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RELIGIOUS PLURALISM AND ORGANIZATIONAL DIVERSITY

AN EMPIRICAL TEST FOR THE CITY OF ZWOLLE, THE NETHERLANDS, 1851-1914

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Abstract

We explore the effect of population heterogeneity on organizational diversity. We do so in the context of a city community. Our argument is that organizational diversity will be positively affected by heterogeneity within the city's population. We focus on a key aspect of population heterogeneity: religious pluralism. We test our logic with time series data for the Dutch city of Zwolle in the 1851-1914 period and find clear evidence for our key logic.

Organizational diversity, broadly defined as variety in organizational outputs (i.e., products and services) and its associated heterogeneity in organizational forms, is an important subject in several scientific disciplines such as (organizational) sociology, (regional and urban) economics, geography and history. The reason is that it represents the dynamo of structural change upon which selection operates (Astley, 1985; Romanelli, 1991), with important ramifications at different levels of analysis, including career opportunities (Hannan, 1988), innovation potential and population-level learning (Grabher and Stark, 1997; Ingram, 2002), and the productivity, growth and adaptive capacity of industries and communities (Fujita, Krugman, and Venables, 1999; Acs and Armington, 2003).

In organizational ecology (an important evolutionary perspective in organizational sociology), understanding organizational diversity is even part of its mission ever since Hannan and Freeman (1977) raised the seminal question: "Why are there so many different kinds of organizations?" Notwithstanding this question's major theoretical and empirical importance, the number of studies that explicitly focus on organizational diversity as the major variable of interest is still limited. Instead, most prior work in organizational ecology modeled the founding and mortality rates in specific organizational populations (for a review, see Carroll and Hannan, 2000). This choice is defended on the ground that the dynamics of population-level organizational diversity are to a large extent controlled by these vital rates, as they differ depending on the features of the (subgroups of) organizations entering in, exiting from or belonging to these populations. In other words, organizational entry and exit affect the mix of organizations in populations. However, as entry and exit are only distal processes that indirectly affect organizational diversity, knowledge of its more proximate dynamics is still limited (Ruef, 2000; McKendrick, Jaffee, Carroll, and Khessina 2003; Boone,

Wezel, and van Witteloostuijn, 2007). Note also that the majority of prior studies focused on the population level of analysis. However, as the direct study of organizational diversity requires a "bird's eye" view capturing variety in systems of interrelated populations, such work could benefit much from a community-level lens (Freeman and Audia, 2006; Ruef, 2007). In the present paper, our major dependent variable is therefore the diversity among different populations within the boundaries of a geographically defined urban community.

Since the publication of Jacobs' *The Economy of Cities* (1969), stressing the importance of community-level industrial diversity for a city's prosperity, the subject of organizational diversity attracted attention of (regional and urban) economists and geographers, too (Quigley, 1998; Glaeser, Kolko, and Saiz, 2001; Dissart, 2003). Scholars in this tradition tend to focus on the *consequences* of industrial variety on local economic performance in terms of, e.g., innovation, growth and productivity. However, despite the centrality of concepts such as organizational and industrial diversity in this literature (Essletzbichler and Rigby, 2005), studies on their consequences and persistence are still rare, whereas virtually nothing is known about where variety comes from in the first place. In this respect, Duranton and Storper (2006: 2) argue that especially a great deal needs to be done on understanding how population characteristics and composition of activities interact over time.

To study the latter interaction is precisely the purpose of the current study. We start from the general ecological principle that the long-run equilibrium level of organizational diversity is isomorphic to the diversity of the resource environment (Hannan and Freeman, 1977). As a community's resource diversity depends on the composition of its population, we hypothesize that diversity of the latter will affect the extent of organizational diversity in that community. As a city's population diversity

comes in many forms and shapes, from ethnicity and gender to age and religion, we have to decide up-front on which dimension of diversity to focus. For historical and substantive reasons explained below in more detail, we opted to focus on religion – or on religious pluralism.

Basically, we focus on a community's religious pluralism because (a) religion is known to be a key driver of economic and social behavior and (b) religious pluralism was a key feature of our community in that part of its history captured by our time window (i.e., 1851-1914). Religious pluralism is of central importance in the sociology of religion (Christiano, 1987; Christiano, Swatos, and Kivisto, 2002; Koçak and Carroll, 2008), with potentially far-reaching implications for organizational diversity. In this respect, we follow the so-called "new paradigm" in the sociology of religion (Warner, 1993) that represents a movement away from the old approach that treated religion as "a derivative of something else" (e.g., economic structure and urbanization), and, as a result, largely overlooked the role of religion in social change. Instead, the new paradigm stresses the importance of treating "religion as a *real* or *independent* variable – that is, as much a part of human behavioral dispositions as any other system of action" (Christiano et al., 2002: 42; italics in original). In the present setting, we will argue below in detail that denominational pluralism drives community differentiation with respect to the supply of and demand for different products and services, which ultimately determines community-level organizational diversity.

We test this general proposition in a relatively small city in the Netherlands, Zwolle, in 1851-1914, a setting highly suited for our purpose for several theoretical reasons. First, estimating a direct link between religious pluralism and organizational diversity in a specific community requires a setting where most of the action is locally confined in a self-sustaining community. Zwolle, in the period under study, is such a

relatively closed system. Second, as in the U.S., this period is characterized by a disestablishment of the dominant churches, gradually leading to an open market for religion and freedom of worship (see also Warner, 1993), making religious pluralism very salient. Third, the period marks the transition of the Netherlands from an agricultural and trade society to an industrial and urbanized country. Gradual modernization strongly affected the composition of Dutch communities, both with respect to their populations and their organizations, guaranteeing sufficiently large variation over time to detect the dynamic interrelationship between our focal variables.

Finally, we decided to focus on one city for pragmatic reasons. Testing our hypothesis requires large and very time-consuming investments as detailed data have to be collected over a relatively long period of time. The data we analyze were painstakingly hand-collected from historical archives in order to map the religious composition of Zwolle's population and the activity of all private organizations for more than 60 years. Similarly, we collected detailed longitudinal information on a number of key control variables. Obviously, our case approach, in all likelihood, reduces the generalizability of our findings. However, we believe that the benefits outweigh this disadvantage. Specifically, a detailed case study generally has higher internal validity and, in addition, allows for "thick description", which is important for understanding the role of religious pluralism (Christiano et al., 2002).

In the following section, we develop in more detail how and why religious pluralism should affect organizational diversity. Next, we translate this general proposition to the specifics of the history of the community setting under study – the Dutch city of Zwolle in 1851-1914. After describing the data sources and measures, we explain the statistical times series methods we apply to unravel the potentially

reciprocal relationship between religious pluralism and organizational diversity. Finally, we end the paper with a discussion, after presenting the major findings.

IMPLICATIONS OF RELIGIOUS PLURALISM

Ever since the modernization wave of the 19th century and the first half of the 20th century, many societies are characterized by religious pluralism (Warner, 1993; Voas, Olsen, and Crockett, 2002). Modernization, which was associated with the disestablishment of the churches, opened up the market for religion (Warner, 1993: 1050), leading to strong competition among denominations to draw people into their religion (Voas et al., 2002). This trend towards religious pluralism is generally regarded to be typical for the experience in the U.S. (Warner, 1993). However, in some European countries, like in the Netherlands, vertical pluralism along religious ideologies gained momentum too, in the second half of the 19th century (Wintle, 2000a).

According to the "old" traditional paradigm in the sociology of religion, this pluralism would eventually reduce the impact of religion on social life. Following Durkheim, it is argued that competition among multiple religious groups "erodes the credibility of any particular one" (Warf, 2006: 554), which, consequentially, undermines religion's status as a universal and absolute truth (Finke, Guest, and Stark, 1996; Koçak and Carroll, 2008). In other words, the more pluralism, the "less it dominates lives" (Durkheim, cited in Finke et al., 1996: 206; see also Berger, 1967). However, as this model of secularization was at odds with the empirical trend revealing continuing growth of religion in the U.S. in the 19th century, a "new paradigm" arose rejecting the general proposition that religion loses significance in people's life (Finke et al., 1996). In contrast, these scholars claim that religion should be regarded as a

fundamental category of identity and association. As a result, religious pluralism is argued to be an important source of societal differentiation (Warner, 1993).

Inspired by this debate, many researchers focused on religious pluralism as a "real" independent variable, especially analyzing the relationship between religious pluralism, on the one hand, and religious participation and church membership, on the other hand, in U.S. communities (for a recent review, see Koçak and Carroll, 2008; see also Christiano, 1987). A major aim of these studies was to challenge the secularization thesis by showing that pluralism increases instead of decreases religiosity (Finke et al., 1996). Although the debate is still unsettled (see also McBride, 2008, for yet another very recent contribution), our study does not explicitly address religiosity. Rather, we focus on another major potential outcome of religious pluralism that, to the best of our knowledge, has not been studied before – i.e., the economic structure of communities. Specifically, in the present paper, we argue that religious pluralism affects the diversity of the domains of organizations active in a community for at least three related reasons.

First, as religion profoundly shapes cultural views and social expectations (Weber, 1930; Laumann, 1969), it affects what is traded, the rules that govern trade, and when and where markets occur (Hirschman, 1983; Mittelsteadt, 2002). Communities characterized by religious pluralism have populations with heterogeneous values, habits and attitudes (Delener, 1994), which spur the establishment of organizations producing services and products that match those needs (Hirschman, 1983). In other words, heterogeneous needs, and hence demand variety, increase the variety of goods, services and skills for consumption and production (Malerba, 2006; Ottavianno and Peri, 2006). Note that the impact of religion on consumer behavior can be quite direct as religious traditions prohibit, discourage, encourage or obligate the production and trade of specific products and services (Mittelsteadt, 2002). As explained below, such

constraining role of religious institutions was especially forceful in Dutch society in the 19th century (Erdtsieck, 1991a and 1991b; Wintle, 2000a). As the boundaries of socially acceptable consumer behavior differ from one religion to the other, organizational diversity is likely to ensue.

Second, the sets of skills and abilities of people raised in the context of different religious ideologies are likely to be different, which might directly spur variety in the supply of products and services. Ottaviano and Peri (2006) suggested that cultural diversity, as reflected in a community's diversity with respect to the population's country of origin, is likely to be associated with the provision of products and services that are not perfectly substitutable, so increasing the total value of production. The following example underscores their point: "an Italian stylist, a Mexican cook and a Russian dancer simply provide different services that their U.S. born counterparts cannot" (Ottaviano and Peri, 2006: 39). Similarly, people from different religious backgrounds are likely to specialize in specific economic activities, which provide another contribution to the diversity of supply.

The two mechanisms suggested above directly relate religious pluralism to the variety of demand and supply, respectively. These relationships are likely to be reinforced by positive, indirect feedback effects at the community level of analysis. Several authors have argued that cultural diversity (including ethnic and religious pluralism) spurs entrepreneurship, innovation and creativity resulting from the social interaction between people with different skills, capabilities, knowledge and attitudes (Alesina and La Ferrara, 2005). The growth in the number and kind of organizations creates attractive cities, triggering immigration of people with heterogeneous skills and capabilities to support this organizational diversity. In addition, organizational diversity *per se*, being a fertile ground for innovation and entrepreneurship, stimulates more

organizational diversity, culminating in so-called Jacobs externalities at the community level (Jacobs, 1969).

HISTORICAL SETTING: ZWOLLE, 1851-1914

During the era of industrialization, the emergence of a religious free market was still in progress (Finke et al., 1996: Koçak and Carroll, 2008), and the economic conditions changed dramatically. Cities in the mid-19th century were much smaller than today, with geographically confined communication and transportation networks (Finke et al., 1996; Ruef, 2000). All this makes cities in that period interesting "laboratories" to explore the interplay between religious pluralism and community ecologies. Below, we first sketch the major economic developments in the Netherlands, generally, and Zwolle, particularly. At that time, Zwolle was an autonomous, relatively small city of regional economic importance in the east of the Netherlands (with 18,028 and 34,187 inhabitants in 1851 and 1914, respectively). Next, we turn to a description of the local religious situation, and how that affected people's experiences, as well as their social and economic actions.

Industrialization in the Netherlands

In the period 1851-1914, the Netherlands transformed from an agricultural and trade economy to an industrial one. The pre-industrial period (1813-1850) with the prosperous days of the Dutch staple market (i.e., merchandise *entrepôt*) were over, as this function was taken over by the London and Hamburg markets. The buying and selling of goods on the basis of securities replaced the system of the staple market. Industrial activity in this period was limited to small handicraft family businesses serving local markets (Brugmans, 1970). Industrialization started later in the

Netherlands compared to, e.g., England (around 1760), France (after 1830) and Germany (1840) due to, among other things, a lack of resources to invest in new process technologies, a relatively small market limiting the profit potential of such investments, and relatively high wages (Smits, Horlings, and van Zanden, 1999). In addition, the Dutch were traditionally specialized in trading instead of fabricating goods, and lacked the specific entrepreneurial spirit needed to reap the opportunities associated with industrialization.

The climate started to change when Dutch economic policy became more liberal, reducing regulation and protectionism in many industries. Additionally, at that time, in the 1850s, government started to invest in railway construction (Brugmans, 1970; Groote, 1996). These developments spurred private investments in cost-saving technologies, based on steam engines, resulting in a continuous growth in labor productivity from the 1860s onwards. Household consumption patterns also changed from a focus primarily on foodstuffs to more luxury products, such as clothing and household wares. This was possible because of the strong increase in the share of wages in the gross domestic product (Smits et al., 1999). These major transformations changed the number and kind of economic organizations, increasing the variety of economic activities both in the Netherlands and in Zwolle.

Industrialization in Zwolle

Modernization created steady progress in Zwolle without extremes (Ten Hove, 2005). The structural economic changes in Zwolle followed the overall Dutch industrialization trend (Ten Hove, 2005). In the 1850s, only 30 relatively large firms were active in Zwolle, with an average of 15 employees per firm. Most of the firms were traditional, family-run craft organizations. Due to the absence of a typical proto-industry before the

1850s (Kooij, 1988), Zwolle did not develop into a full-fledged industrial city specialized in a specific activity, as did some cities in that period (e.g., Tilburg in the Netherlands and Manchester in the U.K., both with their focus on the textile industry). Instead, Zwolle developed a diverse portfolio of activities.

In industry, a growing number of firms emerged in foodstuffs (cigars, biscuits, oils and butter), woodworks and printing. Note that none of these firms had a prominent position nation-wide. Most industrial firms were quite satisfied with the local and regional market, and did not feel a need to expand (*Maatschappij van de Nijverheid*, 1914). The only relatively large firm in Zwolle was the workshop of the Dutch railways. It was founded in 1869, attracting immigrant labor from the Amsterdam region into Zwolle. These immigrants were slightly better educated, earned higher wages, had more leisure time, and were more liberal than most of Zwolle's indigenous population. This immigration wave was also important from an ideological standpoint as it took the socialist spirit to Zwolle (Ten Hove, 2005).

Apart from these developments in production, Zwolle gradually evolved into a lively, regional service and trade center. In 1899, for instance, 32 per cent of Zwolle's employed people worked in transportation and trade, and another 20 per cent in services (*Maatschappij van de Nijverheid*, 1914). Zwolle's success in these activities mainly resulted from its hub-like location in the Netherlands, being an important node linking the large cities in the South-West (e.g., Amsterdam and Rotterdam) with the peripheral north (e.g., Groningen and Leeuwarden). The gradual improvement of transportation means over land expanded the regional trade and service function of Zwolle. In addition, Zwolle was the provincial capital, of the province called Overijssel, harboring all regional governmental services (Ten Hove, 2005).

Table 1 presents the distribution of private firms across the major different activities for every ten years starting in 1851 (for details on data sources and collection, we refer to the Methods section). Clearly, organizational diversity increased over time in Zwolle.

INSERT TABLE 1 ABOUT HERE

Religious pluralism in the Netherlands and Zwolle

The Netherlands

The U.S. is arguably the most religiously diverse society in the world ever since the disestablishment of the churches in the 19th century (Eck, 2001; Warf, 2006). Not surprisingly, almost all studies on religious diversity focus on the U.S. experience. It is generally claimed that the experience on the relatively secular European continent is completely different for idiosyncratic, historical reasons. As Finke et al. (1996: 204) comment: "Many nineteenth-century observers blamed the lack of vitality of religion in Europe as compared with religion in America on the corrupting influence of state subsidies. Not only do subsidized firms become lazy firms, by example they encourage potential religious consumers to believe that religion ought to be 'free,' thereby limiting the capacity of unsubsidized firms to compete." According to the "new paradigm", secularization in Europe precisely resulted from the monopolistic, subsidized position of Christianity, with strong links to powerful political, business, and cultural elites (Finke et al., 1996; Warf, 2006). Lack of competition, together with the increasing role of nation states in maintaining moral integration, eventually reduced the appeal of religion to "consumers", and its role in people's lives. However, although this might be true on average, Europe should not be regarded as a homogeneous set of countries.

Indeed, this reasoning does clearly not apply to the Dutch experience in the 19th century, where in fact religion was firmly fused with civil culture to an extent similar as in the U.S. Freedom of religion in the Netherlands was installed by the law reforms of 1848 (Bank, Huizinga, and Minderaa, 1993). Ever since, many different religions peacefully co-existed together, the most important ones being Catholicism, Protestantism (with four important sub-denominations: liberal Protestantism (i.e., *Hervormden*), orthodox Calvinism (i.e., *Gereformeerden*), Lutheranism, and Baptism), and Judaism. In fact, Dutch tolerance was institutionalized in a specific model of consociation called pillarization (i.e., *verzuiling*) (Lijphart, 1968; Wintle, 2000a). Pillarization can be regarded a legitimate form of "living apart together", and represents a comprehensive system to prevent ideological diversity to become a source of societal instability. It rests on the principle of sphere sovereignty that states that each sphere of life has its own distinct responsibility, authority and competence. It insists that ideological boundaries, and historical differentiation, be affirmed and respected. The architect of this principle was Abraham Kuyper, who organized the seperation of the orthodox Calvinists from mainstream Protestantism in the 1860s, followed by the schism in the late 1880s (Wintle, 2000a; Baum, 2006). The implication of the principle is that the multiple Dutch religious and ideological communities established their own sphere, backed with proper institutions like schools, universities, news media, political parties, hospitals and care – the so-called vertical pillars.

This institutionalized pluralism originated from the conservative reactions of the major confessional groups that constructed walls around their worlds as a reaction against nominal secularization, and the professionalization of many of the churches' social and community functions in the second half of the 19th century (Wintle, 2000a). Interestingly, the Dutch religious experience at that time shares many features of a

"market for religion" akin to the U.S. situation. This becomes obvious in the following quote (Wintle, 2000a: 146):

> "If there was no single national identity or process of nation formation in the nineteenth century in the Netherlands, but a liberal one, a Calvinist one (at least one), a Catholic one, any number of local ones, and many other ones amongst any number of population groups like the Jews, the Baptists, or the Free-thinkers, then *verzuiling* can explain the interaction of all this diversity. With the exception of the liberals, who were on the defensive, the various other groups evolving their own national identity were involved in some form of emancipation struggle. Their nation-building efforts were much to do with creating a location for themselves within the framework of the nation at large; it was a search for legitimation, for a just and recognized place for themselves and an active, important, but unique part of the Dutch nation's past, present and future."

Zwolle

The experience of Zwolle, a relatively conservative but tolerant city in the 19th century (Erdtsieck and Faber, 1986), was similar to that of the Netherlands as a whole, although developments took more time, as is typical for relatively small, regional cities. For instance, although the orthodox Calvinist movement was initiated by Kuyper in 1862 in Amsterdam and the seperation became a fact in 1886, the schism (the so-called *dolente*) in Zwolle became a fact only in 1889 (Ten Hove, 2005). Consequently, the shift in membership from liberal Protestantism to orthodox Calvinism occurred more gradually in Zwolle (Bank et al., 1993; Ten Hove, 2005). Similarly, although freedom of religion was installed in the new constitution of 1848, Catholics still needed to protest against unequal treatment by the Zwolle police even as late as 1918. In general, the Catholic and Jewish minorities were tolerated in the sense that they could profess their fate, as long "as they brought in their own bacon and took care of their own poor" (Bank et al.,

1993). Finally, Socialism, with its associated pillar, was not popular in Zwolle in the second half of 19th century, and was only "professed" by the railway employees imported from Amsterdam (Dam, 1986). This group of more educated employees was for a large part responsible for the later emancipation of Zwolle's working class, putting Socialism on the map in Zwolle (Erdtsieck and Faber, 1986; Ten Hove, 2005). In Table 2, the distribution of Zwolle's populations over the major denominations is summarized for every ten years starting in 1851 (for details of data sources and collection, again, see the Methods section). One observes a noticeable increase in religious pluralism.

INSERT TABLE 2 ABOUT HERE

Several researchers have tried to map the relationship between religious affiliation, on the one hand, and socio-economic position and behavior, on the other hand (Pope, 1948; Mayer and Sharp, 1962; Laumann, 1969; Roof, 1979). Most of these studies have been done by American sociologists in the first half of the 20th century, with an adapted resurgence for marketing purposes in the 1970s (Hirschman, 1983). These studies show that religious preferences have important implications for social structure (Laumann, 1969). Religious affiliation, in turn, constrains a member's network, and, as part of cultural heritage, impinges on the types of occupational roles that people perform (Mayer and Sharp, 1962). Most studies find that Protestant denominations enjoy the elite positions in the social hierarchy, and that the relative status ranking of religious groups is very stable over time (Roof, 1979).

We combined these insights with the detailed information published in a series of historical studies on religion in Zwolle (Erdtsieck, 1988, 1989a, 1989b, 1990, 1991a, 1991b, 1995a, 1995b; Ten Hove, 2005) to summarize the major socio-economic differences among the denominations in Zwolle in the 19th century. Table 3 provides

detail.[1] The liberal Protestants in Zwolle were highly educated, occupying elite positions and gaining high family income. Although the orthodox Calvinists were of high status, too, the Protestant denomination is clearly not a homogeneous group in Zwolle. For instance, the Baptist's socio-economic position and status were among the lowest in Zwolle. The latter shared this fate with the Catholics, who also had relatively low income and occupational prestige. Although the Jews were highly educated and earned high income, they clearly did not belong to Zwolle's elite. Important for the present study is that people specialized in different economic activities depending on their denomination. This specialization resulted from differences in cultural traditions, and from rules and prescriptions proclaimed by denominations, such as those related to food.

INSERT TABLE 3 ABOUT HERE

METHODS

Data sources

We consulted several data sources from the historical archives of the province of Overijssel, the province of which Zwolle is the regional capital. Most data were hand-collected from the municipality's annual reports (*Verslag van den toestand der gemeente Zwolle over het jaar* for the years 1851 to 1914*)*. We complemented this information with data from the decennial census in the Netherlands (*Tienjarige volkstelling in het koninkrijk der Nederlanden, 1795-1971)*, the annual report of the Dutch Chambers of Commerce from 1901 onwards (*Verslag van de Kamer van Koophandel en Fabrieken te Zwolle over het jaar…)*, and the yearly alphabetical tax

[1] Note that we describe average differences between denominations. One should keep in mind, though, that inequality at that time was very high, with strong cleavages between rich and poor within most denominations.

register (*Klassikaal alphabetisch register op het kohier van de hoofdelijken omslag, zoo als het door Burgemeester en Wethouders voorloopig is vastgesteld, 1871-1902).*

The municipality's annual reports are (mostly hand-written) manuscripts that display a number of different reporting methods in various years. Some information was almost yearly provided in small tables, such as the number of inhabitants registered under a certain religious denomination. These data, which we used to compute our measure of religious pluralism (see below), were reported in the years 1850, 1854-1859, 1871, 1875-1876, 1878-1879, and yearly from 1881 onwards. The missing data points were linearly interpolated.

Unfortunately, for the number and kind of firms no such consistent reporting was used. In some years, the municipality's annual reports provide the number and kind of firms in a table using the same classification as the statistics of Dutch industry in the first half of the 19th century (Brugmans, 1956). Brugman's classification, which we also adopted in this study, distinguishes 23 private industries. Each industry in this classification consists of sub-sectors, which are described in more detail in Appendix A. In other years, more narrative information was provided about the activity of the organizations located within Zwolle. By comparing the firm descriptions in the annual reports with the descriptions of the sub-sectors in Brugman's classification system, firms could be matched to industries. The information provided in the annual reports was double-checked and complemented with the decennial census data for the Netherlands.

This census provides information about the number of individual craftsmen in Zwolle every ten years. Here we assumed that one craftsman registered in the census coincided with one firm in the same sub-sector. For larger firms, we also used information provided by the yearly alphabetical municipal tax register. This register

lists firms with revenues higher than a certain amount (varying from year to year). From 1901 onwards, we could also use the annual reports of the Zwolle Chambers of Commerce. All this additional information allowed us to check and complete our time series on the number of firms active in each sub-sector. Again, we used linear interpolation to fill in the few remaining missing data points.

The data to compute the control variables (introduced below) were in most cases also retrieved from the same sources. Specifically, the municipal annual reports provide information, among other things, on the number of inhabitants, births and immigrants, and on the educational level of inhabitants. We obtained the Dutch GDP data from the Dutch national accounts of 1800 to 1913 (http://nationalaccounts.niwi.knaw.nl). Note that, for this period, regional time series data (and therefore the 'gross city product' of Zwolle, as the local equivalent of the traditional country-level GDP measure) are not available.

Measures of focal variables

The two major variables in this study are diversity measures – i.e., organizational diversity and religious pluralism, respectively. The measurement of diversity received much attention in the field of biology (Magurran, 2004). Biological diversity can be partitioned into two components: species richness and evenness. Diversity is considered to be high when a habitat has a lot of species (i.e., richness) and low variance in species (i.e., similarity of population sizes, or so-called evenness). Obviously, a conception of diversity consisting of both evenness and richness is intuitively appealing in the context of the present study, too. That is, organizational diversity is high when the community harbors many industries with relatively equal number of firms in each industry. Similarly, a measure of religious pluralism should be high when both the number of

denominations in a community is large and membership is evenly spread over denominations.

Many biologists have tried to develop indices – single statistics that incorporate information on richness and evenness, a blend that is often referred to as heterogeneity (Magurran, 2004). The most popular diversity measure in biology is the Shannon information index (*H*). This measure has also been applied extensively in economics (the so-called Jacquemin-Berry entropy measure), and geography (Frenken, 2004). The *H*-index measures the expected information content contained in a probability distribution. Suppose there are n_i potential events with probability p_i (with the sum of p_i being 1). As the occurrence of events with small probability yields more information (as they are less expected), a measure of information such as the *H*-index should be a decreasing function of p_i (Frenken, 2004). The index is defined as (for p_i not equal to 0):

$$H = \sum_{i=1}^{n} p_i \log_2\left(\frac{1}{p_i}\right)$$

The minimum value of the index is zero when all organizations are active in the same economic activity or industry, or all members of the community belong to the same denomination. The index reaches its maximum value (i.e., $\log_2 n$) when all organizations or religious memberships are equally spread over categories (i.e., when $p_i = 1/n$).[2]

The Shannon index for *Organizational diversity* is calculated using the distribution of firms over the different activities as listed in Appendix A. For the Shannon index of *Religious pluralism*, we use the distribution of membership over the

[2] Another frequently used diversity measure is the Simpson index (Simpson, 1949; Magurran, 2004), which equals $1-\sum(p_i)^2$. This index, also known as the Blau index, has been used to assess religious pluralism in earlier work (Warf, 2006; Koçak and Carroll, 2008). A drawback of this measure is that dominant categories are given more weight, because proportions are squared. This tends to make the measure insensitive to changes in relatively small categories, which might become problematic when there are many (small) categories, as in our study (Magurran, 2004). To be able to capture the dynamics in a community's fringe, which might have important long-run implications, we preferred to use the *H*-index, which puts more weight on smaller categories.

following seven religious affiliations: Catholicism, liberal Protestantism, orthodox Calvinism, Baptism, Lutheranism, Judaism, and other religions. In 1911, however, it became possible to register in Zwolle as not religious. As a result, we have eight categories from 1911 onwards. The addition of a new category in 1911 caused a structural break in our time series of religious pluralism. Unfortunately, we do not have information about the religious denomination these individuals belonged before 1911, which limits our options to adjust for the break. In our empirical analyses, we decided to adjust the series by ignoring the not-religious people. Specifically, we subtracted the latter from the total number of inhabitants and calculated the Shannon index over the remaining seven denominations that existed for the whole period.[3] Note that our adjustment procedure preserves the increase in diversity after 1911.

Unlike Christiano (1987) and Koçak and Carroll (2008), we did not lump all Protestant denominations together, as these significantly differed with respect to socio-economic position and status, at least in the Netherlands (see the previous section and Table 3). According to Wintle (2000a) and Lijphart (1968), Dutch pillarization did not only create strong differences between the larger religious groups such as the Protestants versus the Catholics, but also similar cleavages between the several Protestant denominations, such as the more liberal Protestants and the orthodox Calvinists, resulting in separate 'Protestant spheres' (Baum, 2006). These spheres are discussed in depth for Zwolle by Ten Hove (2005) and Erdtsieck (1988, 1989a, 1989b, 1990, 1991a, 1991b, 1995a, 1995b). Aggregation of these data would lead to unjustified and unnecessary loss of information in our case of Zwolle in 1951-1914.

[3] We tried a few alternative structural break correction methods, which did not affect the pattern of results reported below (details and results are available upon request).

Control variables

In 1864, Zwolle was connected to the national railway system, which reduced transportation cost considerably. To account for its likely effect on economic activity we include a *Railway* dummy (0 before 1864, and 1 afterwards). Deprived individuals are more likely to be pushed into starting their own business (Carroll and Mosakowski, 1987; Tervo, 2008), which might affect organizational diversity. To control for this, we used a measure that proxies the degree of schooling of Zwolle's young people. Specifically, we calculated the proportion of people under the age of 19 that does not go to school and benefit from formal education (*Population with no education*). Third, we also included the first difference of the number of inhabitants (Δ *inhabitants*) to account for the possibility that some critical population mass is required for sustainable organizational diversity.[4] As a proxy for welfare, we added the growth of Dutch GDP (in prices of 1851) to our models (*GDP growth*). As mentioned above, local welfare data were not available. Finally, we included the yearly number of private firms *(# of private firms*) operating in Zwolle to account for the fact that organizational diversity is likely to depend on the total scale of organizational activity. All independent variables are lagged one year, except when mentioned otherwise.

Estimation methods

Time series analyses are often complicated by the presence of autocorrelated and heteroscedastic errors. This violates the assumptions required for the application of Ordinary Least Squares (OLS). However, it should be noted that both violations do not lead to biased estimates of the regression coefficients, but rather result in inconsistent estimates of the standard errors of these coefficients (Kmenta, 1971). The widely used

[4] We took the first difference as population size correlates very strongly with almost all of our variables under study.

Huber-White sandwich robust variance estimator (White, 1980) provides consistent standard error estimates in the presence of heteroscedasticity. The Newey-West variance estimator is an extension that calculates consistent estimates when both heteroscedasticity and autocorrelation are present (Newey, 1987). In the present paper, we use these Newey-West consistent variance estimates (see also Stata Time series manual, release 9, page 170; command *newey*). This method allows one to deal with different autocorrelation lag structures. In the present paper, we assume first-order autocorrelation. We also ran models with autocorrelation up to three lags, which did not affect the results (not reported here; available upon request).

We also performed two additional robustness analyses. First, the estimates of the regression coefficients would be inconsistent when organizational diversity and religious pluralism are reciprocally related. Then, the latter would be correlated with the error term, which violates a key assumption of OLS. This reciprocal relationship might occur if, for instance, organizational diversity in turn spurs immigration of different denominations, increasing religious pluralism. To explore this issue, we used the instrumental variable method (or indirect least squares) to obtain consistent estimates. That is, we first regressed religious pluralism on all independent variables that we use for explaining organizational diversity, including three additional instrumental variables that are expected to affect religious pluralism (using OLS on this reduced-form equation). Based upon this equation, we obtain predicted values of religious pluralism, which are subsequently used as the independent variable in the organizational diversity equation (our focal structural form equation; see Kmenta, 1971). The first instrumental variable is the so-called *Dolente* – the Schism in the Zwolle reformed church in 1889 – which caused a growth in the orthodox Calvinism denomination and a decline in the liberal Protestantism group, which is a dummy variable. In addition, we divided the

number of births and immigrants with the number of inhabitants to calculate *Natural population growth* and *Immigration population growth*, respectively. The former is expected to affect religious pluralism as the reproduction rate of members of different denominations differs. Similarly, immigration is also likely to affect the distribution of people over different denominations. Unfortunately, we do not have information on the denominational origin of immigrant people.

Another complication is that estimated relationships between the levels of time series might be spurious when the time series are not stationary. A time series is weakly stationary when the mean, variance and covariance of the series do not depend on time. If not, the mean and the variance are arbitrary concepts (Dickey, Jansen, and Thornton, 1991). If the series are integrated of order one [denoted as I(1)], the first difference of the series will be stationary, implying that the analysis can in principle proceed by estimating relationships between these first differences. As we are interested in the structural long-run relationship between two time series that are only changing slowly, such an approach would unfortunately not be suited for our purpose. However, if individual time series are integrated of order one, they still may be cointegrated. This means that one or more linear combinations of these series are stationary even if the variables separately are not. If time series are cointegrated, they cannot move 'too far' from each other (Dickey et al., 1991). In that case, one can be sure that the relationship between the levels of two non-stationary variables of order one is not spurious, and that there exists a long-run equilibrium link between both (Dickey et al., 1991). In this paper, we will therefore first determine the integration order of organizational diversity and religious pluralism, using the augmented Dickey-Fuller unit root test, the presence of a unit root implying non-stationarity. Next, we will apply Johansen's trace test

(Johansen, 1991, 1995) to find out whether both series are cointegrated. If so, we can deduce that the findings of our main Newey-West regressions are not spurious.

FINDINGS

Table 4 reports the descriptive statistics and correlations of the variables under study. Figures 1 and 2 plot the organizational diversity and religious pluralism *H*-index time series. For the latter variable, we plot the original time series and the series corrected for the break in 1911. All series reveal a clear long-run increase in the *H*-index. So, both organizational diversity and religious pluralism clearly increase over time.

INSERT TABLE 4 ABOUT HERE

INSERT FIGURES 1 AND 2 ABOUT HERE

The Newey-West regression estimates are reported in Table 5. With respect to the control variables, Model 1 reveals that the number of private firms has a significant and positive effect on organizational diversity, as well as on the growth of the number of inhabitants. Apparently, organizational diversity can only develop with sufficient organizational mass and people. The estimate of religious pluralism is positive and highly significant, providing evidence for our proposition that denominational heterogeneity spurs organizational diversity.

INSERT TABLE 5 ABOUT HERE

In Model 2, we include the number of activities (see Appendix A) in which firms are active in Zwolle at time *t*, which is an estimate of the community's organizational "richness". We do so to explore whether religious pluralism mainly affects organizational "richness" or its "evenness" (distribution of firms over the different activities), or both. Recall that the *H*-index incorporates information on both richness and evenness. Not surprisingly, Model 2 therefore reveals a strong relationship between

the number of activities and organizational diversity (*H*-index). More interesting is that the regression coefficient of religious pluralism decreases with a factor seven, but still remains significant. This suggests that religious pluralism both affects a community's organizational richness and evenness.

Models 3 and 4 replicate Models 1 and 2 after substituting 'real' religious pluralism with the predicted value of religious pluralism, as obtained from the OLS reduced-form equation, including our three instrumental variables (available upon request): *Dolente, Natural population growth* and *Immigration population growth*. Note that the regression coefficients of *Dolente*, *Immigration population growth* and *Natural population growth* on *Religious pluralism* are all significant (β = .02 with p = .027, β = 1.13 with p = .077, and β = -4.09 with p = .001, respectively). Apparently, the schism and immigration positively affected religious pluralism in Zwolle, while natural population growth decreased religious pluralism. The latter might be due to different attitudes and habits of reproduction within the various denominations. Models 3 and 4 show that the major conclusions that follow from Models 1 and 2 are not altered.[5]

The augmented Dickey-Fuller tests applied to the time series of organizational diversity and religious pluralism all show that the null hypothesis of the existence of a unit root cannot be rejected. This implies that both series are not stationary. When applied to the first difference of both time series, the unit root null hypothesis could clearly be rejected. That is, the Dickey-Fuller test statistic equals -4.130 (p = .0057) and -5.110 (p = .0001) for organizational diversity and religious pluralism, respectively (in specifications including one lag and a deterministic trend). So, the first difference series do appear to be stationary. Next, we performed Johansen's cointegration test on both time series. We first determined the optimal number of lags of each time series to

[5] Interestingly, the railway dummy now becomes significant in Model 3. The connection with the national railway system seems to negatively affect organizational diversity. We speculate that such a connection spurs intercity interaction and city specialization.

include in this analysis with the Akaike Information Criterion (AIC) applied to a VAR model. The optimal number of lags appeared to be one. Johansen's trace statistics (including one lag) show that there is one cointegration relationship between the series (with the confidence level set at 99 per cent).[6] From all this, we can conclude that the findings from the Newey-West regressions are not spurious.

CONCLUSION

In the present paper, we developed the argument that denominational pluralism drives community differentiation with respect to the supply and demand for different products and services, ultimately spurring community-level organizational diversity. The evidence presented in this paper clearly supports this proposition, showing that there is a long-run relationship between religious pluralism and organizational diversity, where the former affects both a community's organizational richness and evenness. Our study contributes to both the sociology of religion and organizational ecology. We contribute to the "new paradigm" in the sociology of religion by showing that religion is not just a "derivative of something else", but has profound implications for a community's economic structure. In doing so, we studied an outcome – i.e., organizational diversity – that has not received attention in prior work. Our study contributes to organizational ecology by directly focusing on organizational diversity as the main variable of interest. Such studies are exceptional, especially when the focus is on the community level of analysis. Our study is one of the first to systematically analyze the role of the resource environment (reflected in religious pluralism) of communities in shaping community level organizational diversity (see Boone, Carroll, and van Witteloostuijn, 2002, for a study at the population level of analysis).

[6] This result holds for tests including no trend, a restricted linear trend and a restricted constant.

Our study is not without limitations, of course. First, in the Introduction we already explained that, as a first step, we decided to focus on one specific community, for the sake of internal validity. Obviously, this reduces the generalizability of our findings. Future work in other communities is needed to reveal the boundary conditions of the relationship between religious pluralism and organizational diversity. Second, communities are embedded in sets of communities that interact. Specifically, cities belong to systems of cities that exchange resources such as labor, capital, services and goods. In the present study, we only focused on the single city of Zwolle, only introducing the impact of the broader environment through a few control variables. Although we do not think that this has affected our findings, as Zwolle in the 19th century was a relatively isolated community, it might be revealing to study the interaction of religious pluralism and organizational diversity within a system of related communities in future research. Third, we did not focus on the consequences of organizational diversity in this study. It would be extremely valuable to theorize about how and when organizational diversity affects community-level outcomes such as economic development, population growth, innovation and welfare (cf. Ruef and Patterson, 2008). Finally, we only focused on private organizations. Future work might also investigate whether religious pluralism affects the number and types of public organizations in communities, and the interplay between organizational diversity in both domains of community life.

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APPENDIX A

Industries (23, in total)	**Number of activities** (121, in total)*	**Activities description**	
Agriculture, fishery and forestry	2	Tree nurseries, Seed banks / farm	
Building materials, earthen and glassware	3	Stone dressing, Bulb factory, Lithography	
Chemicals and chemical products	9	Artificial fertilizers / ammonia production, Creosote oil factory, Oil refinery, Production of bluing powder	Tar oil production, Soap boiler, Paint and varnish factory, Wax production, Other chemical products
Construction	4	Plumbers, Joinery works / carpentry	Mill builders, Lime burning
Craftwork	12	Gold- & silversmith, Watchmaker's shops, Candle makers, Sail makers, Riffle making, Grinding	Knife-grinder, Ivory turner, Wax candles making, Organ builder, Trunk logging, Ball factory
Electrical and optical machinery and equipment	3	Instrument builder, Dynamo production, Production of gas meters	
Fabricated metal products, except machinery and equipment	9	Coppersmith, Tinsmith, Safe and stove factories, Galvanization Foundry, Nickel plating	Skate sharpeners, Blacksmith, Bicycle repairer, Solder and welding
Food products, beverages and tobacco	24	Breweries, Jenever distillery, Colza oil, Coffee-roasting, Coffee-grinding, Ice factory, Vinegar maker, Liquor distillery, Mineral distillery, Biscuit factory, Butter skimmer, Brandied fruits	Grain dealers, Mustard mills, Tobacco and cigar factory Bowel-saltery, Salt extraction / saltery, Fat rendering Flour purifier, Meat products, Oil crusher, Line seed / oil cakes, Dairy products, Sausage production
Hotels, pubs and restaurants	1	Hotels & pubs/ bars	
Leather, leather products and footwear (except clothing)	5	Tannery (salting), Tan yard (tanning), Saddlers, Ropers, Drying house	
Machinery and equipment	1	Steam engine factory	
Manufacturing, recycling, other industries	2	Fireworks, Oilcloth fabrication	
Mining and quarrying	2	Cutting stone, Stone excavation	
Other services	9	Rag-and-bone business, Launderette, Bleaching, Ironing, Garage	Foot warmers, Window-cleaners, Paint rooms, Carriage painter
Intermediate trade	2	Bottling plant, Smokehouses	
Pulp paper, printing and publishing	3	Printing house, Publishing house, Newspaper press	
Retail trade	6	Bakery, Butcher, Florist	Bookshop, Chemists, Fire and water-trade
Rubber and plastic products	0		
Textile, textile products and clothing	12	Weaving mill, Calico printing, Hatter, Cobbler, Tailor, Drapery, Silk factory	Bobbin lace, Furrier, Knitting factory, Fabric dyeing, Trimmings of fabric (silk, wool)
Transport (railway, road and water)	4	Workshop national railway, Wheel turner, Shipbuilding yard, Carriage builders	
Wholesale trade	1	Corn chandlery	
Wood and products of wood and cork	7	Wood turner, Cooperage, Furniture factory, Wood mills	Spades factory, Shrine makers, Carpentry
Sports and entertainment	1	Cinema	

*Represented at least once in Zwolle during the period under study.

FIGURE 1
Organizational diversity (*H*-index) for the period 1851-1914

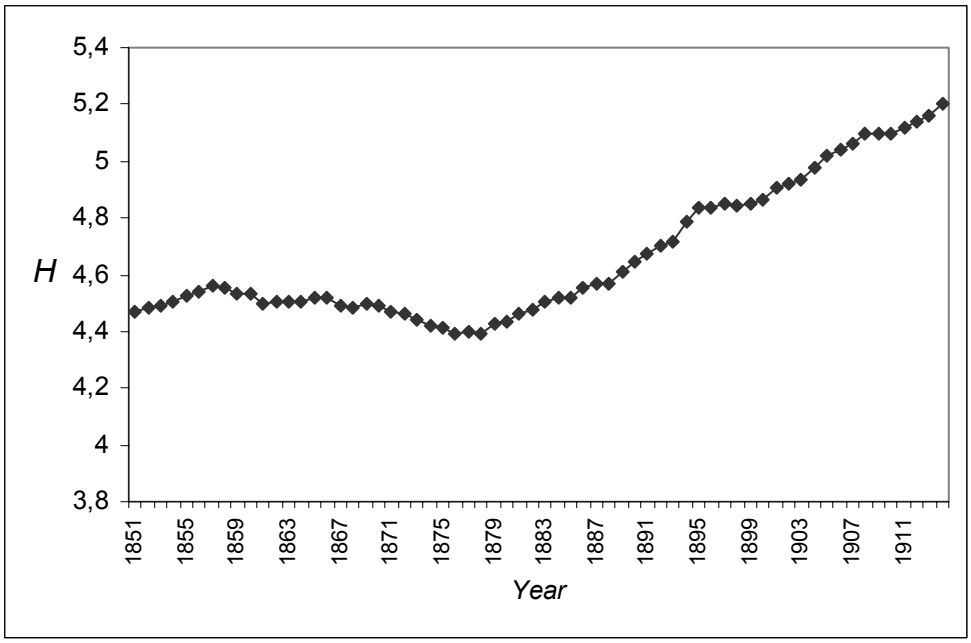

FIGURE 2
Religious pluralism (*H*-index) for the period 1851-1914

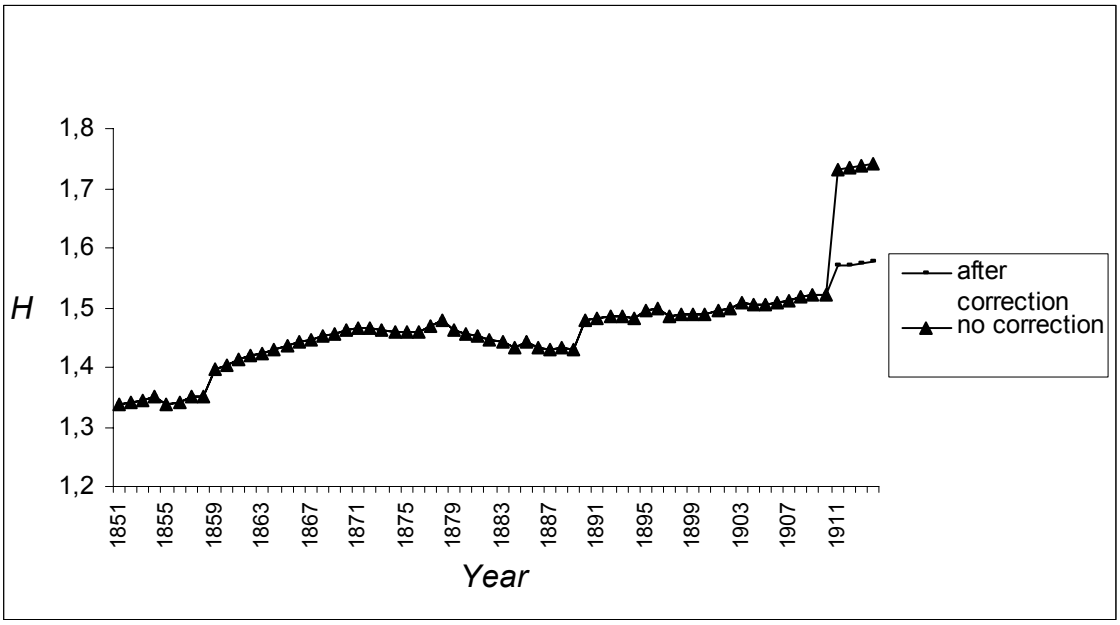

TABLE 1
The proportional distribution of private firms across the different industries in Zwolle

	1851	1861	1871	1881	1891	1901	1911
Agriculture, fishery and forestry	0.59	0.67	0.78	0.85	0.88	0.40	0.40
Building materials, earthen and glassware	1.19	0.84	0.78	0.85	0.66	0.40	1.00
Chemicals and chemical products	0.59	1.18	1.17	1.49	1.99	2.18	3.01
Construction	1.19	1.34	1.37	1.49	1.99	3.76	4.82
Craftwork	13.20	11.60	7.03	5.96	5.75	4.75	4.42
Electrical and optical machinery and equipment	0.15	0.34	0.39	0.43	0.44	0.40	0.80
Fabricated metal products, except machinery and equipment	8.01	8.91	10.55	11.70	12.61	13.66	12.85
Food products, beverages and tobacco	5.64	6.22	6.84	8.09	8.41	9.90	11.85
Hotels, pubs and restaurants	26.56	27.56	28.13	26.38	23.01	16.63	12.85
Leather, leather products and footwear (except clothing)	4.01	3.70	2.15	1.49	1.11	1.39	1.00
Machinery and equipment	0.00	0.00	0.20	0.21	0.22	0.20	0.00
Manufacturing, recycling, other industries	0.15	0.17	0.20	0.21	0.22	0.40	0.60
Mining and quarrying	0.89	0.67	0.59	0.43	0.66	0.99	1.41
Other services	2.08	2.35	2.73	2.77	4.42	4.75	5.22
Intermediate trade	0.00	0.00	0.59	0.64	1.99	4.75	4.82
Pulp paper, printing and publishing	1.19	1.18	0.98	1.06	1.33	1.39	1.81
Retail trade	25.07	23.87	26.56	28.72	28.98	29.50	28.11
Rubber and plastic products	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Textile, textile products and clothing	2.82	2.69	2.73	2.77	2.21	1.98	1.81
Transport (railway, road and water)	1.63	1.34	1.17	0.85	0.44	0.40	0.40
Wholesale trade	0.00	0.00	0.00	0.21	0.22	0.20	0.20
Wood and products of wood and cork	5.04	5.38	5.08	3.40	2.43	1.98	2.41
Sport and entertainment	0.00	0.00	0.00	0.00	0.00	0.00	0.20
TOTAL	100	100	100	100	100	100	100
# of private organizations	674	595	512	470	452	505	498

Note: Table compiled based on information provided in the municipality's annual accounts and other sources (see the main text).

TABLE 2
The proportional distribution of Zwolle's population over the major denominations

	1851	1861	1871	1881	1891	1901	1911
Catholicism	25.68	25.96	26.28	26.33	24.82	23.59	22.49
Liberal Protestantism	66.30	64.78	63.48	63.81	64.51	64.85	59.48
Orthodox Calvinism	0.99	2.01	3.39	3.56	3.63	5.05	9.61
Lutheranism	2.33	2.45	2.35	2.21	2.18	1.96	1.42
Baptism	1.47	1.47	1.40	1.30	1.19	1.19	1.15
Judaism	3.24	3.27	2.94	2.54	2.69	2.40	1.93
Other religions	0.00	0.06	0.16	0.24	0.98	0.98	0.51
Not religious	0.00	0.00	0.00	0.00	0.00	0.00	3.41
TOTAL	100	100	100	100	100	100	100

Note: Table compiled based on information provided in the municipality's annual accounts.

TABLE 3
Religious denominations in Zwolle 1851-1914

Religious denomination	Socio-economic position				Class
	Educational level	Occupational prestige	Family income	Kind of occupations	Representation in elite positions
Catholicism	4	6	5	Large group of day workers and farmers plus small group of factory owners	3
Liberal Protestantism	1	3	1	Better situated trades people and bourgeoisie	1
Orthodox Calvinism	3	2	3	Small trades people, skippers and craftsmen	2
Lutheranism	4	4	4	Trade men, farmers, publishers and distillers	4
Baptistism	2	5	6	Educated trades men and bourgeoisie	6
Judaism	3	1	2	Trades and health	5

Note: Table composed based on Erdtsieck (1988, 1989a, 1989b, 1990, 1991a, 1991b, 1995a, 1995b), Selderhuis (2006), Bank et al. (1993), Wintle (2000a and 2000b), and Ten Hove (2005). Rank 1 refers to highest and 6 to lowest socio-economic position and class. For the small categories "Other religions" and "Not religious" (as of 1911), no information was available, implying that no ranking could be applied.

TABLE 4
Descriptives and correlations

	Mean	SD	1	2	3	4	5	6	7
1. Organizational diversity	4.67	.24	1						
2. Religious pluralism	1.46	.06	.72*	1					
3. Railway	.80	.41	.31*	.77*	1				
4. Population without education	.61	.03	-.44*	-.64*	-.57*	1			
5. Δ inhabitants	256.49	242.95	.04	.09	.19	-.14	1		
6. Growth GDP (%)	2.17	3.24	.07	.09	.11	-.02	-.00	1	
7. # of private firms	523.14	65.17	-.25*	-.72*	-.89*	.58*	-.31*	-.09	1
8. # of activities	77.22	7.21	.99*	.75*	.37*	-.51*	.02	.07	-.33*

Note: Number of observations equals 64, except for growth and first difference variables were n equals 63.
* $p < .05$

TABLE 5
OLS regression estimates with organizational diversity as the dependent variable with Newey-West consistent standard errors

Variables	**Model 1**	**Model 2**	**Model 3**	**Model 4**
Religious pluralism (t-1)	5.38*** (.79)	0.67*** (.23)	-	-
# of activities (t)	-	.03*** (.0009)	-	.03*** (.002)
Predicted religious pluralism (t)	-	-	7.95*** (.82)	1.28*** (.46)
Railway	-.24 (.15)	-.01 (.02)	-.38*** (.09)	-.04 (.04)
Population without education (t-1)	-.37 (1.19)	.43** (.19)	1.28 (1.07)	.58** (.25)
Δ inhabitants (t-1)	.0001* (.00008)	.00008*** (.00002)	.0002** (.0001)	.0001*** (.00002)
Growth GDP (%) (t-1)	.002 (.005)	-.003** (.001)	.0004 (.004)	-.003** (.001)
# of private firms (t-1)	.001* (.0008)	.0005** (.0002)	.002** (.0005)	.00006** (.0002)
F-value (test whether all parameters except the constant differ significantly from zero)	19.57***	650.33***	65.66***	1071.81***

Note: Number of observations equals 62. Standard errors in parentheses.
* $p < .10$, ** $p < .05$, and *** $p < .01$ (two-tailed tests).