Resource-partitioning processes in the audit industry

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Abstract
This article argues that organizational ecology would benefit from comparative studies since the trajectories of organizational populations depend on the resource conditions under which these dynamics unfold. By comparing different settings, the boundary conditions of theories are determined and explanations sharpened. The article reports the results of a comparative study that starts from resource-partitioning processes that explain the counter-intuitive association between market concentration and the rise of specialist organizations. The authors set up an empirical study in the Belgian audit industry, comparing the findings with those of a study of the Dutch audit industry. Contrary to the Dutch setting, this study finds that the failure rate of small (large) organizations increases (decreases) with market concentration in the Belgian setting. The findings suggest that the shape of the resource space and the strength of exploitation economies mould market structure dynamics in predictable ways, and clarify the conditions necessary to trigger resource-partitioning.

Key words • audit industry • method of difference • mortality analyses • resource partitioning

Introduction
Since the publication of Hannan and Freeman’s (1977) seminal paper, many organizational ecology (OE) researchers have systematically analysed the vital (i.e. founding and mortality) rates of organizations in order to understand the dynamics of organizational populations. The almost exclusive focus on vital rates is typical for demographic and ecological approaches in any field of study, and is consistent with OE’s major assumption of organizational
inertia, implying that entry in and exit from organizational populations are the major drivers of structural change. The systematic, paradigmatic approach in OE has cumulated into an impressive body of knowledge and well-established theories within a relatively short period of time, which has been nicely summarized by Carroll and Hannan (2000).

The research strategy of OE has been one of searching for ‘general laws’: theories that are intended to apply to all kinds of organizational populations, in any time period, and in any society (Hannan and Carroll, 1992: 18). This search for generalities is OE’s strength, but is at the same time also its weakness. It implies that less systematic attention has been given to differences between time periods, populations and societies. However, given that exogenous, underlying characteristics of populations strongly constrain population dynamics and outcomes (Sutton, 1991), Boone and van Witteloostuijn (1995) argued that OE could make considerable progress by explicitly studying systematic heterogeneity (see also van Witteloostuijn and Boone, 2006). The systematic comparison of population dynamics under different resource settings would help OE researchers to identify the limits of generalization and to firmly specify the boundary conditions of different theories. Ultimately, it would help us to develop a badly needed theoretically grounded taxonomy that can serve as a conceptual framework for describing and understanding the diversity of organizational populations (McKelvey and Aldrich, 1983).

Recently, van Witteloostuijn and Boone (2006) developed such a theoretical framework, which highlights the boundaries of application of different theories, not only in OE but also in industrial organization (IO). Their resource-based theory of market structure and organizational form proposes that the distributive shape of the resource space, together and in interaction with the presence or absence of exploitation economies (i.e. scale or scope economies), determines firm behaviour, and ultimately population dynamics and market structure. Their theory implies that much can be learned by comparing the trajectories of populations under different resource conditions. In the present article, we apply this framework starting from OE’s resource-partitioning theory, which is developed to explain the frequently observed co-evolution of two trends in mature industries not often thought to be related: i.e. growing market concentration together with rising density (Carroll, 1985; Carroll and Hannan, 2000; Carroll et al., 2002). That is, many populations of organizations eventually segregate into so-called dual market structures, with a high-concentration market centre occupied by a small number of large generalist firms and a high-density market periphery with many but small specialist organizations. We demonstrate that this resource-based theory helps to better understand when exactly (i.e. under which conditions) resource-partitioning processes unfold, and what is expected to happen if a different set of conditions is in place. In this article, we compare the dynamics of two populations in the same profession, the Belgian
and Dutch audit industries, which are associated with resource conditions that differ dramatically. We hypothesize that in the Belgian, in contrast to the Dutch audit industry, resource-partitioning should not operate due to the absence of the main underlying drivers of the process. Rather, given the Belgian industry’s underlying conditions, we expect that small firm mortality will increase with concentration.

This article’s contribution is threefold. First, we offer a first (partial) test of van Witteloostuijn and Boone’s (2006) resource-based theory of market structure and organizational form. That is, we not only test the hypothesis that resource-partitioning does not evolve in the Belgian audit industry, so exploring the theory’s boundary conditions, but also the resource-based theory’s alternative hypothesis that this industry will reveal increased small firm mortality with rising concentration, given the underlying conditions.

Second, organizational theorists in general, and ecologists in particular, tend to selectively sample empirical settings where a theory is expected to hold. This does not only undermine a study’s external validity (i.e. generalizability), but also threatens its internal validity as it might bias estimates of focal variables (Denrell and Kovacs, 2008; Miner, 1993). Denrell and Kovacs (2008) demonstrate that the latter is especially the case for research focusing on explaining increments of path-dependent trajectories, such as organizational density over time. For instance, the selective sampling of large and successful populations can generate spurious non-monotonic density dependence as such populations are unrepresentative, featuring unusually high (low) entry (exit) rates. In a similar vein, resource-partitioning studies that often focus on populations with unusually high levels of market concentration and specialist density might also, to an unknown extent, be biased. Although we do not directly focus on the magnitude and nature of this potential bias in the present study, it does consider the important ‘matter of the feasibility of contrasting results’ by comparing two widely differing empirical settings (Miner, 1993: 360). Specifically, exploring the feasibility of different population dynamics in the Belgian setting, explicitly contrasting it to the ‘typical’ resource-partitioning case of the Dutch auditing industry, strengthens the meaningfulness of inferences that can be made (Miner, 1993).

Third, Stinchcombe (2005: 121) rightly complained that crucial insights are often missed as ‘we ordinarily want to spend as little time as possible on the theory of the context so as to spend as much as possible on the main subject of the research’. In this article, we emphasize the need to spend more time on the theory of the context – in the present case, the context of Carroll’s (1985) resource-partitioning theory. By doing so, deeper insights can be developed into the underlying conditions needed for resource-partitioning to evolve in the first place, and in the chain of causality implied by the theory. A comparative approach,1 such as the one developed in this article, helps to
firmly establish the boundaries of application of resource-partitioning theory, and to hypothesize about alternative outcomes.

**Resource partitioning**

Carroll (1985) distinguishes two ideal-typical types of organizational strategy profiles: generalists and specialists. A generalist organization aims its products at a broad range of consumer tastes in the market; it does so by making products or services with a broad appeal. A specialist organization, by contrast, shoots for a small range of very specific customer tastes (Hannan and Freeman, 1977). Accordingly, a generalist’s target range or niche is a broad region in the market, while a specialist occupies a small spot in the resource space’s periphery. The theory assumes that resource-partitioning generates a dual market structure when at least the following two necessary conditions are met: (1) a unimodal heterogeneous resource distribution (e.g. the distribution of customer taste) with a clear market centre, and (2) the presence of scale economies in the market centre (Carroll, 1985; Carroll and Hannan, 2000). As explained later, Boone and van Witteloostuijn (2004) argue that scope economies in the market centre ignite a similar segregation process that leads to a dual market structure, too. Such a dual market structure outcome is sustainable in the long run when organizations that try to straddle the market centre and periphery incur any type of scope diseconomies (Carroll et al., 2002; van Witteloostuijn and Boone, 2006). The theory contains two steps: one dealing with generalist behaviour and the other with the resulting viability of specialists.

Under the conditions described above, generalists have a strong incentive to maximize their appeal by focusing on the centre of the market and to establish themselves in the dense central region of the resource space. These market conditions therefore ignite an intense scale-based competition for resources in the market centre among generalists. Because of increasing returns to scale, the most intense competition occurs in the ‘densest’ or most abundant resource areas. Cost-efficient supply can take place here if a large market share can be obtained. Indeed, generalist organizations that manage to develop and protect positions in the dense centre possess potentially sustainable advantages over other (smaller) competitors. As a result, only the largest generalists squarely positioned in the market centre will survive and become dominant. This is the theory’s first part.

A major prediction, which is the second part of the theory, is that the rise to dominance of large-scale generalists in the centre (and thus increasing generalist concentration) frees resources in the periphery. This creates opportunities for specialists to supply those segments of the market that generalists, by strategic necessity, cannot service. Indeed, large generalists in many cases cannot exploit differentiation opportunities in the market
periphery without cost sacrifices, which implies the assumption of centre-periphery scope diseconomies (van Witteloostuijn and Boone, 2006). Such scope diseconomies may result from a variety of disadvantages, from reputation bottlenecks to stretching costs (Carroll et al., 2002). By competitive necessity, the centre’s generalists must therefore leave the fringe to small peripheral specialists.

To summarize, the theory invokes a competitive release mechanism to explain the resurgence of specialist organizations in the periphery (Hannan et al., 2002). As Hannan et al. (2002: 18) put it: ‘According to the view of the partitioning process we offer, the growth of very large, dominant organizations in the center (concentration) comes at the expense of organizations in the near-center and the demise of the latter removes a powerful competitive constraint on organizations in the periphery.’ Consequently, generalist concentration increases the viability of specialist organizations in the periphery (i.e. increases their founding rate and reduces their hazard of mortality). The end result is a dual market structure.

Such market segregation can also be triggered by the presence of scope economies in the market centre igniting sunk-cost investment escalation among generalist organizations (Boone and van Witteloostuijn, 1995, 2004; Sutton, 1991; van Witteloostuijn and Boone, 2006). By heavily investing in advertising and/or R&D, the leading generalists seek to establish brand recognition in the market centre. The heavy investment in objective (through R&D) and/or subjective (through advertising) product quality has to be recouped by conquering a large market centre share. In fact, this implies that the high-mass centre of the resource distribution is segmented into niches, where multi-product generalists struggle for dominance. So, again, surviving generalists are large market players, though for different reasons, as now competition for the market centre is driven by multi-product differentiation (scope) rather than single-product cost efficiency (scale).

As the large, leading, market centre, multi-product generalists accumulate impressive investment expenditures in a cut-throat race for market centre dominance, price-sensitive market niches in the periphery are opened up for small specialists with low-priced and investment-inextensive products (Sutton, 1991). In other words, the principle of competitive release also applies in the scope economies case. Although there are subtle differences between both cases, one should recognize that, irrespective of the type of (i.e. scale or scope) economies that drives escalation of competition among generalists for market centre resources, the major prediction remains the same: generalist concentration increases specialist viability (Boone and van Witteloostuijn, 2004). Note also that in many industries, including the (Dutch) audit industry, both scale and scope economies are simultaneously present, amplifying the competitive escalation and resource-partitioning processes.

Indeed, studies of many organizational populations over time have documented that, as generalist concentration increases, the founding rates
of specialist organizations often do rise and/or their mortality rates often do decline (see the extensive review in Carroll et al., 2002). Empirical research in this tradition is very demanding as one needs longitudinal data of each and every organization in a given population in order to test resource-partitioning hypotheses. As a result, it is not surprising that almost all researchers tended to focus on populations in which (1) segregation can readily be observed at first glance by looking at graphs of market concentration and density over time and/or (2) the assumed necessary conditions for resource-partitioning to unfold are met.

Two exceptions are the study of Dobrev (2000), who analysed the effect of decreasing concentration in the Bulgarian newspaper industry on specialist newspapers’ founding and exit rates between 1987 and 1992, and Kuilman (2005), who studied the return of specialist foreign banks from Hong Kong into Shanghai in the 1990s. Take Dobrev’s study, as an illustrative example. He finds evidence for the reversibility of the resource-partitioning process in a period of resource depletion for specialist mortality but not for specialist foundings. Specifically, as expected, decreasing concentration increased the risk of disbanding for specialists. This study is important as it shows that the implicit assumption of a symmetric effect of industry concentration on specialist survival cannot be rejected.

Such a selective empirical research strategy has implications with respect to the level of confidence with which one can draw causal inferences based on this cumulative body of findings. Specifically, much stronger claims can be made with respect to the causal impact of independent variables when no (or other) associations between concentration and outcome variables can be detected in empirical settings in which the conditions for resource-partitioning to occur are not met. Although such comparative analysis is necessary to infer strong causation, it did not receive sufficient attention in a resource-partitioning context – or any other in organization and social sciences, for that matter (Lieberson and Lynn, 2002).

In fact, designing and evaluating a comparative study is precisely what we want to do here. We start from Boone et al. (2000), who show that resource-partitioning processes forcefully operate in the Dutch audit industry in the 20th century (for a detailed description of the Dutch data, we refer to Maijoor et al., 1995). Specifically, they predict and find that as the necessary conditions for resource-partitioning explicated above are present in the Dutch audit industry, market concentration (with the steady growth of a few large international audit firms) decreases the exit rate of specialist organizations. We collected similar, original data in the Belgian audit industry and suggest that as the main underlying drivers of the resource-partitioning process are not present in this particular setting, we should not be able to replicate the Dutch models in the Belgian context. Instead, we use van Witteloostuijn and Boone’s (2006) resource-based theory of market structure and organizational form to specify exactly the opposite of the Dutch experience.
The Dutch and Belgian audit industries compared

Recall that resource-partitioning processes and dual market structures unfold from the escalation of scale or scope-based competition (cf. presence of exploitation economies) between generalist organizations that fight for a viable position in large market centre niches (cf. a heterogeneous distribution of resources with a resource-abundant market centre). With both conditions in place, the benefits of being large are so compelling that resource-partitioning processes are triggered. In the following, we compare the Dutch and Belgian audit industries with regard to both key features.

Exploitation economies

Over the 20th century, the sunk investments required to supply audit services increased dramatically due to growing regulatory complexity and the development of audit innovations. As the sunk costs in developing and maintaining audit expertise can be more fully exploited by building large client bases and by offering clients related advisory services (such as tax preparation, internal control system design, consulting and personnel placement), audit firms had a strong incentive to grow and to diversify, offering an integrated range of specialized expertise and services (Benston, 1985; Maijoor, 1994; Yardley et al., 1992). This actually happened in the Netherlands, where a few audit firms developed into large diversified organizations.

The stricter nature of Belgian audit market regulation compared to the Dutch regulatory environment hampered the growth of Belgian audit firms and the resulting scale-based competition (see Maijoor and van Witteloostuijn, 1996, for an analysis of Dutch audit regulation). Scale and scope economies are more difficult to realize in Belgium, for several regulatory reasons. First, Belgian audit firms are not allowed to offer non-audit services, such as tax preparation, consulting and book-keeping services, to audit clients within the same legal entity (see, for example, Law of 22 July 1953, art. 18). Because they are not able to exploit their audit client base to cross-sell non-audit services, Belgian audit firms faced restrictions in becoming large, full-service providers. These restrictions set limits to the extent of diversification of Belgian audit firms and, as a result, dampen the sunk-cost investment escalation for market share dominance. Such regulatory restrictions were not imposed upon Dutch audit firms in the period under study.

Second, the contract length linking an auditor with a client is fixed by law in Belgium to three years, which is renewable afterwards. In the Netherlands, in contrast, there was no regulation on the length of the appointment of an auditor in the period under study. Such regulation can be expected to restrict market share mobility in the Belgian audit industry, as each audit firm is tied to its clients for at least three years. Evidence suggests that auditor switching is indeed lower in Belgium than in the Netherlands. Vanstraalen (2003)
reports an annual switch rate of 3.1 percent (voluntary and involuntary switches) in a sample of 874 Belgian companies in the period 1994–6. Branson and Breesch (2004) estimate that the voluntary annual switch rate was 1.1 percent in the period 1993–6 (sample of 15,968 Belgian companies). For comparative purposes, we conducted a preliminary analysis on a sample of 500 Dutch companies in the period 1993–4, and found an annual switch rate (again, aggregating voluntary and involuntary switches) that is at least twice as high as the estimates in Belgium, i.e. 6.6 percent.

Third, Belgian audit firms are required to report the number of audit hours and fees for all statutory audits to the professional body (Law of 22 July 1953, art. 18). The intention of this law is to allow the professional body to monitor the quality and price of audit services. Specifically, the body controls whether the audit fee correctly reflects the time invested in producing the audit (Law of 22 July 1953, art. 9). Obviously, such regulation hampers price competition to gain market share, reduces the likelihood of low-balling and creates a barrier for firms to grow. In contrast, in the Netherlands there is no such regulation, which makes it easier for Dutch firms to compete on price. For instance, a Dutch audit firm could in principle perform an initial first-year audit engagement at a minimal audit fee, recovering this loss by simultaneously offering lucrative consulting services. Such strategic behaviour would not be possible in Belgium.

Fourth and finally, until 1991, Belgian audit firms were not allowed to use international brand names, and were required to stick to their local name. Hence, brand names of the large international audit firms, such as KPMG, Ernst & Young, Price Waterhouse and Coopers & Lybrand, were only introduced in the Belgian audit market in 1991. In contrast, large international audit firms such as Andersen, Arthur Young, Deloitte, Haskins & Sells and Coopers & Lybrand already competed in the Dutch audit market in the 1970s. Such regulation evidently limits the escalation of sunk-cost investments in reputation and brand name in Belgium.

**Resource distribution and market centre**

The resource distribution of audit firms is primarily shaped by the characteristics of the demand side (i.e. organizations requiring audit and related services), which is very different in Belgium compared to the Netherlands. Demand-side concentration started to rise substantially in the Netherlands from the 1960s onwards, resulting in the emergence of large client niches (the so-called market centre) where scale-based competition among generalists unfolded. Globalization of the world economy accelerated this process as the Dutch economy has always been internationally oriented, with many Dutch-based multinational enterprises profiting from growing international business opportunities. Dutch multinational enterprises such as Akzo Nobel, Heineken, ING, Philips, Royal Dutch Shell and Unilever reflect a
surprisingly large market centre for a country as small as the Netherlands. The so-called ‘size isomorphism’ principle forced Dutch audit firms to follow the pace of the dramatic, international growth of their clients. The reason is that large clients require the (worldwide) service of hundreds of auditors. A group of small audit firms might technically be able to do the job, but the cost of coordination would be outrageous (Benston, 1985). These processes ignited fierce competition among the already larger audit firms for market dominance. Not surprisingly, Langendijk (1990) estimated that the Big Four Dutch audit firms performed 97 percent of the audits of all listed (and thus larger) companies in the Netherlands in 1990.

In the Belgian audit industry, however, the resource environment is much more fragmented, reducing incentives for audit firms to grow and become large. That is, there are no comparable big-client niches that ignited scale-based competition and pulled Belgian audit firms towards a market centre. As the Belgian economy is dominated by small and medium-sized companies, counting numerous family businesses, the extent of demand-side market concentration has never reached the same significance as in the Netherlands. In addition, there are no large-scale Belgian multinational companies that forced Belgian audit firms to co-evolve with their international clients. In Table 1, we report the sales of the four largest audit clients as a percentage of GNP for the period from 1955 to 1994. These figures provide clear evidence for the large differences between the Belgian (fragmented) and Dutch (concentrated) audit firm resource environments.

**Market structure and survival of specialist audit firms**

Boone et al. (2000) argued that, in the Netherlands, the escalation of competition among large generalist audit firms ultimately resulted in the repositioning or movement of these firms towards the large niches in the

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<tr>
<th>Year</th>
<th>Belgium</th>
<th>Netherlands</th>
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<tbody>
<tr>
<td>1955</td>
<td>8.4%</td>
<td>58.7%</td>
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<tr>
<td>1960</td>
<td>8.3%</td>
<td>60.4%</td>
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<tr>
<td>1965</td>
<td>7.9%</td>
<td>62.0%</td>
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<td>1970</td>
<td>9.0%</td>
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<td>1975</td>
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<td>1980</td>
<td>9.6%</td>
<td>66.8%</td>
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<td>1985</td>
<td>12.9%</td>
<td>60.9%</td>
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<tr>
<td>1990</td>
<td>13.6%</td>
<td>49.0%</td>
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<tr>
<td>1994</td>
<td>13.7%</td>
<td>46.3%</td>
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market (the so-called market centre) and the opening up of resource space for small specialist audit firms (in the so-called market periphery). These small specialists possess special competitive advantages in the small-client niche in the audit market where the large generalists also operate. Their less standardized, low-overhead approach compared to large generalist centre players gives them the advantage of temporal flexibility and a customized approach to client service. The latter is especially important for small business managers, who need personal advice on many issues including tax preparation, book-keeping and IT at relatively low cost. Clearly, the conditions for resource-partitioning appear to be firmly in place in the Dutch audit industry. Given that niche width (i.e. specialism and generalism) and firm size are strongly related in the Dutch audit industry, the following testable implication follows from this story: the effect of market concentration on the exit rate will be smaller for small as opposed to large audit firms. This hypothesis was clearly confirmed by Boone et al. (2000).

In Belgium, however, the relative absence of substantial scale advantages resulting from strict audit market regulation together with a fragmented resource environment precludes the development of a ‘division of labour’ at the population level between large dominant generalists specializing in serving the centre, on the one hand, and specialists occupying the peripheral market niches that have been released by competitive escalation among the generalists, on the other hand. Note that resource-partitioning goes hand in hand with an increasing competitive distance between generalists and specialists (Boone et al., 2004). This explains the success of specialist organizations in concentrating markets even when scale or scope economies are substantial. Specialists then enjoy the positional benefit of soft competition, although they have a size- or scope-related cost disadvantage. In a fragmented resource environment, however, each firm potentially is a direct competitor of every other firm. Due to the absence of segregation between generalists and specialists, successful performance of a focal firm (e.g. growth and survival) may go at the expense of other competitors. From this line of reasoning, it follows that we expect the usual resource-partitioning prediction – i.e. concentration releases resources for specialist organizations – not to hold in the Belgian audit industry:

**HYPOTHESIS 1** In contrast to the Dutch audit industry, the negative effect of market concentration on the exit rate of small firms is absent in the Belgian audit industry.

Instead, using the predictions in van Witteloostuijn and Boone (2006), we can specify what alternative outcome to expect in the specific setting of the Belgian audit industry. As explained earlier, we argue that the Belgian audit industry is associated with the following pair of conditions, in contrast with its Dutch counterpart: (1) the resource space is much more fragmented,
as a clear and substantial centre with large client firms is missing; and
(2) exploitation economies are much less substantial, since all kinds of
regulatory restrictions constrain Belgian audit firms. From this, van
Witteloostuijn and Boone's (2006) logic runs as follows. Due to the absence
of a clear market centre that positively reinforces size-based competition,
there is no collective movement of the competitive position of generalist
audit firms towards the market centre. To put it differently, all audit firms,
be they small or relatively large, are competing for similar resources, and
can be regarded as direct competitors in a relatively fragmented market.
Concentration of similar or homogeneous resources results in a condensed
resource space (van Witteloostuijn and Boone, 2006: 414).

In such a setting, concentration is expected to go at the expense of
smaller firms for two reasons. First, although we argued that scale advantages
are smaller in Belgium, larger audit firms do have some scale advantage over
smaller competitors because fixed and sunk-cost investments can be spread
over a larger number of clients, resulting in lower average costs for larger
audit firms, ceteris paribus. In addition, larger audit firms are less sensitive to
demand fluctuations (Carroll and Hannan, 2000). Second, because generalists
do not position themselves firmly in a market centre, growing concentration
does not increase the competitive distance between specialists and generalists.
As a result, smaller firms cannot compensate for their scale disadvantage by
specializing in the market fringe in order to benefit from weak competitive
pressures from larger generalists. Such markets tend to behave according
to the stylized laws described in standard IO economics. That is, when the
market share of the largest companies increases, small firms are pushed out of
the market. Then, ultimately, van Witteloostuijn and Boone (2006) predict
either a concentrated or a fragmented market structure, depending upon the
relative degree of scale economies.

Note that Boone et al. (2004) report findings consistent with this logic
in the Dutch newspaper industry. Specifically, they observe that inside the
Randstad, national dailies (generalists) and regional newspapers (specialists)
are direct competitors so that escalation of competition, and the resulting
concentration among the nationals, goes together with a shrinking niche for
regional newspapers, suppressing their growth opportunities. Interestingly,
Baum (1995) reports that the resource-partitioning model, which predicts
that the failure rate of small organizations decreases with increases in
market concentration, is not supported in his study. His estimates, in fact,
unexpectedly reveal that market concentration systematically reduces the
survival chances of small Manhattan hotels. We speculate that this is precisely
because the resource space of the Manhattan hotel industry does not have a
market centre and a periphery, but rather is fragmented and condensed. So,
from their Figure 3 and the associated propositions in van Witteloostuijn
and Boone (2006: 418–21), we therefore have:

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HYPOTHESIS 2 In contrast to the Dutch audit industry, the effect of market concentration on the exit rate will be larger for small as opposed to large firms in the Belgian audit industry.2

Data and methods

Data setting and sources

The Belgian auditing profession was created by law in 1953. The developments that eventually led to the creation of a profession of independent auditors had already started in 1873 with the introduction of the 1873 Company Law (De Beelde, 2002). According to this law, limited liability companies were required to publish financial statements that are reviewed by a supervisory body. Since these commissaires were not independent from company management, they are not regarded as independent auditors, however.

A next step in the development of the Belgian auditing profession is the Law of 9 July 1935, prescribing statutory audits for banks and the institution of the bankrevisor (auditor of banks). This was a reaction to the financial crisis in the 1930s, after which the government wanted to obtain more control over the banking industry. These bankrevisors were merely civil servants and, similar to commissaires, were not considered as independent auditors (De Beelde, 2002). After the Second World War, both the increased size of companies and the introduction of a system of labour involvement in company management increased the need for independent auditors. The government then decided to create the profession of auditor (bedrijfsrevisor) and a professional association of auditors, the Instituut der Bedrijfsrevisoren, by the Law of 22 July 1953. The Law of 1953 authorizes bedrijfsrevisoren to conduct services in the fields of preparation, reviewing and auditing financial statements. In the years thereafter, as a result of other laws, bedrijfsrevisoren were granted the monopoly in a number of statutory assignments. The year 1953 is generally regarded as the birth of the Belgian audit industry (De Beelde, 2002), although it still took three more years before the Law of 22 July 1953, was applied and the institute of auditors was created in 1956.

In the early years of the Belgian audit market, the profession was organized around the ‘liberal profession’ concept, with only sole practitioners operating as auditors. Later, sole practitioners organized as partnerships, in which partners shared expenses and profits but still acted as individual auditors. The first partnership of auditors entered the Belgian market in 1966 (Berger, Block, Schellekens & Co. – an association of four auditors). Gradually, these partnerships started to expand not only because clients became larger, but also because a minimal critical mass helped to gain efficiency in personnel planning and to capture growth opportunities. This trend was institutionalized by law in 1985, when audit firms, instead of individuals only, were enabled to act as statutory auditors. The steady development from
sole practitioners to partnerships and large audit firms was also observed in the early years of the Dutch audit industry, and appears to be typical for the audit profession. At the end of the observation period, the large Belgian audit firms were partnerships of about 50–80 auditors, employing 300–500 employees with sales figures of about €25–50 million.

The database we compiled contains information on each and every Belgian audit firm that existed between 1956 (the year of application of the Law of 22 July 1953) up until the beginning of 1994. The main sources we used to identify firms are the membership lists of the Belgian auditor association (cf. Maijoor et al., 1995, for the Dutch case). These lists are published annually and record information at the auditor level, providing data on, among other things, the name, address and employment affiliation of every auditor. To reconstruct the life histories of audit firms, we aggregated this information to the firm level. By comparing successive membership lists, we registered important firm events such as year of founding and exit, and the number of auditors working in a firm in any particular year.

As in Boone et al. (2000), we distinguish three types of founding: (1) \textit{de novo} founding (firm X appears on the source list with auditors entering the profession for the first time), (2) founding by spin-off (firm X appears on the source list with auditors who were previously employed by another firm that still appears on the source list) and (3) founding by merger (firm X appears on the source list with auditors that were previously employed by firms Y and Z, which both disappeared from the source list). Following Bröcheler et al. (2004), we discern three types of exit: (1) pure exit (firm X disappears from the source list and its auditors do not work in public practice anymore), (2) exit by acquisition (firm X disappears from the source list and its auditors reappear the following year in a firm that already existed) and (3) exit by merger (firms X and Y disappear from the source list, while the auditors reappear under the heading of a new firm Z). We observed a total of 593 exits (296 pure exits, 108 exits by merger and 189 exits by acquisition). Finally, firms that change their name but of which the majority of auditors remain the same are treated as continuing firms. Based on these coding rules, the database contains the life histories of 771 audit firms in the period 1956–94. These rules were also used in compiling the data on the Dutch audit market.

Although our database contains information on all Belgian audit firms that existed between 1956 and 1994, some of these were already founded before 1956, acting as book-keepers. Unfortunately, the data on the Belgian auditing profession do not contain information on (book-keeping) firms that were founded and disappeared before 1956. We deem that this left censoring is not problematic in the present case as the number of missing firms is in all likelihood very limited. To estimate the age in 1956 of the audit firms in our database that were founded before 1956, we used the following rule of thumb. As all firms in 1956 were sole-practitioner firms, the age of the
firms is strongly associated with the age of the auditor. We could therefore
deduce the year of founding by means of the age of the auditor in 1956, and
the average time it takes to become an auditor in Belgium (university degree
plus, on average, eight years to complete the auditor examinations).

Variables

As this study is designed to replicate the Dutch audit industry findings,
we took care to follow the operationalizations and methodology of Boone
et al. (2000) as closely as possible. In the following, we explicitly indicate
when the approach in the present article differs from theirs. We want to
model the mortality rates of audit firms, defined as exit from the market. As
already mentioned, we discern three types of exit: (1) pure exit, (2) exit by
acquisition and (3) exit by merger. Besides estimating models in which we
do not differentiate between the different types of exit (as in Boone et al.,
2000), we also try to separately predict pure exit, on the one hand, and exit
by merger and acquisition, on the other hand. We combine exit by merger
and acquisition as our coding rules used to distinguish both types are not
very sharp. In addition, we want to avoid the complications associated with
estimating relatively rare events.

The major independent variables necessary to test our hypotheses are
audit firm size, market concentration and the interaction between size
and concentration. Organizational size is measured in two ways: (1) by
counting the number of auditors of an audit firm; and (2) by creating a
dummy variable indicating whether the firm is a single proprietorship or not.
Following Boone et al. (2000), Baum (1995) and Dobrev et al. (2002), this
implies that we use organizational size as a proxy for generalism. As explained
at length by Dobrev et al. (2002), this is a legitimate approach because
generalist competition tends to be primarily scale-based. The reason is that
if ‘the resource distribution is unimodal, then very large size usually implies
generalism on some important environmental dimension’ (Dobrev et al.,
2002: 240). Only in the exceptional case of polymodal resource distributions
and substantial scope economies, could specialists, at least theoretically, grow
very large.

Because of the historical significance of the Big Eight audit firms, we
used the eight-firm concentration ratio ($C_8$) to assess market concentration,
as in Boone et al. (2000). This ratio measures the sum of the market shares,
in terms of the number of affiliated auditors, of the eight largest audit firms.
We check the robustness of our findings by also estimating models with the
more usual four-firm concentration ratio ($C_4$).

Unlike Boone et al. (2000), we could not include two firm-level human
capital variables (i.e. average education of auditors and average number of
years of experience of auditors) as control variables in our models due to
the unavailability of this information in the Belgian setting. We did control
for age dependence in the mortality rate by using a piecewise constant rate specification with five age-defined period dummy variables (i.e. age periods 0–5, 5–10, 10–20, 20–30 and >30). Note that the findings presented in the following section are not sensitive to the choice of different age periods. We also incorporated four population-level control variables common in this type of model: (1) population mass, calculated as the total number of auditors employed each year, to control for the potential mass dependency of the exit rate (Baum, 1995; Hannan and Carroll, 1992); (2) the annual number of foundings; (3) audit firm density in each year; and (4) density squared in each year. Consistent with the well-established stylized fact in OE, we expect that density first decreases the exit rate due to its form-legitimating function up to a point where further increases in density raise competitive intensity, which pushes the exit rate up (Carroll and Hannan, 2000). We could not measure fixed density at founding, as in Boone et al. (2000), because of our short left-censored observation period.

We incorporated six additional controls to account for the specifics of the Belgian audit industry. The first two dummy variables trace important shifts in the carrying capacity in the Belgian audit market. Before 1976, most audits were requested by firms on a voluntary basis, except for financial institutions and public sector organizations for which statutory audits were obliged by law. The number of the latter organizations was limited, though. In 1976, however, the Companies Act introduced the statutory audit of all large and medium-sized public limited liability companies (dummy equals 0 before 1976, and 1 otherwise). A second shift occurred in 1985 after the introduction of the Fourth European Community Directive, which stipulates that all large and medium-sized private limited liability companies and incorporated partnerships had to audit their annual accounts (dummy equals 0 before 1985 and 1 otherwise). Both events dramatically increased the demand for audit services.

The third period dummy controls for the empirical observation that the industry did not experience pure exit events before 1962, and mergers and acquisitions before 1965. A plausible explanation for this ‘industry honeymoon period’ is the large investment in human capital (i.e. in years of education) an individual has to make before she or he is allowed to operate as an auditor. Such sunk investments, together with the limited competitive pressure at the onset of the industry, might have postponed early firm exits. This dummy variable equals 1 before 1962 and 0 otherwise (in the models in which we predict the merger and acquisition rate the period dummy equals 1 for the years before 1965 and 0 otherwise).

Fourth, there are three official languages in Belgium, use of which is to a large extent regionally confined: French in the Walloon part of the country, Dutch in Flanders and German in a small area in the east of the country. The capital of Brussels is French-dominated, but officially bilingual (French and Dutch). Each auditor has to be enlisted in a language register.
(note that a German-language register does not exist), indicating the main official language she or he employs. We aggregated this information at the firm level to determine the language niche to which the firm belongs. Three indicator variables were constructed: Dutch (1 if all auditors are enlisted as Dutch and 0 otherwise), French (1 if all auditors are enlisted as French and 0 otherwise) and mixed (1 if the auditors of a firm are not homogeneous with respect to language and 0 otherwise). The last sometimes occurs in audit firms located in Brussels, and in larger firms that service different language groups. Including these variables is important as it is likely that clients choose audit firms, among other things, that match the language of their mother tongue. In addition, by doing so, we also control for regional heterogeneity, as there is almost a perfect overlap between region and language use. In the models, the French-language audit firms serve as reference category.

Fifth, we created a dummy variable to indicate the firms that were founded before 1956. We did so to check whether their failure rate systematically differs from audit firms that are not left-censored. Finally, we also included a dummy variable that controls for the type of founding being either de novo (value 1) or de alio (founding by spin-off or merger, with value 0), as it is possible that the failure rate depends on the industry experience of the founders.

Given the fragmented nature of the resource distribution in the Belgian audit industry, we also investigate whether the size-localized theory of competition (Baum and Mezias, 1992; Hannan and Freeman, 1977) applies in this setting. If indeed resource-partitioning appears to be absent, then a size-based crowding argument could reflect a relevant alternative competitive process. This theory argues that organizations of different size depend on different mixes of resources, implying that patterns of resource use will be specialized to segments of the size distribution (Baum, 1995). As a result, competition between large and small organizations will be relatively low compared to competition between organizations of similar size. Medium-sized firms especially will suffer from being positioned in a crowded spot as they experience competition from organizations at both ends of the size distribution (Baum, 1995; Hannan and Freeman, 1977). In the present article, we test this argument by computing the audit firm’s relative size as suggested by Dobrev and Carroll (2003), which is defined as the focal firm’s size divided by the size of the largest firm at time $t$. If size-localized competition is present, then one should find that firms with small and large relative size would have lower exit rates compared to firms with intermediate relative size. Consequently, to test for this alternative theory, we estimate models with relative size and the square of relative size included, expecting an inverted U-shape relationship with exit rates.5

Every independent variable is measured at the beginning of each observation year. In other words, the independent variables are all lagged one period in the models presented in the following subsection. The descriptive
statistics are presented in Table 2. Table 3 shows the correlations among all variables under study.6

**Modelling framework**

The dependent variable in the event-history analysis framework is the instantaneous rate of audit firm exit, which is defined as:

\[
   r(t) = \lim_{dt \to 0} \frac{Pr(\text{exit } t, t + dt \mid \text{no exit by } t)}{dt},
\]

where \(Pr(.)\) is the probability of a firm experiencing exit from the market between \(t + dt\), conditional on being at risk for the event at \(t\). The specific rate models we estimate are piecewise constant-rate exponential models of the general form:

\[
   r(t) = \exp(\pm_l + A\pm),
\]

where \(\pm_l\) is a constant coefficient associated with the \(l^{th}\) time period, \(A\) is a row vector of covariates and \(\pm\) is an associated vector of coefficients assumed

**Table 2  Descriptive statistics**

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\(^aN = 8328.\)
### Table 3  Correlation matrix\(^a\)

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\(^a\)First order correlations, \(N = 8328\). \(* p < .05\).
not to vary across time periods (Blossfeld and Rohwer, 1995; Carroll and Hannan, 2000). The piecewise constant-rate model is useful because then no specific assumptions are made about the age dependence of the exit process. Exit rates are specified as log-linear functions of the covariates, so estimated failure rates are constrained to be positive. Because the covariates vary over time, firm histories were split into yearly intervals and covariates were updated at the beginning of each interval. Time-varying covariates imply repeated observations of the same firm. As a result, the assumption of independence of the observations is highly questionable, meaning that the conventional estimate of the variance–covariance matrix of the coefficients (and, hence, the standard errors) is not appropriate. Therefore, the significance of the estimated coefficients will be evaluated by means of robust standard errors based on the Huber/White/sandwich estimator of variance, which takes the clustering of observations on firms into account. We used STATA (version 9.1) to estimate the vector of parameters by the method of maximum likelihood.

Findings

In Figures 1a and b, we plot the concentration ratio ($C_8$) and density ($N$), respectively, as a function of time.

Two observations are worth making. First, the dynamics of concentration and density are remarkably similar to the pattern observed in the Dutch audit industry if one considers the entire period. That is, also in Belgium, a rising level of market concentration (from $C_8 = 7.34$ percent in 1956 to $C_8 = 35.49$ percent in 1994) goes together with a growing firm density (from $N = 109$ in 1956 to $N = 341$ in 1994). At first glance, this co-evolution (especially since 1985) of both trends goes against our claim that resource partitioning did

Figure 1a  The $C_8$ of the Belgian audit market between 1956 and 1994
not occur in the Belgian audit industry. However, as is demonstrated later, more in-depth analysis reveals that such a conclusion is precarious. Second, the absolute level of concentration is much lower in the Belgian compared to the Dutch audit industry. In the beginning of the 1990s, the Dutch $C_8$ reached almost 70 percent, which is twice as high as the concentration level in Belgium. This large difference provides preliminary evidence for our argument that the compelling drive for dominance did not (yet) occur in the Belgian audit industry.

Table 4 presents the models estimated to test our hypotheses. Models 1 to 4 use $C_8$ as a concentration measure, as in Boone et al. (2000). Models 1 and 2 include single proprietorship as our firm size measure, as well as its interaction with $C_8$. In Models 3 and 4, we substitute single proprietorship for the number of firm employees (i.e. log size). We decided not to simultaneously enter the variables single proprietorship and log size in the equations, as in Boone et al. (2000), because both variables are highly correlated in the Belgian setting (–.85).

Before turning to the focal results, we comment on the estimates of some important control variables. First, as in Boone et al. (2000), we observe a similar pattern of non-linear age dependency of the hazard rate. The rate first decreases up unto the age of 10–20 years, and then increases as firms grow older.

Second, Boone et al. (2000) found the surprising result that exit first rises and then tapers off with density. This finding is precisely the opposite of the stylized fact observed in OE research (Carroll and Hannan, 2000). Interestingly, the same results seem to hold in the Belgian audit industry, too. The models in Table 4 consistently show that the competition effect

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**Figure 1b** The density of the Belgian audit market between 1956 and 1994

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Table 4 Hazard rate models of audit firm exit between 1956 and 1994 (all events)\textsuperscript{a}

<table>
<thead>
<tr>
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*Independent variables are lagged one year. As a result, the number of spells equals 7419 (with number of firms and exits equal to 771 and 482, respectively). Robust standard errors, adjusted for within-firm clustering of observations, are reported in parentheses. † < .10, *.05 < p < .01, ** p < .01.
of density, spurring the exit rate of audit firms, strongly dominates. Taken together, both in the Belgian and Dutch audit industry context, no evidence was found for the density-related legitimation process generally observed in empirical OE studies. A plausible explanation for the Belgian context is that the role of the state was very important in establishing the audit profession. In such hierarchical organizational fields, legitimacy is imputed top down, which downplays the role of collective action (and density) in gaining taken-for-grantedness (De Beelde, 2002; for an explanation for the Dutch context, see Bogaert et al. 2006). Another, explanation is that our study has a short left-censored period, which might affect tests of the legitimation effect of density (Carroll and Hannan, 2000).

Third, the number of entrants is the only control variable where the Belgian estimate is different from the Dutch one. In the Netherlands, contemporaneous foundings significantly increase subsequent exits, while in Belgium this coefficient is negative but not significant. To summarize, with one exception, the estimates of the control variables, shared in both studies, are very similar.

As far as the other control variables are concerned, the hazard of exit surprisingly is significantly higher in the period after the introduction of the law of 1976. This dummy variable probably captures other time-related factors over and above the carrying-capacity-increasing institutional change. Finally, the models show that size-localized competition does not hold in the present setting. That is, both relative size and relative size$^2$ are non-significant in all models.

Before turning to the estimates of our focal variables, we first summarize the main findings of Boone et al.’s (2000) Dutch audit industry study: (1) the main effects of single proprietorship and log size were not significant, which was, at first glance, unexpected given the robust finding of previous research indicating that size decreases the hazard rate of mortality (Carroll and Hannan, 2000); and (2) the parameter of the interaction $C_8 *$ single proprietorship was significantly negative, and of $C_8 *$ log size was significantly positive. For the period 1896 to 1992, the interactions appeared to be monotonic. Specifically, the overall positive impact of concentration on the hazard rate decreases when audit firms are smaller. Sub-period analyses revealed that the interaction effects were especially pronounced before 1971 – a period in which the rules of the game were not yet fixed by law. After 1971, important laws were passed that strongly regulated both the supply and the demand side of the Dutch audit industry. Boone et al. (2000: 376) conclude that ‘because the effects are strongest in the unregulated area, competition among the different organizational forms does indeed seem the force driving resource-partitioning processes…. We speculate that the ecological process causing a dual market structure was accelerated and institutionalized by law.’ Note that the interaction effects were non-monotonic in the period before
regulation, implying that concentration increased the exit rate of large firms, and substantially decreased the exit rate of small audit firms.

The results for the Belgian audit industry can be summarized as follows. First, Models 1 and 3 reveal that, contrary to the Dutch case, size has a large negative impact on organizational exit. Second, the estimates of the interactions ($C_8 \times \text{single proprietorship}$ and $C_8 \times \log \text{size}$) are both insignificant, and even have the opposite sign compared to the estimates in the Dutch audit industry. So, clearly, the results of the Dutch audit industry could not be replicated in the Belgian setting, as expected. This provides support for Hypothesis 1, reflecting the first outcome of our comparative study as to a non-effect if the resource-partitioning scope conditions do not hold.

We also performed additional analyses to check the robustness of our findings. First, we re-estimated the Models 1–4 of Table 4, but now with $C_4$ instead of $C_8$ (see Models 5–8 in Table 4). Note that both interaction effects of concentration with size now reach significance with the same sign as the interaction estimates of Models 2 and 4. Specifically, a rising $C_4$ increases the hazard rate especially of small audit firms. In Figure 2, we graphically show the impact of concentration ($C_4$) on the multiplier of the hazard rate for single proprietorships (i.e. $\log \text{size} = 0$), for firms with size 10 (i.e. $\log \text{size} = 2.3$) and for firms with the maximum observed size, which is 70 auditors (i.e. $\log \text{size} = 4.25$), based on the estimates of Model 8 in Table 4.

Second, as size-localized competition was not included in the models in the Dutch case, and because relative size and relative size$^2$ are strongly correlated with our concentration measures (above $-0.70$, see Table 3),
we reran all Belgian models excluding both of these variables (not shown here). The coefficient of $C_4 * \text{single proprietorship}$ of Model 6 now becomes significant at $p < .05$. All other findings are not substantially affected.

Third, we ran all models for pure exit events, on the one hand, and for merger and acquisition events, on the other hand, separately (not shown here). The findings with respect to our focal interaction variables appear to be more pronounced for pure exit compared to merger and acquisition events. Specifically, the coefficients of $C_8 * \text{single proprietorship}$, $C_8 * \text{log size}$, $C_4 * \text{single proprietorship}$ and $C_4 * \text{log size}$ are .14, −.16, .13, and −.16 ($p < .001$ for all coefficients) in the case of pure exit. These coefficients are much smaller for the merger and acquisition events, although the signs are the same (.01, −.02, .05, −.06; with only the last one being significant at $p < .05$).

Apparently, our competition models are better able to predict pure exit than merger and acquisition events. With hindsight, this should not be surprising as the latter events are not necessarily instances of failure but might occur for diverse reasons. Important for the present study, however, is that market concentration either has no significant differential impact on the exit rate of audit firms of different sizes, or increases the exit rate of small audit firms in the models where it does have a significant impact.

Together, this set of results is in line with Hypothesis 2 (especially for pure exit), reflecting the second outcome of our comparative study as to what to expect if a different set of conditions hold. In this way, we find empirical evidence for part of the integrated perspective suggested by van Witteloostuijn and Boone (2006).7

Discussion and conclusion

Although some theorizing exists with respect to the boundaries of resource-partitioning theory’s applicability (see Boone et al., 2002; Carroll and Hannan, 2000; van Witteloostuijn and Boone, 2006), to our knowledge no empirical study has been designed to formally test when the theory actually works (except for Dobrev’s [2000] study demonstrating the reversibility of resource-partitioning). The necessary boundary conditions set forth in earlier work stipulate that (1) the resource environment should be heterogeneous with a clear market centre and (2) scale or scope advantages should be large enough to ignite size-based competition among generalist organizations. In addition, centre-periphery scope diseconomies should prevent generalists to straddle the market centre and peripheral niches. As these conditions are clearly present in the Dutch audit industry, Boone et al. (2000) indeed found that the exit rates of specialist and generalist audit firms were shaped by resource-partitioning processes. In the present study, we applied the methodology of Boone et al. (2000) to the Belgian audit industry, implementing a partial test.

For one, we hypothesized that the conditions in the Belgian audit industry are such that resource-partitioning processes should not occur in this setting. Demand-side concentration did not occur at the same pace and to the same extent in Belgium compared to the Netherlands, precluding the occurrence of large, market centre client niches. In addition, the potential for reaping scale or scope advantages is much less pronounced in Belgium, due to the more stringent regulation with respect to the scope of activities that can be performed by a single audit firm and with respect to the use of their international brand name. As a result, larger audit firms are not pulled towards the large market centre niches in which scale advantages abound. Therefore, concentration does not go hand in hand with the opening up of resource space for small audit firms. In contrast, most models actually showed that concentration increases the (pure) exit rate especially of small audit firms, as expected. This is in line with the argument put forward by van Witteloostuijn and Boone (2006). Specifically, in a condensed resource space, where small and larger organizations are ‘fishing in the same pond’, market concentration pushes small firms out of the market in the presence of minimal scale advantages. This also explains why we did not find any evidence for size-localized competition in the present setting. In addition, when scale economies are weak, the urge for growth forces generalists to economize on the internal transfer of capital and managerial skills by encroaching on the niches of small specialists. In this way, we complement resource-partitioning with a theoretical argument as to what to expect if the underlying scope conditions turn out to be different.

However, further reflecting on van Witteloostuijn and Boone’s (2006) resource-based theory of market structure and organizational form provides additional insights into the evolution of the Belgian industry’s market structure. Inspecting Figures 1a and 1b reveals that the industry’s market structure looked differently before and after 1985, the year in which an important new regulation was introduced that made annual report auditing mandatory for a much larger group of organizations, implying a substantial expansion of the resource space’s carrying capacity. Before 1985, concentration increased and density decreased. This resembles van Witteloostuijn and Boone’s (2006) first case of a concentrated industry. Since 1985, the increase in concentration slowed down, whereas density started to increase sharply. This market structure evolution is similar to a movement towards van Witteloostuijn and Boone’s (2006) second case of a fragmented industry.

To summarize, previous empirical research has shown that if the set of resource-partitioning conditions is satisfied (i.e. rising concentration together with a specific resource distribution and scale advantages), then the segregation process unfolds. We attempted to show that if this set of conditions is not satisfied, then the resource-partitioning process should not
occur. The results of our comparative study indeed underscore the hitherto untested assumption of resource-partitioning theory that segregation between specialists and generalists can only occur in populations where a market centre and scale advantages are firmly present. On a more general level, this is very important for resource-partitioning theory because it explicitly reveals its boundaries of applicability, and at the same time allows one to infer with much more confidence that concentration together with specific ecological conditions are actually the ultimate ‘causes’ of the changing vital rates of specialist organizations.

We want to close with a short methodological note. In sciences such as medicine and physics, the ultimate standard of research is the experimental design where the causative factors are experimentally manipulated and objects are randomly assigned to the experimental and control groups. The tendency in many empirical social sciences, especially in the area of economics and sociology with an evolutionary flavour, is to test hypotheses by means of econometric models applied to longitudinal data collected in highly specific settings. This is also the case in OE. Although there is nothing wrong with such an approach, one should recognize that it is probably not the best way to reveal general ecological principles with respect to organizational dynamics. As OE is about understanding the dynamic interplay between organizational forms and environmental resources, this type of research would surely benefit from a more extensive comparative approach where environmental differences are clearly incorporated into the design (see Denrell and Kovacs, 2008; Lieberson and Lynn, 2002; Miner, 1993; van Witteloostuijn and Boone, 2006).

Of course, formal experiments are hard to imagine in a field of research aiming to understand long-run evolutionary organizational processes. However, the quasi-experimental comparative approach that is extensively used in biology, a field that has much inspired OE (Hannan and Freeman, 1977), would be well suited to study organizational dynamics. Lieberson and Lynn (2002) advocated the use of this approach in the field of sociology, generally. In an entirely different setting, Diamond (1999) made a similar plea to focus on natural experiments in order to upgrade history from a ‘mass of details’ to a historical science on a par with other historical subjects, such as biology, ecology and geology. This also relates to Miner’s (1993) and Denrell and Kovacs’ (2008) argument as to the need to correct the tendency to engage in sample biases in organization theory.

We hope that the present study has demonstrated that in OE also it will be fruitful to go beyond the idiosyncrasies of specific settings in a more systematic, comparative way. This is because it will facilitate the revelation of the ultimate causes of general evolutionary principles. As a byproduct, it will also allow one to build taxonomies with respect to the applicability of different theories given certain boundary conditions, and as a result increase the precision of our predictions (Boone and van Witteloostuijn, 1995;
van Witteloostuijn and Boone, 2006). We are aware that the methodology of natural experiments, which combines the time dimension with cross-environment comparison, is not easy to implement. The data collection investments in order to trace the full life history of each and every organization that ever existed in a specific setting (i.e. population) are already tremendous. Adding different environmental conditions to this time dimension exponentially increases the required efforts. However, we think it is a matter of trade-off. For some research questions, it is probably worthwhile to play safe on the time dimension (e.g. by collecting data each five years instead of yearly, or by restricting the observation window to only part of the population’s history), and simultaneously adding theoretically well-chosen, different environmental settings to the cross-sectional dimension.

Acknowledgements

We gratefully acknowledge comments of Filippo Wezel, the participants of the Strategy and Organizational Ecology conference at the University of Washington (St Louis, 2004), Joel Baum and three anonymous reviewers of this journal. All errors remain ours.

In addition, Christophe Boone and Arjen van Witteloostuijn gratefully acknowledge the financial support of the Flemish Science Foundation (FWO) through their Odysseus programme.

Notes

1 Dobrev (2001) is an excellent illustration of the merits of a comparative approach for the development of density-dependence theory. In the current paper, we follow a similar but more explicit approach, focusing on two populations of the same industry in different countries, rather than different time periods within the history of the same population in a single country, as in Dobrev (2001).

2 Although confirmation of Hypothesis 2 automatically implies that Hypothesis 1 is also true, the opposite is not the case. The latter can be true without confirmation of the former. As a result, it is informative to formally explicate both hypotheses, where Hypothesis 1 is a test of the scope of application of resource-partitioning theory, and Hypothesis 2 a test of what else can be expected in the resource conditions of the present setting, based on van Witteloostuijn and Boone’s (2006) resource-based theory.

3 Bröcheler et al. (2004) treat diaspora (firm X disappears from the source list and its auditors all go their own, but different ways) as a separate additional exit event. We do not as a diaspora only occurred four times in the present setting, but without disappearance of the firm from the source list.

4 Since the beginning of the 1970s, a number of firms developed into large international providers of audit services. During the period of our study, before the merger and acquisition wave among these large audit firms, eight firms were active on a global scale. These were known as the Big Eight: Arthur Andersen, Coopers & Lybrand, Deloitte, Haskins & Sells, Ernst & Whinney, KPMG, Price Waterhouse, Touche Ross and Arthur Young.
One could also calculate the Euclidean distance of a focal firm’s size compared to the size of all other firms within a pre-specified size-based competitive window (Baum and Mezias, 1992). However, given that 88 percent of the firms in our sample are single proprietorships and the ‘larger’ firms are still relatively small, this approach is less straightforward to implement in the present setting.

Given the very strong correlation between the number of auditors active in the industry and density (.93), we decided to drop the former variable and not to test for mass dependency of the exit rate. Note that our focal findings do not change even with this variable included.

Finally, we performed one additional robustness analysis by including population age in all models. We do not report the findings here as population age is strongly correlated with our concentration measures (above .90). Nevertheless, our major findings are, again, not substantially affected.

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