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Faithful Strategies: How Religion Shapes Nonprofit Management

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Abstract

This paper studies the strategies employed by Catholic and Protestant nonprofit hospitals in Germany and traces them back to the theological foundations of those religions, which shape managers' values. We find that Catholic nonprofit hospitals follow a strategy of horizontal diversification and maximization of the number of patients treated. By contrast, Protestant hospitals pursue a strategy of horizontal specialization 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.

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

Keywords: religious values; managers' values; nonprofits; religious organizations; Catholicism and Protestantism

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1 Introduction

What role do the values and beliefs of top managers play for the choices and performances of their firms? Is it possible to predict organizations' strategic decisions using the religious faith of their managers? Upper echelons theory (Hambrick and Mason, 1984) argues that the individual characteristics of managers influence their perceptions of certain situations and, thereby, shape optimal strategies, from the individual's perspective. This translates into observable actions of their firms.

The theoretical focus of upper echelons theory and most of its empirical tests have been directed at profit-maximizing publicly-traded firms (Finkelstein, Hambrick, and Canella, 2009). The nonprofit sector, however, accounting for 5.5 percent of GDP and 9.2 percent of all wages and salaries paid in the United States (The Nonprofit Almanac, 2012), is understudied by behavioral strategic management scholars - despite its economic and social importance and despite the long tradition of strategic management scholarship on nonprofits (Hatten, 1982).

The scarcity of research combining upper echelons theory and the nonprofit sector is striking because the governance structures in most nonprofit organizations allow managers more discretion than in for-profit firms: although supervision is not completely absent, there are no shareholders with high-powered incentives monitoring them and restricting their strategic choices (Glaeser, 2003). Simultaneously, nonprofit organizations operate under a nondistribution constraint. While tax privileges give nonprofits a financial advantage over competing for-profits, the nondistribution constraint makes it unlawful that managers or other decision makers appropriate the profits generated by this advantage (Hansmann, 1980).

Consequently, on the one side, profit-maximization is no reasonable goal for nonprofit managers, on the other side, they may have more leeway than the managers of publicly-traded firms to implement strategies that are in line with their personal values: an ideal environment for testing the link between managers' beliefs and their organizations' strategies.

But what beliefs? Chin, Hambrick, and Treviño (2013) study how the political ideologies, especially their stance on the conservatism-liberalism di-

mension, influence managers' actions. Going one step further, Schneider and De Meyer (1991) point at the significance of national cultures for managers' perceptions and attitudes. One of the most fundamental dimensions of culture, which has been found to shape organizational attributes, is religion (see Boone et al., 2012). As early as 1970, the significance of "The Religious Manager" was realized in management scholarship (Senger, 1970). Related, Marquis and Lee (2013) point at the ramifications of senior managers' characteristics for corporate philanthropic contributions and Horwitz (2007) reports on evidence for managerial altruism in their strategic decisions - two dimensions associated with religious values.

In this paper, we develop and test the idea that the personal values of the managers of religious nonprofit organizations, as borne in the specific religious faith a nonprofit organization is affiliated with, will influence their firms' strategies in the market. Thereby we contribute both to the behavioral strategy literature and to the understanding of nonprofit organizations and of the importance of religious values for strategic managerial decision making.

Chin, Hambrick, and Treviño (2013) point at the necessity to identify centrally important value dimensions and corresponding measures, when studying the impact of managers' values on strategy. But how can we measure unobservable managerial values, and what is our theory of how those values affect managerial strategic decision making?

We take an indirect approach and tackle these issues by developing a novel methodology: We first review the literature on the economic effects of religious values - specifically: Catholicism and Protestantism - and identify three important theological cornerstones of those faiths. Catholicism and Protestantism lend itself to such an exercise because our data refer to Germany where, in contrast to many other countries such as the United States, both the Protestant and the Catholic theologies are relatively homogenous. Second, to translate the theological foundations of Catholicism and Protestantism into testable hypotheses regarding the strategic decision making of religiously affiliated organizations, we construct a mathematical model of a market with nonprofit providers, where the only difference between a "Catholic provider" and a "Protestant provider" stems from the different religious values identified in step one. We chose to

model a health care market because the health care sector is the economically most important industry with significant market shares of nonprofits (Hansmann, 1980, 1996; Sloan, 2000). Third, we test the hypotheses generated by our model with a novel dataset covering all German hospitals for the years 2006 and 2008 and including both input and output indicators for various clinical areas and information on organizational form. Closing the circle, we take the empirical results back to the literature on Catholic and Protestant values, where we find them well reflected.

The starting point of our research are key insights from the literature on the economic effects of Catholicism and Protestantism, which feed into our mathematical model: First, both Catholic and Protestant managers in nonprofits get spiritual rewards from altruistic behavior and hence, in a health care context, will maximize patient benefits (lat. *caritas*). Second, Protestantism has an individualist emphasis. Therefore, we assume Protestant managers to maximize the benefit of an individual patient who is up for treatment. In contrast, Catholicism has a communal emphasis, which suggests that Catholic managers focus on the group benefit of the community of all patients. Third, a Protestant believer obtains relatively high rewards from observable measures of worldly success. This indicates 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.

Based on these inputs, our mathematical model predicts different strategies for Catholic and Protestant managers: a Catholic provider will choose to serve relatively more patients and make higher total revenues but a Protestant provider will make higher average revenues per patient and treat relatively more complex cases. The model also produces testable hypotheses on providers' choice of diversification vs. specialization.

We then test the hypotheses generated with the data on German hospitals. All Catholic hospitals in our dataset are members of the *Caritas* organization, all Protestant hospitals are members of *Diakonisches Werk*, the two leading religious welfare associations in Germany. Serving as the manager of a religious hospital requires to have the hospital's faith. 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 areas 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 as well as more specialist doctors per patient than Catholic hospitals to produce their services.

These results suggest that Catholic nonprofit hospitals, steered by Catholic managers, follow a strategy of horizontal diversification and maximization of the number of patients treated. By contrast, Protestant hospitals pursue a strategy of horizontal specialization 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 support upper echelons theory, specifically the idea that managers have individual background characteristics that influence their strategic decisions. One contribution of our paper is the addition of religious values to the set of previously studied values, including political attitudes (Chin, Hambrick, and Treviño, 2013) and national cultures (Schneider and De Meyer, 1991). Our findings may be surprising because Europe has experienced a long period of secularization, at least since the 1950s, and the impact of religious values is mostly ignored publicly.

We also contribute to the development of research methodology by proposing an "interlinked research method" to tackle the problem that managerial values are not directly observable. This interlinked method comprises the application of three different methods - filtering relevant theological values from the literature on the economic effects of Catholicism and Protestantism, mathematical modeling, and econometric estimations. The output of each step is used as input into the next one, in a circular way. Only if the inputs into the model coming from the literature filtering produce hypotheses that are confirmed empirically, this research method regards the results as being robust.

In our case, the literature filtering generates insights on the differential attitudes of Catholicism and Protestantism regarding believers' altruism and

regarding the focus of that altruism (individual vs. communal). These insights are used to motivate assumptions in the mathematical model, which produces testable hypotheses regarding strategic outcomes such as patient numbers, total and average revenues, and numbers of specialization areas of religious nonprofit hospitals. The hypotheses are confirmed empirically. Additionally, our econometric study confirms hypotheses about the impact of education and complex technologies in Catholic and Protestant hospitals, which are constructed directly from the theological literature. Thereby, we seek to address the problem that managerial values are unobservable directly, as mentioned by Godfrey and Hill (1995) and Chin, Hambrick, and Treviño (2013), in an indirect way.

Finally, our findings contribute to the discussions among organizational scholars what goals nonprofits pursue, where nonprofit managers have both more discretion than managers of publicly listed firms and the for-profit motive is ruled out legally. The simple answer is: it depends on the managers' values, which are shaped by their religious beliefs. As values depend on culture, and religion is a key determinant of culture, the faith of managers influences the strategic actions of their firms.

The next section elaborates on our argumentation and gives an account of the literatures on managerial values, 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 econometric study. Section 5 discusses our main findings, limitations, and contributions. Model proofs are in the appendix.

2 Managerial values, faith, and nonprofits

2.1 Managers and nonprofits

In the economics literature, it is commonly accepted to assume that for-profit firms maximize profits, and nothing else. The story goes that managerial opportunism and other agency problems exist but that, at least for publicly-held corporations, a governance structure with shareholders supervising managers and the market for corporate control mitigate deviations from profit maximiza-

tion (Jensen and Ruback, 1983).

In strategic management, Hambrick and Mason (1984) went a step further towards formulating realistic assumptions of managerial behavior and introduced the notion that even managers of publicly-traded corporations make choices through highly individualized lenses that are formed by the managers' experiences, personalities, and values - the famous upper echelons perspective. Consequently, even if the legal and economic corset of managers in public corporations were as tight as taken for granted by economists, it would be conceivable to assume that those experiences, personalities, and values are reflected by the firm's decisions, which are taken under uncertainty and hence require the managers to make individual judgements based on incomplete information. Therefore, it should not come as a big surprise that the upper echelons perspective and related theories underlining the role of the identity of decision makers for their firms' actions, such as the work of Hansmann (1996), have found lots of empirical support (see, for instance, Thomsen and Pedersen, 2000, or Finkelstein, Hambrick, and Canella, 2009).

Most of these studies have considered the role of managerial personalities and experiences. The impact of managerial values and ethics for strategy has received much less attention. Senger (1970) reports that the objectives and perceptions of subordinates of the managers in his sample were related to their religiosities. Hosmer (1994) underlines the positive, trust-enhancing effects of ethical management for company performance, which is related to managing according to religious values. Agle, Mitchell, and Sonnenfeld (1999) identify the link between managerial values and corporate social performance. In a related study, Marquis and Lee (2013) analyze the characteristics of senior managers that shape their philanthropic views and thereby influence the philanthropic contributions of their firms. Chin, Hambrick, and Treviño (2013) extend the picture to include managers' political attitudes as determinants of their firms' corporate social responsibility activities.

The majority of these research articles considers profit-maximizing, publicly-listed corporations. Nonprofit organizations, despite their large social and economic relevance, are heavily understudied by behavioral strategic management researchers (less so by other strategic management scholars; see Hatten, 1982).

Nonprofit organizations offer a particularly promising field to study the strategic ramifications of managerial values because of two reasons. First, in most nonprofits managers face more relaxed governance schemes than in publicly-traded corporations because a self-interested monitor with high-powered incentives is missing (Glaeser, 2003, Herbst and Prüfer, 2007). This gives them more discretion in decision making. Second, due to the nondistribution constraint nonprofit managers cannot follow a simple goal with straightforward metrics - namely profit-maximization - but are to cater to complex and sometimes ambiguous objectives laid down by the founders of the organization (Stone and Brush, 1996).

This underlines the importance of the manager's values for strategic decisions in nonprofits, a fact empirically confirmed by Horwitz (2007). The values 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. If the organization is affiliated with such a group, the group can foster its values by selecting managers that hold the same values. Given that many different groups with many different values exist, the approach of most economists studying nonprofits and striving to find one unique objective for all nonprofit organizations, must fail necessarily.

Therefore, not surprisingly, Malani, Philipson, and David (2003:181/2) conclude, "[t]here is no accepted theory of NFP behavior, and little of the empirical work is connected to—let alone compares—existing theories." 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 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." And on the individual background characteristics of managers, one may add.

In the light of upper echelons theory, we argue that to understand the be-

havior of nonprofits better, we have to subdivide the organizations operating under the nonprofit label into smaller, more homogenous groups, where each group is characterized by a unique objective function. Prüfer (2011) discusses such an approach but only studies one subgroup, so-called consumer-dominated nonprofits. However, he 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 values—and hence the identity—of the key decision maker as crucial. To do that we first need to identify an observable characteristic of subgroups of nonprofits, which allows us to infer the values and objectives of the key decision makers, often the managers, 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 of how nonprofits with different decision makers make different strategic decisions. 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, depending on the wealth of the organization and the outside options of the individual stakeholders (Glaeser, 2003). Because it is hard to specify at a given point in time who is the key 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, Kessler, and McClellan (2003:48/9) note: "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 The economic effects of Catholic and Protestant values

Odom and Boxx (1988) are among the first strategic management scholars to study the behavior of religious organizations. They find that the importance of environmental factors used in churches' decision-making procedures are related to the level of planning sophistication. Miller (2002) studies the sources of sustainable competitive advantage of religious organizations in a theoretical article, drawing both on scholarship from economics and sociology. Rennhoff and Owens (2012) show that churches in two suburban Nashville, Tennessee, counties, employ different strategies in the market, which are affected by the decisions of other churches. Boone et al. (2012) point at the importance of religion as a fundamental category of identity and association and show that religious pluralism is correlated with organizational diversity.

Studies distinguishing between religious and secular nonprofit organizations could identify significant differences in behavior between these groups. Hansmann, Kessler, and McClellan (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 they studied. Gertler and Kuan (2009) 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, thereby suggesting a trade-off between religious values and monetary income.

These studies indicate 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 the studies cited above treat religious nonprofits as one group, it is hard for them to speculate about *one consistent* objective for the entire group. If we zoom into the spectrum of religious non-

profits, however, this is possible. Among Christian denominations, Catholic and Protestant values differ in key aspects, which we expect to be reflected by the strategies of nonprofit managers affiliated with those congregations.

We focus on these two denominations and neglect other Christian congregations because our data refer to German hospitals. Baumann (2007:144) 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 pluralism´ in both Germany and Switzerland [...]. 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."

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 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). This result is re-

lated to Glaeser and Sacerdote (2008), who provide evidence and an explanatory model for the empirical finding that education in the United States 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. The differential interaction of education and Christian 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 should 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 organizations.

On the other hand, in their careful meta-study on nonprofit objectives,

Malani, Philipson, and David (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). This judgement is in line with Senger (1970) and Hosmer (1994) and reflects recent studies about the role of altruism and prosocial preferences—especially by workers—in the delivery of social services in nonprofits (Francois, 2003, Besley and Ghatak, 2005, Francois and Vlassopoulos, 2008, Delfgaauw et al., 2011, and Dur and Zoutenbier, 2011). Importantly, 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 mathematical model in the subsequent section: First, both Catholicism and Protestantism value altruistic behavior (*caritas*). Hence, the objective function of managers 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 pro-

ductive efficiency and attracted by complex procedures and technologies, two economic and intellectual measures of success. These differences are the key drivers of our model, which is inspired by Ellis (1998) and which we will use to translate the three theological cornerstones of Catholicism and Protestantism identified here into testable hypotheses.

3 The Model and Empirical Hypotheses

3.1 A caring monopolistic provider

Patients are characterized by a severity of illness, $s \in \{1, 2\}$. 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:

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

Hence, patients' utility increases in the level of services received but every additional unit of service is less valuable than the previous one.

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. This assumption reflects the situation of nearly all patients in Germany (Simon, 2008). However, patients bear a travel cost to reach the provider. Hence, the market may not be completely covered. Demand increases 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:

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

To keep the model as simple as possible, there is a monopolistic provider offering services to the patients. Assuming competition between providers would surely influence the model outcome but it would not change the actions of a Catholic *relative to* a Protestant provider, yet complicate the analysis significantly. 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:

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

Hence, the production of services gets more and more expensive and high severity treatments are more expensive than low severity treatments.

Since 2004 German hospitals have operated under a fully prospective payment system (Simon, 2008). Therefore, we assume such 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:

$$R(s = 1) < R(s = 2) \quad (5)$$

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

$$\pi = R(s) - C(X(s)) \quad (6)$$

We study a one-stage game looking for a unique 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 manager 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. Note that, if the nondistribution constraint was indeed binding, the nonprofit manager's objectives were less relevant for the decision taken. But as the purpose of this model is to construct empirical hypotheses that differ across nonprofit types, we focus on the interesting case without a binding nondistribution constraint. There $R(s)$ is sufficiently high to allow the manager to produce her most preferred level of services.

We consider a governance structure, where the nonprofit manager is selected by the members of a governing board, who hold certain religious beliefs, only if she holds such beliefs, too (which is in line with the usual hiring procedures in religiously affiliated hospitals in Germany). Therefore, we assume that the manager's objectives are shaped by the respective religious values.

Let the manager's indirect utility from treating one type-s patient:

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

This captures that the manager has prosocial preferences, as she cares about patients' benefit, but that she also strives to maximize productive efficiency, as treatment costs reduce her utility. 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 à la Francois (2007), where v would be an increasing function of B even if B was exogenous to the provider.

Independent of her degree of altruism, a rational manager never chooses $X(s)$ 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 Section 2, we assume that manager $j \in \{C, P\}$ maximizes the following objective function:

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

where $\rho = 1$ if the manager has a Catholic affiliation (C) and $\rho = 0$ if the manager has a Protestant affiliation (P). This implies that, for Protestant nonprofits, $V_P = v(s, X(s))$: the manager cares about the benefit of the *one* patient who is up for treatment. In contrast, a Catholic manager 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 manager, 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:

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

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

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

The equilibrium service intensity of a Catholic manager is strictly higher than the one of a Protestant manager. The reason is that the Catholic manager 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 manager additional utility. Therefore, we find a positive *demand effect* of caring for one's community. Given that the Protestant manager'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:*

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

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:*

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

Intuitively, because she cares for more patients' benefits, a Catholic manager sets a higher service intensity than a Protestant manager. 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 studies and corresponding to average revenues of a provider.[1] 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 manager puts relatively more resources into treating low severity patients because there patients' marginal treatment benefits net of marginal treatment costs are higher than at the high severity level. 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

[1] 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.

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 $F > 0$, for instance, 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 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 that in every treatment area:

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

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 every treatment area with higher probability than Protestant hospitals.*

This result captures an 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.

Note that Proposition 4 does not depend on assumption (18). It holds for any $R(s)$ that satisfies $F > R(s) \geq AC(MES)$. 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 4 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 treat more patients than Protestant hospitals (Proposition 1).*

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

H3: *The average revenue or Casemix Index (CMI) is 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 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: *Protestant hospitals 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: *Catholic hospitals are active in more treatment areas than Protestant hospitals (Proposition 4).*

Being equipped with predictions about the strategic behavior of Catholic and Protestant hospitals, we move on to test the validity of these hypotheses.

4 Data and Empirical Results

4.1 The dataset

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 (*Bundesgeschäftsstelle für Qualitätssicherung* or *BQS*) and from the 2010 *Krankenhaus-Report* (Klauber, 2009).[2] 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 (Filistrucchi and Ozbugday (2012) use this dataset to measure the impact of quality disclosure on quality supply in German hospitals).

The Krankenhaus-Reports instead include data from the German Federal Statistical Office. We matched 2008 data on casemix index from the Krankenhaus-Report (Klauber, 2009) to the data from the 2006 and 2008 BQS reports, respectively.

While the BQS data provide information on whether the hospital is non-profit, public, or for-profit, they do not explicitly distinguish between different

[2]The BQS data are officially known as *quality reports of the hospitals* ("*Qualitätsberichte der Krankenhäuser gemäß § 137 Abs. 3 Nr. 4 SGB V*"). The complete set of reports, one for each hospital, is available at `www.g-ba.de`.

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 and 23 percent are Protestant, whereas 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 of their managers.

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

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 "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 *Bundesländer* 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 test the six hypotheses stemming from the mathematical 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 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 a set of 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:

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

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 patient numbers 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 utilize Protestant hospitals and Catholic patients utilize Catholic hospitals. If so, the number of patients in Protestant hospitals should be lower the higher the number of Catholics relative to Protestants in a state. 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

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

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 (the direct effects of these ratios are not significant and hence not reported, to keep the table short). 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 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

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

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 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). As shown in the last three columns and consistent with the mathematical model, this result is an effect of the higher number of patients in Catholic hospitals than in Protestant ones, fostering economies of scale, and no direct choice of Catholic managers (the

	(1)	(2)	(3)	(4)
VARIABLES	cmi	cmi	cmi	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

	(1)	(2)	(3)	(4)
VARIABLES	academic	academic	academic	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

	(1)	(2)	(3)	(4)
VARIABLES	docperpat	docperpat	docperpat	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

	(1)	(2)	(3)	(4)
VARIABLES	specperpat	specperpat	specperpat	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

protestant dummy is not significant anymore as soon as we control for patient numbers).

5 Conclusion

This study of the complete set of German nonprofit hospitals supports our predictions about the measurable effects of faith for the corporate strategy of religiously affiliated nonprofits. Managers hired to run a certain nonprofit are selected based on congregation and are influenced by their religious values when deciding about their organizations' actions. Via this channel, the religious and moral values of denominations that were developed hundreds of years ago are represented in strategic choices that can be observed and predicted in today's markets.

Four key contributions of this work arise. First, we confirm the relevance of upper echelons perspective à la Hambrick and Mason (1984), which claims that the individual background characteristics of top managers influence the strategic actions of firms. We extend the upper echelons perspective to the study of nonprofit organizations. Nonprofits appear to be a very fruitful avenue for future research of behavioral strategic management scholars because nonprofit managers have more discretion in making strategic choices and face performance metrics that are less easy to monitor, given the absence of straightforward goals such as shareholder value maximization. Therefore, the strategic choices of nonprofit managers can more easily be influenced by their individual characteristics than the choices of managers in publicly-traded for-profit companies.

Second, most empirical tests of upper echelons theory have ignored managers' values and focused on managers' experiences and personality instead. Whereas other research has studied the strategic effects of managers' national cultures (Schneider and De Meyer, 1991) or managers' political attitudes (Chin, Hambrick, and Treviño, 2013), this paper is among the first to investigate the effects of managers' religious values. The fact that in our subject - religiously affiliated nonprofit hospitals in Germany - a religious, long-lasting parent organization (*Caritas/Diakonisches Werk*) and an employed nonprofit manager with the same religious values interact suggests that the effects of religious

	(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

values for strategy are particulary persistent.

Third, moving from the managerial to the organizational level, we have tackled the difficulties of the empirical and theoretical literatures on nonprofit organizations to predict nonprofits' strategic actions by fleshing out appropriate lines of distinction between different nonprofit types, which are distinguishable according to observable organizational characteristics. When looking at hospitals, the economically most important market with significant nonprofit market shares, we found that at least three subgroups exist among nonprofits in Germany: 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 novel dataset covering all German hospitals for the years 2006 and 2008, we found that the empirical patterns confirm the strategic behavior of Catholic and Protestant nonprofit hospitals predicted by the model. Catholic nonprofit hospitals 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 - a result that is fully in line with the literature's notion that Protestant believers value education and complex technologies, as signs of worldly success, more than Catholic believers.

Fourth, we contribute to the development of new research methodology in strategic management. Especially in interdisciplinary research the problem of unobservable variables often occurs. For instance, when Greif (1993) set out to study the institutional details of medieval merchant groups, it was nearly impossible to prove the precise rules that were used in certain communities and that decided about success and failure of such early business groups. To tackle those issues, Greif developed a new methodology (see Greif, 2006, for a comprehensive description): He first studied the historical records of Maghribi and other Mediterranean traders. Then he translated the key historical findings into assumptions of game-theoretic models. Next, he solved the models, which created predictions about the traders' actions that were *not* direct consequences of the assumptions used and compared those predictions with the actual historical behavior. Only if the predictions were confirmed by historical evidence, he accepted them as new results and the model as a sufficient reflection of the situation studied.

In this paper, we develop a related methodology, which we call "interlinked research method." In our case, the social science to be combined with strategy research is not history but religious studies. We first review the literature on the economic effects of Catholicism and Protestantism and identify three important theological cornerstones of those faiths. Because these cornerstones do not warrant to construct testable hypotheses of the actions of religiously affiliated nonprofits directly, we construct a mathematical model of a market with nonprofit providers, where the main decision makers are managers with the same faith as the religious affiliation of the provider they manage. Next, we test the hypotheses generated by our model with a novel dataset and take the empirical results back to the literature on Catholic and Protestant values, where we find them confirmed. Thereby, we address the problem that managers' religious values are not directly observable (Godfrey and Hill, 1995, Chin, Hambrick, and Treviño, 2013).

Our results imply for future studies of nonprofit organizations that they should distinguish between different nonprofit types, depending on observable organizational characteristics found in the market at study. Regarding the question what goals nonprofits pursue, our answer is: it depends on the nonprof-

its organizational affiliation, which shapes their managers' values. As values depend on culture and religion is a key determinant of culture, the faith of managers impacts the strategic actions of their firms. The case of religiously affiliated nonprofits is particularly strong because the religious parent organizations are influential, directly or indirectly, when nonprofit managers are selected. Hence, it can be expected that the intensity of managerial faith is stronger in religious than in secular organizations. But our results make it conceivable that future research finds related effects of managers' religion in other organizational structures, including publicly-traded firms, as well.

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References

Agle, B.R., Mitchell, R.K. and J. A. Sonnenfeld. 1999. "Who matters to CEOs? An investigation of stakeholder attributes and salience, corporate performance, and CEO values," *Academy of Management Journal,* 42: 507–525.

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: K. Adenauer Stiftung: 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.

Boone, C., Brouwer, A., Jacobs, J., Witteloostuijn, A. van, and M. de Zwaan. 2012. "Religious Pluralism and Organizational Diversity: An Empirical Test in the City of Zwolle, the Netherlands, 1851-1914," *Sociology of Religion*, 73(2): 150-173.

Chin, M. K., Hambrick, D.C. and L.K. Treviño. 2013. "Political Ideologies of CEOs: The Influence of Executives' Values on Corporate Social Responsibility," *Administrative Science Quarterly,* DOI: 10.1177/0001839213486984.

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.

Finkelstein, S., Hambrick, D.C. and A. Cannella. 2009. *Strategic leadership: Theory and Research on Executives, Top Management Teams, and Boards,* New York: Oxford University Press.

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.

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

Godfrey, P.C. and C.W.L. Hill. 1995. "The Problem of Unobservables in Strategic Management Research," *Strategic Management Journal*, 16(7): 519-533.

Greif, Avner. 1993. "Contract Enforceability and Economic Institutions in Early Trade: The Maghribi Traders' Coalition," *American Economic Review*, 83(3): 525-548.

Greif, Avner. 2006. *Institutions and the Path to the Modern Economy: Lessons from Medieval Trade.* New York: Cambridge University Press.

Hambrick, D.C. and P.A. Mason. 1984. "Upper Echelons: The Organization as a Reflection of Its Top Managers," *Academy of Management Review,* 9(2): 193-206.

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.

Hatten, M.L. 1982. "Strategic Management in Not-For-Profit Organizations," *Strategic Management Journal,* 3: 89-104.

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

Hoorn, A. van 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`.

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.

Hosmer, L.T. 1994. "Strategic Planning as if Ethics Mattered," *Strategic Management Journal,* 15: 17-34.

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.

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.

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.

Marquis, C. and M. Lee. 2013. "Who is Governing Whom? Executives, Governance, and the Structure of Generosity in Large U.S. Firms," *Strategic Management Journal,* 34: 483-497.

Miller, K.D. 2002. "Competitive Strategies of Religious Organizations," *Strategic Management Journal,* 23: 435-456.

Odom, R.Y. and W.R. Boxx. 1988. "Environment, Planning Processes, and Organizational Performance of Churches," *Strategic Management Journal,* 9(2): 197-205.

Prüfer, 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.

Schneider, S.C. and A. De Meyer. 1991. Interpreting and responding to strategic issues: The impact of national culture. *Strategic Management Journal,* 12 (4): 307-320.

Senger, J. 1970. "The Religious Manager," *Academy of Management Journal,* 13(2): 179-186.

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 Einführung in Struktur und Funktionsweise.* 2nd ed. Verlag Huber: Bern.

Stone, M.M. and C.G. Brush. 1996. "Planning in Ambiguous Contexts: The Dilemma of Meeting Needs for Commitment and Demands for Legitimacy," *Strategic Management Journal,* 17: 633-652.

Thomsen, S. and T. Pedersen. 2000. "Ownership Structure and Economic Performance in the Largest European Companies," *Strategic Management Journal,* 21: 689-705.

A Appendix: 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 $C(X(s=1)) < C(X(s=2))$:

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

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

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:

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

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). $Q.E.D.$