{6}$$

We study a one-stage game looking for a unique Nash equilibrium, where the provider announces an intensity of services $X(s)$ for each severity level and demand and payoffs are realized.

Based on the insights from Section 2, we consider a nonprofit provider who cares both about patient benefits and treatment costs. For ease of exposition, we assume that the nondistribution constraint is not binding, such that the provider can actually produce her most preferred service intensity.[23] The nonprofit provider is an organization which is governed by a board, which makes decisions according to some decision making rule. Henceforth, when writing about "the provider", we refer to the pivotal person on the board—the one determined by the decision making rule applied—who de facto decides about the nonprofit's strategy. Let the provider's indirect utility from treating one type-s patient:

$$v(s, X(s)) = B(X(s)) - C(s, X(s)) \tag{7}$$

This implies that the provider has prosocial preferences, as she cares about the patient's benefit, but that she also strives to maximize productive efficiency,

[21]Since 2004 German hospitals have operated under a fully prospective payment system (Simon, 2008). We assume that the provider reports a patient's diagnosis s correctly because insurers could randomly check s after treatment and threaten a provider to revoke the license to treat an insurer's patients in case of revealed misreporting.

[22]Recall that nonprofits can legally make profits—they are just prohibited to distribute these profits to decision makers.

[23]If the nondistribution constraint was binding, the nonprofit decision maker's objectives were less relevant for the decision taken. But as the purpose of this model is to construct empirical hypotheses that differ across objective functions, we focus on the interesting case without a binding nondistribution constraint. There $R(s)$ is sufficiently high to allow the provider to produce her most preferred level of services.

as treatment costs reduce her utility.[24]

A rational provider would never choose $X(s)$ such that $v(\cdot) < 0$. Hence, we restrict our attention to situations where:

$$B(X(s)) \geq C(s, X(s)) \tag{8}$$

Based on the literature review, we assume that provider $j \in \{C, P\}$ maximizes the following objective function:

$$Max_{X(s)} \quad V_j \;=\; \sum_{s=1}^{2} \left[B(X(s)) - C(s, X(s))\right] N^{\rho}(B(X(s))), \tag{9}$$

where $\rho = 1$ if the provider has a Catholic affiliation (C) and $\rho = 0$ if the provider has a Protestant affiliation (P). This implies that, for Protestant nonprofits, $V_P = v(s, X(s))$: the provider cares about the benefit of the *one* patient who is up for treatment. In contrast, a Catholic provider gets reward from maximizing the benefits of *all* patients net of treatment costs, thereby focusing on the community of patients rather than on one individual.

3.2 Analysis

If $\rho = 0$, it follows that $N_X^{\rho} = 0$. Thus, for a Protestant provider, the solution of (9) is:

$$X_P^*(s) = \{X | B_X(X(s)) = C_X(s, X(s))\} \quad \forall s \tag{10}$$

$X_P^*(s)$ corresponds to the individually efficient service intensity, which equalizes the patient's marginal benefits and marginal treatment costs.

If $\rho = 1$, the First-Order Condition (FOC) of (9), for every s, is:

$$[B_X(X(s)) - C_X(s, X(s))]N(B(X(s))) = \\ - [B(X(s)) - C(s, X(s))]N_X(B(X(s))) \tag{11}$$

[24] In the words of Francois and Vlassopoulos (2008), the provider is characterized by "action-oriented" or "impure" altruism because v is an increasing function of the provider's effort, $X(s)$. See Besley and Ghatak (2005) for a related model of action-oriented altruism. These models differ from "pure" or "output-oriented" altruism ï¿½ la Francois (2007), where v would be an increasing function of B even if B was exogenous to the provider.

For a Catholic provider, the equilibrium service intensity $X_C^*(s)$ is determined by (11). By (8), the RHS of (11) is negative. Hence:

$$X_C^*(s) = \{X | B_X(X(s)) < C_X(s, X(s))\} \Rightarrow X_C^*(s) > X_P^*(s) \tag{12}$$

The equilibrium service intensity of a Catholic provider is strictly higher than the one of a Protestant provider. The reason is that the Catholic provider not only equates marginal treatment benefits with marginal treatment costs of one patient. Instead, she partly internalizes that a marginal increase in the service intensity not only benefits one patient but attracts another patient at the margin. Treating the marginal patient, too, yields the Catholic provider additional utility. Therefore, we identify a positive *demand effect* of caring for one's community. Given that the Protestant provider's service intensity satisfies productive efficiency, (12) implies that the Catholic provider overproduces service intensity, thereby decreasing the net treatment benefit per individual patient, $B(X(s)) - C(s, X(s))$.

Combining (2) and (12) produces the following proposition.

Proposition 1 (Equilibrium Demand) *Provider C attracts more patients than provider P:*

$$N_C^*(s) > N_P^*(s) \Rightarrow \sum_{s=1}^{2} N_C^*(s) > \sum_{s=1}^{2} N_P^*(s) \tag{13}$$

As the provider is reimbursed by the insurer via lump-sum payments per patient, which are increasing in the severity level, we obtain Proposition 2.

Proposition 2 (Equilibrium Revenues) *Provider C generates higher revenues than provider P:*

$$R(s)N_C^*(s) > R(s)N_P^*(s) \Rightarrow \sum_{s=1}^{2} R(s)N_C^*(s) > \sum_{s=1}^{2} R(s)N_P^*(s) \tag{14}$$

Intuitively, because she cares for more patients' benefits, a Catholic provider sets a higher service intensity than a Protestant provider. This is appreciated by patients, which increases patient numbers of Catholic providers as compared to Protestant providers and, due to the payment scheme implemented, lets the Catholic provider make more revenues than the Protestant provider.

Now define the average revenue of provider j as:

$$CMI_j \equiv \frac{R(1)N_j^*(s=1) + R(2)N_j^*(s=2)}{N_j^*(s=1) + N_j^*(s=2)}, \tag{15}$$

where CMI stands for *casemix index*, a concept frequently used in health care economics and corresponding to average revenues of a provider.[25] As the average revenues are determined using standardized reimbursement rates, which distinguish among more and less complex treatments, amongst other factors, a higher CMI corresponds to a higher average complexity of treatments. We prove the following proposition in the appendix.

Proposition 3 (Average Revenues) *The average revenue of provider P is larger than the average revenue of provider C:*

$$CMI_P > CMI_C \tag{16}$$

Although the Catholic provider generates higher revenues in total, the average revenues of a Protestant provider are higher. The reason for this result is that the Catholic provider puts relatively more resources into treating low severity patients because there the marginal cost of production is lower than at the high severity level but patients' marginal treatment benefits are equal across severity levels. This drives up total patient numbers and revenues of the Catholic provider but reduces her average severity of treatments and, hence, her average revenues.

3.3 Model extension: diversity vs. specialization in treatments

In the baseline model we assumed no fixed costs of operation; see (4). This was a simplification when considering hospitals. Now let us assume that a variety of m treatment areas exists, across both severity levels, which a hospital can be active in. Offering services in each treatment area comes at a fixed cost $F > 0$, e.g. for special diagnosis equipment or personnel with a specific education. F can differ across treatment areas. Moreover, we assume that the marginal cost of treating another patient, while keeping the service intensity X fixed, is increasing.

In this setting, the number of treatment areas $n \in \{1, ..., m\}$ a hospital is active in can be seen as a measure of horizontal differentiation—as opposed to the positioning in the vertical differentiation dimension measured by $\frac{X(s=2)}{X(s=1)}$. High

[25] See `http://en.wikipedia.org/wiki/Case_mix_index` for a description of the concept of casemix index and its importance in the hospital sector and `http://www.oshpd.ca.gov/HID/Products/PatDischargeData/CaseMixIndex/CMI/ExampleCalculation.pdf` for an application.

n refers to a hospital offering a great variety of treatment areas, whereas low n refers to a relatively specialized hospital.

The adjusted cost structure implies that the average cost (AC) of treating a patient in a certain treatment area decreases for small patient numbers and increases for large patient numbers. The average cost curve has a local minimum, at the Minimum Efficient Scale (MES). Generalizing across all demand and cost functions meeting our assumptions in (1) to (4) and using Proposition 1 yields:

$$prob\{N_C^*(s) < MES\} < prob\{N_P^*(s) < MES\} \tag{17}$$

On the hospitals' revenue side, it is conceivable that the lump sum payment $R(s)$, which is determined by health insurers and/or the government, is set such that a hospital can operate with it on a long-term basis. Hence, for ease of exposition, we assume:[26]

$$R(s) = AC(MES) \tag{18}$$

Rewriting (17) in revenue and cost terms and substituting (18) gives:

$$prob\{AC(N_C^*(s)) > R(s)\} < prob\{AC(N_P^*(s)) > R(s)\} \tag{19}$$

Because providers cannot make losses, $prob\{AC(N_j^*(s)) > R(s)\}$ equals the probability that it is too expensive for provider j to be active in a treatment area. This leads to the following result.

Proposition 4 (Diversity and specialization) *Catholic hospitals serve any treatment area with higher probability than Protestant hospitals.*

This result captures a simple economies of scale effect. Catholic hospitals attract more patients, which, in the light of fixed costs, drives down the average cost of serving one patient in a given treatment area. As the revenue per patient in a treatment area is also fixed, larger hospitals have a higher probability to break even and sustain operations in this treatment area than smaller hospitals. Hence, Catholic hospitals can afford to be active in more treatment areas than Protestant hospitals.

[26]Proposition 4 does not depend on this assumption. It holds for any $F > R(s) \geq AC(MES)$. For $R(s) > F$, both providers serve all treatment areas. For $R(s) < AC(MES)$, no treatment area is served by any provider.

3.4 Empirical hypotheses

The equilibrium values identified in Propositions 1 to 3 are unique. Therefore, it is possible to use them for the construction of empirical hypotheses. We expect to find the following correlations in our data:

H1: *Catholic hospitals should treat more patients than Protestant hospitals (Proposition 1).*

H2: *Catholic hospitals should have higher revenues (or total casemix) than Protestant hospitals (Proposition 2).*

H3: *The average revenue or Casemix Index (CMI) should be higher in Protestant than in Catholic hospitals (Proposition 3).*

Following the discussion on the differential role of education between the Catholic and Protestant religions in section 2, we also expect the following correlation:

H4: *Protestant hospitals should have more links to universities and other academic institutions than Catholic providers.*

Moreover, the higher complexity of services in Protestant hospitals, captured by the higher CMI identified in Proposition 3, has to be produced by appropriately educated personnel. Hence, we construct H5.

H5: *We expect Protestant hospitals to employ (a) more doctors per patient and (b) more specialized doctors per patient than Catholic hospitals.*

Finally, the model extension gives rise to H6.

H6: *We expect Catholic hospitals to be active in more treatment areas than Protestant hospitals (Proposition 4).*

Being equipped with theoretical results, we move on to the empirical part to test the validity of our hypotheses.

4 Data and Empirical Results

4.1 The dataset

In order to test the hypothesis of the model we use a newly constructed dataset covering all German hospitals. In particular, we merge data from the 2006 and 2008 reports published by the German Federal Office for Quality Assurance (*Bundesgeschï¿½ftsstelle fï¿½r Qualitï¿½tssicherung* or *BQS*) and from the

2010 *Krankenhaus-Report* (Klauber, 2010).[27] The BQS currently focuses on measuring quality in hospitals but also publishes hospital-level data on ownership status, links to universities, and number of patients, doctors, specialists, nurses, and beds. It also reports information regarding the number of diagnoses in each ICD-10 category at the 4-digit level. The data are self-reported by the hospitals but are subject to a "structured dialogue" with experts discussing the reported data. The BQS makes the standardized reports in *xml*-format available to interested researchers. One report is published for each hospital, 1939 reports for 2006 and 1922 reports for 2008. We extracted the relevant data using a computer program which exploited the standardized format of the reports to recover the variables of interest. To the best of our knowledge no other researchers have used these data before.[28]

The Krankenhaus-Reports instead include data from the German Federal Statistical Office. We matched 2008 data on casemix index from the Krankenhaus-Report (Klauber, 2010) to the data from the 2006 and 2008 BQS reports, respectively.

While the BQS data provide information on whether the hospital is nonprofit, public, or for-profit, they do not explicitly distinguish between different types of nonprofit hospitals. We thus classified nonprofit hospitals into Protestant, Catholic, and other types of hospitals by looking ourselves at the hospital denomination and affiliation provided in the first section of each BQS report. All Catholic hospitals are a member of the *Caritas* organization (`www.caritas.de/`), all Protestant hospitals are a member of *Diakonisches Werk* (`www.diakonie.de/`).

Table 1 shows that 40 percent of the nonprofit hospitals are Catholic, 23 percent of the hospitals are Protestant, while 37 percent belong to workers organizations, the Red Cross, or other congregations. In this paper, we focus only on Catholic and Protestant hospitals because the other organizations are too heterogeneous to reasonably assume a common objective function.

Table 2 reports summary statistics for this subset of nonprofit hospitals for the variables we use in the empirical analysis in the next section. The variables

[27]The BQS data are officially known as quality reports of the hospitals ("*Qualitï¿½tsberichte der Krankenhï¿½user gemï¿½ï¿½ ï¿½ 137 Abs. 3 Nr. 4 SGB V*"). The complete set of reports, one for each hospital, is available at `www.g-ba.de`.

[28]Filistrucchi and Ozbugday (2012) use this dataset to measure the impact of quality disclosure on quality supply in German hospitals.

Variable	Mean	Std. Dev.	N
catholic	0.398	0.49	1652
protestant	0.236	0.425	1652
other_nonprofit	0.371	0.483	1652

Table 1: Percentage of nonprofit hospitals by type

"protestant" and "catholic" are dummy variables which take value 1 when a hospital is affiliated with *Caritas* or *Diakonisches Werk*, respectively. "Casemix" and "cmi" measure the corresponding variables in the theoretical model. The variables "patients", "doctors", "specialists", "nurses", and "beds" report the number of patients, doctors, specialist doctors, nurses, and beds in each hospital. "State" takes values from 1 to 16 for each of the 16 *Bundesli¿½nder* in Germany. The variable "different_diagnosis" reports the number of different diagnoses treated in a hospital at the 4-digit level according to the 10th revision of the International Statistical Classification of Diseases and Related Health Problems (ICD-10 classification). Finally, "academic" is a dummy variable which takes value 1 when the hospital is a teaching hospital or is linked to a university.

Variable	Mean	Std. Dev.	N
protestant	0.375	0.484	1039
catholic	0.632	0.482	1039
cmi	0.962	0.219	803
casemix	23982.786	19520.096	735
patients	23622.21	19450.657	921
different_diagnosis	252.693	189.495	985
beds	249.061	166.847	1024
doctors	47.526	40.337	991
specialists	25.533	21.997	992
nurses	155.309	113.214	516
academic	0.285	0.452	1039

Table 2: Summary statistics

4.2 Empirical strategy

We now test the six hypotheses stemming from the theoretical model and proceed in order from H1 to H6. Since the hypotheses put forward by the model refer to differences between Protestant and Catholic hospitals in the means of the variables of interest, our empirical strategy is a simple one: we run a linear regression of the variable of interest on a dummy variable which takes value 1 if the hospital has a Protestant affiliation, controlling for year specific fixed effects when data on more than one year are available and, where necessary, controlling for additional relevant factors. We thus run a series of linear regressions of the form:

$$X_{it} = \alpha + \lambda \text{PROTESTANT}_i + \gamma \text{YEAR2008}_t + \delta Z_{it} + \varepsilon_{it}, \tag{20}$$

where X_{it} is the variable of interest for hospital i in year t, *YEAR2008* is a dummy variable equal to 1 if the observed data is for 2008, Z_{it} is one or more control variables and ε_{it} is a normally distributed unobserved error term. A positive and significant λ implies that the mean of the variable of interest is higher for Protestant nonprofit hospitals than for Catholic nonprofit hospitals. Vice versa, a negative and significant λ implies that the mean of the variable of interest is lower for Protestant nonprofit hospitals than for Catholic nonprofit hospitals. Finally, we also estimate a fixed effects specification:

$$X_{it} = \alpha + \varphi_s + \lambda \text{PROTESTANT}_i + \gamma \text{YEAR2008}_t + \delta Z_{it} + \varepsilon_{it}, \tag{21}$$

where φ_s are state (*Bundesland*) fixed effects. This specification allows to control for differences across states, which might affect the difference in the variable of interest among Catholic and Protestant nonprofit hospitals. In other words, in the latter specification, we estimate λ from within state differences in the variable of interest. λ hence measures the average of the within-state differences in the variables of interest between the two types of religious hospitals.

4.3 Estimation results

Table 3 tests H1 and shows results of regressions of patients on a hospital's religious affiliation. The first column presents results of an Ordinary Least Squares (OLS) estimate without controls. It shows that on average Protestant nonprofit hospitals have a significantly lower number of patients than Catholic ones, as

predicted by the model. One may wonder whether the difference in the mean number of patients is driven by differences among states rather than among hospitals. Indeed, some states are mainly Protestant, others are mainly Catholic. Then the Protestant variable in the specification of column one could pick up differences between Catholic and Protestant states rather than between Catholic and Protestant hospitals.

The second column reports results of a Least Squares Dummy Variable (LSDV) estimator using state fixed effects. Here the effect of the religious affiliation is estimated using within state variations. Albeit lower, the mean number of patients in Protestant hospitals is still negative and significant. Another confounding factor could be that Protestant patients go to Protestant hospitals and Catholic patients go to Catholic hospitals. If so, the number of patients in Protestant hospitals should be lower the higher the number of Catholics relative to Protestants. Moreover, the difference in the number of patients between Catholic and Protestant hospitals could depend on the share of religious people in the population. The third and fourth column show OLS estimates of the mean number of patients, which include interaction terms of the Protestant dummy with the percentage of religious people in a state (PROT_PERCREL) and the ratio of Catholics to Protestants (PROT_RATIOCATPROT) in the state where the hospital is located. They both confirm that Protestant hospitals have fewer patients, as postulated in H1.

Table 4 tests H2 and shows results of regressions of casemix on a hospital's religious affiliation. Column one presents results of an OLS estimate without controls: on average Protestant nonprofit hospitals have a lower total casemix than Catholic ones, as predicted by the model, but this difference is not statistically significant. This finding is confirmed when using a LSDV specification with state dummy variables (column two). The difference is also estimated to be insignificant when allowing the difference in the mean casemix to change depending on the ratio of Catholics to Protestants in the state where the hospital is located (column three). Notably, it is estimated to be negative and significant, as predicted by H2, when allowing for both the percentage of religious people and the ratio of Catholics to Protestants in the state of the hospital to affect the difference in mean casemix between Catholic and Protestant hospitals (column four).

These results indicate that a higher percentage of religious people in the state (PROT_PERCREL) increases the casemix of Protestant hospitals relative

VARIABLES	(1) patients	(2) patients	(3) patients	(4) patients
protestant	-4,058***	-2,614*	-4,449**	-9,277***
	(1,329)	(1,439)	(1,823)	(2,860)
yd2008	2,046	2,164*	2,044	2,074
	(1,275)	(1,267)	(1,276)	(1,273)
prot_percrel				16,922**
				(7,733)
prot_ratiocatprot			420.9	-3,591
			(1,341)	(2,270)
Constant	24,057***	23,480***	24,057***	24,042***
	(1,019)	(1,030)	(1,020)	(1,017)
Observations	921	921	921	921
R-squared	0.013	0.007	0.013	0.018
Number of state		16		

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 3: Testing H1: Regression of number of patients on religion

VARIABLES	(1) casemix	(2) casemix	(3) casemix	(4) casemix
protestant	-1,893	-1,329	-2,438	-9,291**
	(1,900)	(2,067)	(2,660)	(4,050)
prot_percrel				27,285**
				(12,211)
prot_ratiocatprot			576.4	-6,586*
			(1,965)	(3,754)
Constant	23,567***	23,367***	23,567***	23,567***
	(1,131)	(1,169)	(1,132)	(1,126)
Observations	367	367	367	367
R-squared	0.003	0.001	0.003	0.016
Number of state		16		

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 4: Testing H2: Regression of total casemix on religion

to Catholic ones while a higher ratio of Catholics relative to Protestants in the state (PROT_RATIOCATPROT) decreases it. Overall, results in Table 4 provide weak evidence in favor of the hypothesis that Protestant hospitals have a lower casemix than Catholic ones, as postulated by H2.

In the fourth columns of Table 3 and Table 4, results show that the difference between Catholic and Protestant hospitals, keeping fixed the ratio of Catholic to Protestant believers, declines the higher the number of religious people: the sign of the interaction term PROT_PERCREL is the opposite of that of the PROTESTANT dummy in both tables. A possible explanation is that, when religiousness is a more conscious choice—as it may be in a state where less religious people live—the intensity of beliefs of those who choose to reveal their religiousness may be higher than in states where the default is to be religious. This may strengthen the role of religious values for the decisions made by people in less religious states.

Results in Table 5 report, consistently across specifications, that the casemix index is on average significantly higher for Protestant hospitals. Columns two to four show that the finding is robust to the inclusion of state fixed effects and to controlling for the ratio of Catholics to Protestants and the percentage of religious people in the state where the hospital is located. A higher CMI indicates that the average treatment of patients is more complex. H3 is confirmed.

Turning to the role of education and to the links of hospitals to institutions of higher education, we find that significantly more Protestant hospitals have an academic affiliation compared to Catholic hospitals. This finding confirms H4 and is robust to the different specifications reported in Table 6. It is also confirmed when using a logit specification (not reported in the paper).

Hypotheses H5a and H5b are also confirmed by the estimation results. Tables 7 and 8, respectively, show that the number of doctors per patient and the number of specialized doctors per patient are significantly higher in Protestant than in Catholic hospitals. A higher number of Catholics with respect to Protestants in the state of the hospital reduces this difference but does not reverse it.

Finally, Table 9 shows that, as postulated by H6, Catholic hospitals treat on average significantly more types of diagnoses, classified at the ICD-10 category 4-digit level (DIFFERENT_DIAGNOSIS). Moreover, as shown in the last three columns and consistent with the theoretical model, this is due to the higher number of patients in Catholic hospitals than in Protestant ones.

VARIABLES	(1) cmi	(2) cmi	(3) cmi	(4) cmi
protestant	0.0915***	0.0713***	0.137***	0.123**
	(0.0225)	(0.0241)	(0.0314)	(0.0483)
prot_percrel				0.0531
				(0.142)
prot_ratiocatprot			-0.0478**	-0.0617
			(0.0233)	(0.0440)
Constant	0.929***	0.937***	0.929***	0.929***
	(0.0134)	(0.0137)	(0.0134)	(0.0134)
Observations	401	401	401	401
R-squared	0.040	0.022	0.050	0.050
Number of state		16		

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 5: Testing H3: Regression of CMI on religion

VARIABLES	(1) academic	(2) academic	(3) academic	(4) academic
protestant	0.114***	0.0622**	0.149***	0.144**
	(0.0287)	(0.0303)	(0.0398)	(0.0635)
prot_ratiocatprot			-0.0371	-0.0405
			(0.0298)	(0.0482)
prot_percrel				0.0147
				(0.162)
yd2008	0.00201	0.00177	0.00215	0.00215
	(0.0278)	(0.0268)	(0.0278)	(0.0278)
Constant	0.241***	0.261***	0.241***	0.241***
	(0.0225)	(0.0221)	(0.0225)	(0.0225)
Observations	1,039	1,039	1,039	1,039
R-squared	0.015	0.004	0.017	0.017
Number of state		16		

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 6: Testing H4: Regression of academics on religion

VARIABLES	(1) docperpat	(2) docperpat	(3) docperpat	(4) docperpat
protestant	4.907***	2.817**	8.529***	8.912***
	(1.099)	(1.183)	(1.511)	(2.361)
prot_ratiocatprot			-3.938***	-3.610*
			(1.135)	(1.922)
prot_percrel				-1.351
				(6.395)
yd2008	-1.978*	-1.836*	-1.937*	-1.941*
	(1.053)	(1.039)	(1.046)	(1.047)
Constant	24.97***	25.64***	24.95***	24.95***
	(0.839)	(0.842)	(0.834)	(0.835)
Observations	893	893	893	893
R-squared	0.026	0.010	0.039	0.039
Number of state		16		

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 7: Testing H5a: Regression of doctors per patient on religion

VARIABLES	(1) specperpat	(2) specperpat	(3) specperpat	(4) specperpat
protestant	3.292***	2.127***	5.178***	5.701***
	(0.632)	(0.681)	(0.868)	(1.357)
prot_ratiocatprot			-2.055***	-1.607
			(0.653)	(1.107)
prot_percrel				-1.847
				(3.681)
yd2008	-1.326**	-1.238**	-1.302**	-1.307**
	(0.605)	(0.598)	(0.603)	(0.603)
Constant	13.32***	13.69***	13.31***	13.31***
	(0.482)	(0.484)	(0.480)	(0.480)
Observations	894	894	894	894
R-squared	0.035	0.016	0.045	0.046
Number of state		16		

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 8: Testing H5b: Regression of specialists per patient on religion

	(1)	(2)	(3)	(4)
VARIABLES	different_diagnosis	different_diagnosis	different_diagnosis	different_diagnosis
protestant	-30.64**	-31.90**	6.298	-4.364
	(12.55)	(13.48)	(8.074)	(8.654)
yd2008	12.00	11.98	-6.675	-6.338
	(12.05)	(11.90)	(7.673)	(7.612)
patients			0.00761***	0.00757***
			(0.000198)	(0.000199)
Constant	257.7***	258.1***	86.80***	91.14***
	(9.644)	(9.711)	(7.795)	(7.795)
Observations	985	985	883	883
R-squared	0.007	0.007	0.628	0.628
Number of state		16		16

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 9: Testing H6: Regression of number of different diagnoses on religion

5 Conclusion

To tackle the difficulties of the empirical and theoretical literatures on nonprofit organizations in predicting nonprofits' behavior in the market, we have posited that the generally accepted definition of nonprofits is too broad. Instead we have conjectured that several types of nonprofits exist, which depend on nonprofits' governance structures, which are distinguishable according to observable organizational characteristics, and which employ different strategies, thereby producing different economic outcomes.

When looking at the organizational characteristics of nonprofit hospitals in Germany, we found that at least three subgroups exist: those in Catholic ownership, those in Protestant ownership, and those affiliated to a bundle of heterogeneous owners. Due to the relatively high degree of homogeneity of Catholic theology and Protestant theology, respectively, in Germany as compared to other countries, it was possible to apply a key insight from the literature on the comparative economic effects of these two denominations: both Catholicism and Protestantism value prosocial behavior. However, while Protestantism has an individualist emphasis, Catholicism has a communal emphasis.

We used this distinction as the only differentiating assumption between Catholic and Protestant providers in a simple model of a health care market. This model generated predictions about the differences in patient numbers, total revenues, average revenues, links to academic institutions, use of highly skilled labor, and diversity of treatment areas.

Testing the hypotheses on a dataset covering all German hospitals for the years 2006 and 2008, we found that the empirical patterns confirm the market behavior of Catholic and Protestant nonprofit hospitals predicted by the model.

These results highlight several contributions of our paper. First, Catholic hospitals in Germany follow a strategy of horizontal diversification and maximization of the number of patients treated. By contrast, Protestant hospitals specialize in fewer treatment areas horizontally and focus more on vertical differentiation by producing more complex services on average, which they generate with more specialized labor (doctors and specialized doctors per patient). They also have more links to universities and other institutions of higher education.

Second, these findings suggest that religious values that have been shaped over hundreds of years influence the objectives of decision makers affiliated with the respective congregations today in significant ways. This insight calls for more

research on the long-lasting effects of religious and other values on the objectives of economic subjects and how these values can be shaped by organizations.

Most importantly, our findings suggest that different types of nonprofits exist and that we can distinguish among them by using observable criteria. The caveat applicable here is that the dependence of these results on the institutional context mentioned by Eggleston et al. (2008), which we report on in Section 2, cannot be fully refuted. Our study has used data from today's Germany, and it is the task of future research to verify whether similar results differentiating among nonprofit types can be found in other contexts, too.

Nevertheless, the inputs and outputs of all methodologies used in this paper fit well together: the literature review on the economic effects of Catholic and Protestant values in Section 2 generated assumptions used in our theoretical model in Section 3, which generated hypotheses on nonprofits' market behavior that were confirmed by the econometric estimations in Section 4. Closing the circle, the empirical results reinforce the differences between Catholic and Protestant values identified in the literature (Section 2).

Therefore, we argue that it is insufficient to treat nonprofits as one unified group of organizations, which are only contrasted with for-profit and public organizations. Instead, nonprofits should be subdivided in smaller groups, where the heterogeneity within the groups is limited, and we therefore have more reason to assume homogeneous objective functions when studying their behavior. This serves as a basis for a theory of nonprofit organizations that can explain and predict nonprofit behavior better than previous theories.

Our results imply for future studies of the market behavior of nonprofit organizations that they should distinguish between different nonprofit types, depending on observable organizational characteristics found in the market at study. For policy makers, law makers, and antitrust authorities, it implies that rules and regulations should take the heterogeneity of governance and ownership structures of nonprofits into account.

References

Arrunada, B. 2009. "Protestants and Catholics: Similar Work Ethic, Different Social Ethic," *Economic Journal,* 120, 890-918.

Baumann, M. 2007. "Researching Religious Diversity in Western Europe: The Study of Diaspora Communities, Religious Conflict, and Public Domain in Germany and Switzerland", in: K.S. Nathan (ed.), *Religious Pluralism in Democratic Societies: Challenges and Prospects for Southeast Asia, Europe and the United States in the New Millennium*, Singapore, Kuala Lumpur: K. Adenauer Stiftung, Malaysian Ass. for American Studies, 139-157.

Becker, S.O. and L. Woessmann. 2009. "Was Weber Wrong? A Human Capital Theory of Protestant Economic History," *Quarterly Journal of Economics,* 531-596.

Besley, T. and M. Ghatak. 2005. "Competition and Incentives with Motivated Agents," *American Economic Review,* 95(3), 616-636.

Castaneda, M.A., Garen, J. and J. Thornton. 2007. "Competition, Contractibility, and the Market for Donors to Nonprofits," *Journal of Law, Economics, & Organization*, 24(1), 215-246.

Delfgaauw, J., Dur, R., Propper, C. and S. Smith. 2011. "Management Practices: Are Not For Profits Different?," *Tinbergen Institute Discussion Paper* TI 2011-094/1.

Dur, R. and R. Zoutenbier. 2011. "Working for a Good Cause," *Tinbergen Institute Discussion Paper* TI 2011-168/1.

Eggleston, K., Shen, Y.-C, Lau, J., Schmid, C.H., and J. Chan. 2008. "Hospital Ownership and Quality of Care: What Explains the Different Results in the Literature?," *Health Economics,* 17, 1345-62.

Ellis, R.P. 1998. "Creaming, skimping and dumping: provider competition on the intensive and extensive margins," *Journal of Health Economics,* 17, 537-555.

Filistrucchi, L. and F.C. Ozbugday. 2012. "Mandatory Quality Disclosure and Quality Supply: Evidence from German Hospitals." TILEC Discussion Paper 2012-031, Tilburg University.

Francois, P. 2003. "Not-For-Profit Provision of Public Services," *The Economic Journal*, 113, C53-C61.

Francois, P. 2007. "Making a difference," *RAND Journal of Economics,* 38(3), 714-732.

Francois, P. and M. Vlassopolous. 2008. "Prosocial Motivation and Delivery of Social Services," *CESifo Economic Studies,* 54 (1), 22-54.

Gertler, P. and J. Kuan. 2009. "Does It Matter Who Your Buyer Is? The Role of Nonprofit Mission in the Market for Corporate Control of Hospitals," *Journal of Law and Economics*, 52, 295-306.

Ghatak, M. and H. Mueller. 2011. "Thanks for nothing? Not-for-profits and motivated agents," *Journal of Public Economics,* 95, 94-05.

Glaeser, E.L. 2003. "Introduction," in: E.L. Glaeser (ed.), *The Governance of Not-for-Profit Organizations*, University of Chicago Press.

Glaeser, E.L. and S. Glendon. 1998. "Incentives, Predestination and Free Will," *Economic Inquiry,* 36, 429-443.

Glaeser, E.L. and A. Shleifer. 2001. "Not-For-Profits Entrepreneurs," *Journal of Public Economics*, 81, 99-115.

Glaeser, E.L. and B.I. Sacerdote. 2008. "Education and Religion," *Journal of Human Capital,* 2, 188-215.

Grossman, S.J. and O. Hart. 1986. "The costs and benefits of ownership: A theory of vertical and lateral integration," *Journal of Political Economy,* 94, 235-259.

Hansmann, H. 1980. "The Role of Nonprofit Enterprise," *The Yale Law Journal,* 89(5), 835-901.

Hansmann, H. 1996. *The Ownership of Enterprise*, Belknap/Harvard University Press, Cambridge, MA.

Hansmann, H., Kessler, D. and M. McClellan. 2003. "Ownership Form and Trapped Capital in the Hospital Industry," in: E.L. Glaeser (ed.), *The Governance of Not-for-Profit Organizations*, University of Chicago Press.

Hart, O. and J. Moore. 1990. "Property rights and the nature of the firm," *Journal of Political Economy,* 98, 1119-1158.

Herbst, P. and J. Prï¿½fer. 2007. "Firms, Nonprofits, and Cooperatives: A Theory of Organizational Choice," *CentER Discussion Paper*, No. 2007-07; Tilburg University.

Horwitz, J. 2007. "Does Nonprofit Ownership Matter?," *Yale Journal on Regulation*, 24(1), 139-204.

Horwitz, J. and A. Nichols. 2007. "What Do Nonprofits Maximize? Nonprofit Hospital Service Provision And Market Ownership Mix," *NBER Working Paper*, 13246.

Jensen, M.C. and R.S. Ruback. 1983. "The Market for Corporate Control," *Journal of Financial Economics*, 11: 5-50.

Klauber, J. 2009. *Krankenhaus-Report 2010.* Schattauer Verlag: Stuttgart.

Lakdawalla, D. and T. Philipson. 2006. "The Nonprofit Sector and Industry Performance," *Journal of Public Economics*, 90, 1681-1698.

Lam, Pui-Yan. 2006. "Religion and Civic Culture: A Cross-National Study of Voluntary Association Membership," *Journal for the Scientific Study of Religion*, 45(2), 177-193.

Levy, G. and R. Razin. 2012. "Religious Beliefs, Religious Participation, and Cooperation," *American Economic Journal: Microeconomics,* 4(3): 121-151.

Malani, A., Philipson, T. and G. David. 2003. "Theories of Firm Behavior in the Nonprofit Sector: A Synthesis and Empirical Evaluation," in: E.L. Glaeser (ed.), *The Governance of Not-for-Profit Organizations*, University of Chicago Press.

Newhouse, J.P. 1970. "Toward a Theory of Nonprofit Institutions: an Economic Model of a Hospital," *American Economic Review*, 60, 64-74.

Pauly, M.V. and M. Redisch. 1973. "The Not-For-Profit Hospital as a Physicians' Cooperative," *American Economic Review,* 63(1), 87-99.

Prï¿½fer, J. 2011. "Competition and Mergers among Nonprofits," *Journal of Competition Law & Economics*, 7(1), 69-92.

Rennhoff, A.D. and M.F. Owens. 2012. "Competition and the Strategic Choices of Churches," *American Economic Journal: Microeconomics,* 4(3): 152-170.

Sloan, F.A. 2000. "Not-for-profit ownership and hospital behavior," in: A.J. Culyer & J.P. Newhouse (ed.), *Handbook of Health Economics*: 1141-1174.

Simon, M. 2008. *Das Gesundheitssystem in Deutschland. Eine Einfï¿½hrung in Struktur und Funktionsweise.* 2nd ed. Verlag Huber: Bern.

van Hoorn, A. and R. Maseland. 2013. "Does a Protestant work ethic exist? Evidence from the well-being effect of unemployment," *Journal of Economic Behavior and Organization*, `http://dx.doi.org/10.1016/j.jebo.2013.03.038`.

Vlassopoulos, M. 2009. "Quality, Reputation and the Choice of Organizational Form," *Journal of Economic Behavior and Organization,* 71, 515-527.

Weisbrod, B.A. 1988. *The Nonprofit Economy.* Harvard University Press: Cambridge, MA.

A Appendix

A.1 Proof of Proposition 3

First, we have to establish how the equilibrium service intensity, $X^*(s)$, and the difference in service intensities between providers, $X_C^*(s) - X_P^*(s)$, change across severity levels.

According to (4), $C(X(s=1)) < C(X(s=2)) \forall X > 0$ but, according to (1), $B(X(s=1)) = B(X(s=2))$. Applying these relations to (11), c.p. the RHS is less negative for $s=2$ than for $s=1$. Additionally, because $C(X(s=1)) < C(X(s=2))$, the LHS is more negative for $s=2$ than for $s=1$. Hence, when moving from $s=1$ to $s=2$, any provider reduces $X^*(s)$:

$$X^*(s=1) > X^*(s=2) \tag{A.1}$$

Define $\Delta X^*(s) \equiv X_C^*(s) - X_P^*(s)$. It follows from (12) that $\Delta X^*(s) > 0$.

What is the impact of changing severity s on $\Delta X^*(s)$? A Protestant provider, after a change from $s=1$ to $s=2$, reduces $X(s)$ by the amount dictated by the different slopes of the cost functions, $C_X(s=1, X(s=1))$ and $C_X(s=2, X(s=2))$, according to (10). A Catholic Provider does the same, according to (11), but additionally reduces $X(s)$ because the demand effect of caring for one's community, captured by $\frac{N(B(X(s)))}{N_X(B(X(s)))}$, is less pronounced for the smaller set of $(s=2)$-patients than for the $(s=1)$-patients the provider will treat, due to $C(X(s=1)) < C(X(s=2))$:

$$X_C^*(s=1) - X_C^*(s=2) > X_P^*(s=1) - X_P^*(s=2) \tag{A.2}$$

$$\Leftrightarrow \quad \Delta X^*(s=1) > \Delta X^*(s=2) \tag{A.3}$$

Now we have to show how this affects average revenues. (A.3) implies:

$$\frac{X_C^*(s=1)}{X_C^*(s=2)} > \frac{X_P^*(s=1)}{X_P^*(s=2)} \tag{A.4}$$

Because of (1) and (2), (A.4) translates into:

$$\frac{N_C^*(s=1)}{N_C^*(s=2)} > \frac{N_P^*(s=1)}{N_P^*(s=2)} \tag{A.5}$$

Substituting (15) in (16) and rearranging gives:

$$R(1)\left(\frac{N_P^*(s=1)}{N_P^*(s=1)+N_P^*(s=2)} - \frac{N_C^*(s=1)}{N_C^*(s=1)+N_C^*(s=2)}\right) > R(2)\left(\frac{N_C^*(s=2)}{N_C^*(s=1)+N_C^*(s=2)} - \frac{N_P^*(s=2)}{N_P^*(s=1)+N_P^*(s=2)}\right) \tag{A.6}$$

Multiplying both sides by $(N_C^*(s=1)+N_C^*(s=2))(N_P^*(s=1)+N_P^*(s=2))$ and canceling yields:

$$R(1)\left(N_P^*(s=1)N_C^*(s=2)-N_C^*(s=1)N_P^*(s=2)\right) > R(2)\left(N_P^*(s=1)N_C^*(s=2)-N_C^*(s=1)N_P^*(s=2)\right) \quad \text{(A.7)}$$

After rearranging and using that $R(1) < R(2)$, by definition, we obtain

$$\frac{N_C^*(s=1)}{N_C^*(s=2)} > \frac{N_P^*(s=1)}{N_P^*(s=2)}, \quad \text{(A.8)}$$

which is identical to (A.5). *Q.E.D.*