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ARTICLE

The search for hypercompetition: evidence from a Nordic market study

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ABSTRACT

Some scholars and practitioners argue that markets have become hypercompetitive, decreasing the opportunities for sustainable competitive advantage. We test for increasing competition in a panel of 266 Danish firms from 7 industries over the period 1980–2017. We find no support for the argument that the market across industries has become hypercompetitive over this period. The durability of abnormal business returns has remained stable. Dynamism only changed in the 1980s, and levels of munificence are also stable. We do, however, find a small decrease in the survival probability rate of firms over time. Our results lead us to caution against the use of hypercompetition as a universal label for the state of contemporary competition.

KEYWORDS

Hypercompetition; sustainable competitive advantage; resource-based view; competitive dynamics

1. Introduction

Many scholars argue that the nature of competition has changed over the last few decades. They argue that competition has moved towards what they term 'hypercompetition', a state of intense industry rivalry, making it impossible to sustain competitive advantages (Andrevski and Ferrier 2019; D'Aveni 1994; Ilinitch, D'Aveni, and Lewin 1996; Wiggins and Ruefli 2005). The effects would be diminishing business returns, higher business mortality, and more dynamic industry environments (McNamara, Vaaler, and Devers 2003; Vaaler and McNamara 2010).

Scholars offer varying explanations for a supposed movement towards hypercompetition, including globalisation, financial instability, new technological developments, and digitalisation, and suggest that this is posing as a potential challenge to strategy-making (D'Aveni and Dagnino 2010; Harvey and Griffith 2007; Hermelo and Vassolo 2010; Ilinitch, D'Aveni, and Lewin 1996; Thomas and D'Aveni 2009). It is argued that these exogenous changes began in the 1970s, worked through the 1980s, and completely transformed the competitive environment from static to dynamic in the 1990s (D'Aveni 1994; Nault and Vandenbosch 1996; Thomas 1996; Thomas and D'Aveni 2009), making the competition more dynamic, hostile, and uncertain. This situation is described as '*a fundamental shift in the rules of competition and the way the game of competition is played*' (Ilinitch, D'Aveni, and Lewin 1996: 211), a shift towards what

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D'Aveni (1994) calls 'hypercompetition'. Some scholars argue that this new type of competitive environment has widely supplanted the traditional type of competition (D'Aveni and Dagnino 2010; Thomas and D'Aveni 2009), and decreased the possibility of building sustainable competitive advantages, questioning if not the validity, then at least the contemporary usefulness of the resource based view of strategy. But has the world truly become hypercompetitive across sectors and regions? The hard, empirical evidence is surprisingly limited and ambiguous.

Labelling industry environments as hypercompetitive remains popular, not least in the aftermath of the financial crisis. For example, Roberts and Grover (2012: 579) write that, '*in today's hypercompetitive environment, firms that are agile tend to be more successful*'. They go on to empirically link such agility to firm performance. As for Hoisl, Gruber, and Conti (2017), they examine the effects of an R&D team's composition on its performance outcomes in hypercompetition, based on data from Formula 1 teams. Common to these types of studies is that they label an industry environment, or even the economy, as hypercompetitive, but never actually verify this label empirically. They also fail to verify the argument of increasing hypercompetitivity through time. In fact, the little empirical evidence for hypercompetitivity is ambiguous (Castrogiovanni 2002; McNamara, Vaaler, and Devers 2003; Thomas and D'Aveni 2009; Vaaler and McNamara 2010). A few studies indicate positive evidence of hypercompetition (e.g. Barry, Kemerer, and Slaughter 2006; Farjoun and Levin 2011; Lee et al. 2010; Thomas and D'Aveni 2009). Others disagree (e.g. McNamara, Vaaler, and Devers 2003; Vaaler and McNamara 2010). The key problem in this debate is methodological. Different studies have used very different techniques and samples to measure very different variables that may or may not be indicative of a changed nature of competition. Some have focused on measures of firm performance, such as return on assets (ROA), and the degree of volatility in these (e.g. McNamara, Vaaler, and Devers 2003; Thomas and D'Aveni 2009). Others have examined volatility in individual firm resources (Barry, Kemerer, and Slaughter 2006), or firm mortality (firm exit) data (McNamara, Vaaler, and Devers 2003). The lack of methodological consistency makes it difficult to find an agreement on the existence or non-existence of hypercompetition and indicates a need for studies using similar methodologies, on new samples and time periods. Further complicating matters is that the world has been through a recent financial crisis, that could have affected the nature of competition. In that relation, McNamara, Vaaler, and Devers (2003) and other scholars (e.g., Wiggins and Ruefli 2005; Chen et al. 2010) suggest more empirical research on the nature of business performance in volatile environments in different contexts and levels of analysis, including time periods with economic downturns.

In this paper we follow this suggestion and quasi-replicate McNamara, Vaaler, and Devers (2003) with firms in Denmark. The replicative nature of our study results from borrowing some of the measurement instruments and hypotheses from the original study. As does the original study, in this paper we pose the question of whether hypercompetition is a universal phenomenon, or may be context or time specific. Therefore, we test hypotheses related to hypercompetition on Danish publicly listed firms for a longer period than has previously been attempted in the search for evidence of hypercompetition, covering both the period before and after the financial crisis. We find little evidence for increasing levels of hypercompetition, adding to the body of evidence that the idea of a generalised movement towards extreme competition is wrong. We find

no decrease in the durability of abnormal business returns, increasing dynamism only for a short period in the 1980s, and no significant change to the levels of munificence. We do find a small decrease in the survival rate of firms over time. As such we do not find support for the criticisms of the resource-based view of strategy according to which it would now be difficult for firms to build sustainable competitive advantages. We conclude by echoing McKinley's (2011) caution that simplifying labels such as hypercompetition may be used by both scholars and management practitioners in a way that leads them to believe in the objective reality of the construction. Using this label may in fact simplify and misrepresent a more complex reality. The benefit of our quasi-replication lies in the fact that it tests the generalisability of previous findings, arguing that hypercompetition may be more context and time specific rather than a universal label of industry environments.

2. The search for hypercompetition

Scholars applying the hypercompetition construct appear to treat this as both a new (objective) competitive reality and a theoretical construct (D'Aveni 1994; Hanssen-Bauer and Snow 1996). Hypercompetition is a perspective on competition that contrasts to the traditional resource-based view and industrial organisation approach within strategy. The construct is credited to D'Aveni (1994), who argues that industries have '*changed from slow moving stable oligopolies to environments characterized by intense and rapid competitive moves, in which competitors strike quickly with unexpected unconventional means of competing*' (D'Aveni 1997: 183). He furthermore suggests that in hypercompetition, '*the frequency, boldness, and aggressiveness of dynamic movement by the players accelerates to create a condition of constant disequilibrium and change. Market stability is threatened by short product life cycles, short product design cycles, new technologies, frequent entry by unexpected outsiders, repositioning by incumbents, and radical redefinitions of market boundaries as diverse industries merge. In other words, environments escalate towards higher and higher levels of uncertainty, dynamism, heterogeneity of the players, and hostility*' (D'Aveni 1995: 46). Hypercompetitive behaviour is the process '*of continuously generating new competitive advantages and destroying, obsoleting, or neutralizing the opponent's competitive advantage, thereby creating disequilibrium, destroying perfect competition, and disrupting the status quo of the marketplace*' (D'Aveni 1994: 218).

The construct of hypercompetition can be seen as an extension of the ideas contained in the discussion of hypervelocity (Eisenhardt and Bourgeois 1988), and more generally environmental uncertainty (Huff et al. 2016). In a hypercompetitive environment firm performance trends will be inherently more difficult to sustain (McNamara, Vaaler, and Devers 2003; Thomas and D'Aveni 2009; Vaaler and McNamara 2010), due to escalating and shifting patterns in business rivalry, shorter product life cycles, and a quicker pace of innovation. In addition, hypercompetition decreases the possibility for firms to build sustainable competitive advantages, questioning if not the validity, then at least the usefulness of the resource-based view of strategy. Hypercompetition is said to be a dynamic application of the resource-based view, but involving 'the rapid depreciation of strategic assets' (Thomas 1996: 226). In other words, to be successful in

a hypercompetitive environment, firms must continuously learn and apply their knowledge to the changing environment.

2.1. Implications for strategy research

In strategy content research, the question that often arises is how to gain and sustain superior firm-level competitive advantage over others (Foss and Knudsen 2003; Saadatmand, Dabab, and Weber 2018; Selsky, Goes, and Baburoglu 2007). Theoretical perspectives on performance and competitive advantages predate the strategic management literature. The traditional industrial organisation (IO) view identifies different types of competitive environments ranging from monopoly to perfect competition (Saadatmand, Dabab, and Weber 2018). This traditional view provides insights to firm performance and how firms gain competitive advantage through positioning in the industry structure, and creating strategies appropriate to this structure (Hanssen-Bauer and Snow 1996; Saadatmand, Dabab, and Weber 2018; Selsky, Goes, and Baburoglu 2007). An extension is the well-known five forces framework (Porter 1991, 1996). The framework emphasises the relationship between industry structure and performance that could promote competition, where the equilibrium depends on what one rival believes the other rivals will do in a particular situation (Porter 1991).

The static five forces framework provides a snapshot of competition in time. It has thus been criticised for not taking into account the dynamics of the competitive environment over time (Selsky, Goes, and Baburoglu 2007). Some hypercompetition scholars seem to argue that traditional types of competition have been supplanted by something new and different (D'Aveni and Dagnino 2010; Polowcxy 2012; Thomas and D'Aveni 2009), whilst others seem to more simply equate hypercompetition with what economists would call 'perfect' competition (Hanssen-Bauer and Snow 1996). This view indicates that hypercompetition leads more markets towards perfect competition, where there are numerous buyers and sellers, low barriers to entry and exit, and low profit margins. Hypercompetition may or may not be contradicting to the IO view on competition (Foss and Knudsen 2003; Saadatmand, Dabab, and Weber 2018; Selsky, Goes, and Baburoglu 2007).

Another broad theory being questioned in the literature on hypercompetition is the resource-based view (RBV), the dominant contemporary approach to analysing sustainable competitive advantages (D'Aveni and Dagnino 2010; Selsky, Goes, and Baburoglu 2007). Using economic reasoning, Wernerfelt (1984) developed a theory from an inter-firm perspective, to understand why some firms earn supernormal profits in comparison to others (Hunt 1995; Lockett, O'Shea, and Wright 2008; Saadatmand, Dabab, and Weber 2018). Barney (1991) defined value, rareness, inimitability and non-substitutability of resources to be conditions for building a sustainable competitive advantage. According to the theory of hypercompetition, this form of competition would make value less sustainable, and accelerate efforts at imitation (Sharapov and Ross 2019) and substitution by competitors. In Peteraf's (1993) conceptualisation of competitive advantage, hypercompetition would eliminate limits to competition, again reducing the ability to sustain any competitive advantages over time. Hypercompetition implies that resting on yesterday's achievements, performance, and knowledge of competitors, could result in a failure tomorrow (D'Aveni 2010; Saadatmand, Dabab, and Weber 2018). Thomas (1996) goes

as far as suggesting that management researchers' traditional approaches to strategy may be obsolete in a hypercompetitive environment.

2.2. Detecting hypercompetition

Although scholars employing the hypercompetition construct typically argue that there has been a fundamental shift in competition, meaning that sustainable competitive advantages have become increasingly rare, not everyone agrees (McNamara, Vaaler, and Devers 2003; Porter 1996; Vaaler and McNamara 2010). The existing research on hypercompetition offers quite different approaches to the field and analysis (D'Aveni 1994; Longin 2016; McNamara, Vaaler, and Devers 2003). The majority of studies are limited to the United States (McNamara, Vaaler, and Devers 2003; Thomas 1996; Thomas and D'Aveni 2009; Vaaler and McNamara 2010). Thomas (1996) conducted the first large-scale empirical investigation of hypercompetition, looking for evidence at the industry level for manufacturing industries from 1958 to 1991. He examined proxies for such variables as demand elasticity, dynamism of demand, and barriers to market entry, and concluded that many of these show changes over time that would be compatible with a hypothesis of increasing hypercompetition. In a more recent analysis, Thomas and D'Aveni (2009) find evidence of a change in the nature of competition in the U.S. manufacturing industry from the 1950 to 2002, by analysing the volatility in firm performance.

In contrast, McNamara, Vaaler, and Devers (2003) find little evidence of hypercompetition in the study of business unit ROA, mortality rates, and industry-level dynamism and munificence, concluding that *'we find little support for the argument that markets have become more hypercompetitive'* (McNamara, Vaaler, and Devers 2003: 261). Makadok (1998) in a study on money-market funds in the US, similarly, reports no evidence that could support hypercompetition, concluding that *'it may be that the phenomenon of "hyper-competition" is largely psychological or perceptual in nature'* (Makadok 1998: 693). Many scholars cite technology-related industries as the context in which hypercompetition is most pronounced (D'Aveni 1994; Kim and Kogut 1996; Lee et al. 2010; Vaaler and McNamara 2010; Wiggins and Ruefli 2005). However, Vaaler and McNamara (2010) indicate no long-term decrease in the performance durability among firms from the high-technology industry. They also argued that the indication of dynamic competition that Thomas (1996) found were only temporary, and that the conclusions would have been different if the study was conducted today. Key issues with the search for hypercompetition are therefore a lack of consistency of definition and measurement, a lack of research on more recent datasets, and a lack of studies using datasets outside the United States. There is not a clear definition of how we can measure hypercompetition, and until now studies have used different techniques and samples to measure very different variables that may or may not indicate a change in competition (Wiggins and Ruefli 2005). With this in mind, we here report the empirical results of a study inspired by the analysis of McNamara, Vaaler, and Devers (2003) and Vaaler and McNamara (2010), but with more recent data.

2.3. Hypothesis development

We take inspiration from the aforementioned studies in developing our hypotheses. If the competitive environment has changed substantially and moved towards

hypercompetition, we would assume that the need for strategic decision making increases, as the instability in business performance patterns increases, forcing some firms to adapt to the new competitive environment (Ilinitch, D'Aveni, and Lewin 1996). Some firms may fail to do so. This would then have an impact on the task environment of the organisation such as dynamism (stability-instability, turbulence) and munificence (capacity) (Dess and Beard 1984; McNamara, Vaaler, and Devers 2003; Vaaler and McNamara 2010). While firms are willing to make internal changes to adapt to the increasing dynamic market, these firms will still in a hypercompetitive environment be likely to have a higher variance in their performance (both positive and negative) compared to the firms in a more stable environment. As does the original study of McNamara, Vaaler, and Devers (2003), in this paper we propose that increasing hypercompetition would decrease the stability of markets and business performance over time. With this in mind, we can build four distinct hypotheses linked to hypercompetition.

With our first hypothesis, we link hypercompetition to a decreasing durability of abnormal business returns, where abnormal returns are the '*difference between actual return and the competitive return*' (Jacobsen 1988: 416). In previous research, scholars have demonstrated how abnormal returns tend to move towards the mean over time, i.e. be stationary, as a consequence of competition (Jacobsen 1988; Makadok 1998; Mueller 1986). Sustaining a competitive advantage, a firm must undertake strategies that not only generate abnormal returns, but also ensure the persistence of these (Jacobsen 1988; Ruiz, Arvate, and Xavier 2017). Under hypercompetition, lower barriers to entry, radically changing market boundaries, shorter product life cycles, and rivalry would lead to a more intense competition (Bengtsson and Powell 2004; D'Aveni 1994; Zucchini, Böhmer-Horländer, and Kretschmer 2019), which in turn would decrease the ability of firms to sustain abnormal business returns over time.

Hypothesis 1: The durability of abnormal business returns has decreased over time.

With the second hypothesis, we link the proposition of a move towards hypercompetition to a decrease in the survival rate of firms. The intensity of a competitive environment is often said to be enhanced by the proximity of competitors (Bengtsson and Sölvell 2004), the industry density and concentration (McNamara, Vaaler, and Devers 2003; Vaaler and McNamara 2010), the aggressiveness of competitive actions (Andrevski and Ferrier 2019), and by the rate of environmental change, and that these factors may have an impact on the number of firm exits. Some firms will fail to adapt to environmental change, or see the value in their resources drop (e.g. outdated technological assets), which may result in firm exit (deliberately or following death). Changes to entry and exit barriers as a result of increasing competition would have similar effects (D'Aveni and Dagnino 2010; McNamara, Vaaler, and Devers 2003; Vaaler and McNamara 2010). Thus, increasing hypercompetition would likely decrease the survival rate of firms (increasing business mortality).

Hypothesis 2: The rate of firm survival has decreased over time.

In the final set of hypotheses, we raise the level of analysis from firm to industry-level. The characteristics of an industry can be measured in many different ways.

A common method involves examining the firms task environment in terms of dynamism and munificence (Castrogiovanni 2002; Dess and Beard 1984; McNamara, Vaaler, and Devers 2003; Vaaler and McNamara 2010). Following this perspective, we assume that hypercompetition may affect the level of dynamism and munificence within an industry positively and negatively respectively. We define dynamism as the degree of volatility in an industry, and munificence as the degree of resource abundance, necessary to support firm growth (Castrogiovanni 2002; Dess and Beard 1984). Scholars argue that factors such as technology and globalisation have altered the structure of industries, creating a state of hypercompetition. Dynamism would be positively related to previously discussed variables such as the extent of firm entry and exit, and the extent of rivalry. Such rivalry would lead to more intensive competition for scarce resources, affecting negatively munificence. Higher rivalry is also associated to price changes and faster product life cycles, leading to volatility. Thus, a hypercompetitive environment should be associated to increasing dynamism over time. The contrary should apply to munificence. This leads us to the following hypotheses:

Hypothesis 3: Industry dynamism has increased over time.

Hypothesis 4: Industry munificence has decreased over time.

3. Methodology

3.1. Data collection and sampling

In order to use a comparable methodology to some of the largest existing studies, but for a sample outside the US, we chose to collect data from a developed Scandinavian economy, namely Denmark. Denmark is internationally recognised as a frontrunner in several areas of research and technology such as greentech, biotech, pharmaceutical sciences, telecommunications, IT and design (Cleantech Group, & WWF 2014; Schwab 2019). Looking at the rankings of the Global Competitiveness Index, covering 141 economies, Denmark has fairly consistently been among the top 12 of competitive countries among regions such as the US, Japan, Hong Kong, and Germany (Schwab 2017, 2018, 2019). Similarly to the US, Denmark has a stable macroeconomic environment (rank 1st), widespread of ICT adoption (rank 9th), modern working skills (rank 3rd), and a robust labour market (rank 3rd) (Schwab 2019). The innovation ecosystem is well developed, thanks to a vibrant business dynamism (3rd, just behind the Netherlands 2nd and the United States 1st) and advanced innovation capability (Schwab 2019).

We collected 5,574 annual observations of financial data of 433 Danish publicly listed firms from 1980 to 2017 from the Thomson Reuters Eikon database. We use return on assets (ROA) as a measure of firm performance, a very common approach to analysing firm performance (Etiennot et al. 2019; McNamara, Vaaler, and Devers 2003). ROA is a measure of the sum of net income plus interest expense, divided by the average of last year's and current year's total assets. We further collected data on total revenues and total assets for every firm. While the former variable represents gross sales and other

operating revenues minus discounts, the latter represents the sum of total current assets, total investments, net loans, investments, and other assets.

To measure industry density, we use the annual number of firms in each industry. Unfortunately, Reuters does not divide Danish firms into Standard Industry Classification (SIC) codes. Consequently, we manually categorised the different Danish firms into the corresponding highest level SIC codes, according to the standards used by Reuters for the American stock market. Industries include: 'Mining', 'Construction', 'Manufacturing', 'Transportation, Communication, Electric, Gas & Sanitary Services', 'Retail Trade', 'Finance, Insurance & Real Estate' and 'Services'.

We follow McGahan and Porter (1997) suggestion, also followed by McNamara, Vaaler, and Devers (2003), and exclude firms with a market value of less than 70 million Danish kroner (approximately 10 USD million, in real values of 2017) and with less than 6 years of data on ROA. We measure market value as the stock price multiplied by the number of issued shares. Once screened on these criteria, our base sample comprised 4,477 observations of 266 Danish firms across 7 industries publicly traded in the period 1980 to 2017. On average, we have approximately 120 annual business observations in each of the 38 years covered. In order to control for general economic environment (Etiennot et al. 2019), we collected data on the total Danish real Gross Domestic Product (GDP) and calculated its yearly variation leading to a series of real GDP growth rates. We also included a control variable on yearly inflation, proxied by the variation of the Danish Consumer Price Index.

3.2. Autoregressive analysis

To formally test hypothesis 1, we built an autoregressive model to measure business performance over the last 38 years, to investigate the durability of abnormal profitability over time (Jacobsen 1988; Mueller 1986). We analyse the Return on Assets of firm i in time t (ROA_{it}), and its decay over time. Since in this analysis we had to construct a data series for the lag of ROA over time, we excluded all first data points on our original ROA series. Our final sample therefore comprises 4,198 observations for 266 firms from 1981 to 2017. We regress ROA on its lag ROA_{it-1}, and on a number of control variables: a year counter to capture any time trend, GDP growth, and inflation, in order to control for macroeconomic conditions that may affect the degree to which abnormal returns will appear (Huhtala 2014; Westergård-Nielsen and Neamtu 2012). Thus, our base model can be written as:

$$ROA_{i,t} = \beta_0 + \beta_1 ROA_{i,t-1} + \beta_2 YEAR_t + \beta_3 GDP_t + \beta_4 INF_t + \varepsilon_{i,t}, \quad (1)$$

where *ROA* is the yearly return on assets, *YEAR* is the respective year counter that ranges from 2 (in 1981) to 38 (in 2017), *GDP* is the real GDP growth rate and *INF* is the annual inflation rate. We expect a β_1 between 0 and 1, where a value near 1 would indicate little if any decay in ROA in the current period. A value over 1 for this parameter would indicate an explosive time series, which would go against economic reasoning.

With the objective to study whether the rate of decay on the prior performance exhibits any linear time trends over the study period, we build a second model including an interaction term between *ROA* and the time counter *YEAR*. If there is a change in the

competitive environment towards hypercompetition, we would expect the coefficient associated with this interaction term to be significant and negative, indicating that the previous year's ROA for a business should explain less of the current year's ROA for the same business.

$$ROA_{i,t} = \beta_0 + \beta_1 ROA_{i,t-1} + \beta_2 YEAR_t + \beta_3 GDP_t + \beta_4 INF_t + \beta_5 \left(ROA_{i,t-1} * YEAR_t\right) + \varepsilon_{i,t}, \tag{2}$$

In order to investigate whether the pattern of competition is different across industries, we repeat the exercise of Equation 1 and 2 but with industry dummy variables according to SIC codes (SIC_i).

3.3. Survival probability regression

To formally test hypothesis 2, we ran a panel regression model to explain survival probability. We investigate whether there is a relationship between survival and time and look for the likelihood that a firm *i* will exit an industry from one year to the other. In order to deal with firm exit (business mortality), we construct a dummy variable that assumes the value of 1 when a firm *i* does not report ROA in the following years. Thus, we observe firm exit on a discrete time scale from year to year. In line with McNamara, Vaaler, and Devers (2003), we decided to exclude all observations related to the final year in our sample, 2017, since we are not able to determine whether the firm has survived in 2018. For this model, we use the Kaplan-Meier survival probability that defines our dependent variable. This is given by the following equation:

$$Survival\ Prob_t = \frac{n_t - Dead_t}{n_t}, \tag{3}$$

where n_t is the number of firms collected in our sample in year *t* and $Dead_t$ is the number of firms that exit the sample the following year. Equation 3 measures the probability that a firm *i* will survive beyond any given time in the range of 1980 to 2016. We regress this in percentage terms. Factors other than hypercompetition could influence firm survival. For example, our sample period includes the global financial crisis that could potentially have an impact on business mortality (Abildgren and Thomsen 2011; Bertola et al. 2012; Nationalbank 2018; Westergård-Nielsen and Neamtu 2012). In order to account for this type of macroeconomic effects on firm survival, we follow McNamara, Vaaler, and Devers (2003) and Hannan and Freeman (1988) and control for economic growth (GDP_t). Moreover, we control for industry density ($DENSITY_t$). This variable counts the number of firms in each industry in our sample every year. Lastly, we again follow the aforementioned authors and include the quadratic transformation of density ($DENSITY_t^2$), which allows us to account for eventual nonlinear effects of density in survival. In order to account for any trend in competition over time we include a year counter. Thus, we check for any possible trend on competition over time using the following equation:

$$Survival\ Prob_t = \beta_0 + \beta_1 GDP_t + \beta_2 Density_t + \beta_3 Density_t^2 + \beta_4 Year_t + \varepsilon_t \tag{4}$$

To support our hypotheses of hypercompetition, we predict that the coefficient for the year counter ($YEAR_t$) will be negative and significant, indicating a decrease in the business survival along the years of our sample. Thus, we assume that movement towards hypercompetition is linked to an increase in the number of firm exits, and therefore, with decreasing firm survival. Finally, in order to check for any specific trend of survival in each specific industry, we divide our sample into the 7 different SIC codes. Then, we re-estimate equation 4 for each individual industry.

3.4. Industry dynamism and munificence analyses

In order to test our hypotheses 3 and 4, we follow McNamara, Vaaler, and Devers (2003) and make an analysis of industry dynamism and munificence in Denmark using the different SIC codes. In order to calculate industry munificence and dynamism we also follow Dess and Beard (1984) and Vaaler and McNamara (2010) and divide our sample into 8 time subsamples of 5 years each. As a preliminary step, we examine whether variables that are usually used to proxy munificence are associated to a time trend.[1] Thus, we run the following regressions 5 and 6:

$$Rev_{i,t}^{k,s} = \beta_{0,Rev}^{k,s} + \beta_{1,Rev}^{k,s} Year_t + \varepsilon_{i,t}^{k,s}, \tag{5}$$

$$TOA_{i,t}^{k,s} = \beta_{0,TOA}^{k,s} + \beta_{1,TOA}^{k,s} Year_t + \varepsilon_{i,t}^{k,s}, \tag{6}$$

where i represents each firm in a specific SIC level k, t represents each of the 5 years in each of the 8 subsamples s, REV is revenues and TOA is total assets.

We divide the regression coefficients by the mean value for each of the dependent variables to construct a composite measure of the level of industry munificence in each of the sampled industries k.

$$Mun\_Index_t^{k,s} = \frac{\frac{\beta_{1,Rev}^{k,s}}{\frac{\sum_{i=1}^{n_{k,t}} Rev_{i,t}}{n_{k,t}}} + \frac{\beta_{1,TOA}^{k,s}}{\frac{\sum_{i=1}^{n_{k,t}} TOA_{i,t}}{n_{k,t}}}}{2}, \tag{7}$$

where n is the total number of firms in the particular industry k in year t. This will provide us with an indication of the degree of growth or decline in munificence in each industry over the period 1980–2017.

In order to calculate dynamism, we divide the standard error of each of the prior regressions by the mean of each dependent variable (revenues and total assets) in each of the 5 years periods. The average of the two resulting numbers in each of the panel periods are used as the level of dynamism of a given industry k in year t.

$$Dyn\_Index_t^{k,s} = \frac{\frac{\sigma_{res,Rev}^{k,s}}{\frac{\sum_{i=1}^{n_{k,t}} Rev_{i,t}}{n_{k,t}}} + \frac{\sigma_{res,TOA}^{k,s}}{\frac{\sum_{i=1}^{n_{k,t}} TOA_{i,t}}{n_{k,t}}}}{2}, \tag{8}$$

[1]Note that it is also standard in the literature to use capital expenditure as another determinant of munificence. However, since there were excessive numbers of missing values in our sample for capital expenditure, we decided to exclude this variable from our study.

where $\sigma^{k,s}_{res,Rev}$ and $\sigma^{k,s}_{res,TOA}$ are the standard errors of each regression on revenues and total assets respectively for each sub-period s and industry k.

We regress the estimated munificence and dynamism composites on industry dummies in order to search for industry-specific differences in our dependent variables. Moreover, we control for the different time sub-periods by using time dummies.[2]

In order to support hypothesis 3 of increasing dynamism across time, we need to observe the coefficients of our time dummies to be negative and significant, with the lowest estimate in the earliest sub-period (1980–1984). This would indicate a positive trend in the level of dynamism over the study period. An analogous reasoning is valid for the analysis of hypothesis 4 with respect to munificence. Here, coefficients related to time dummies are expected to be positive and significant, with a decreasing value in time. This would indicate a negative trend in the level of munificence over the period. In order to avoid small sample bias, we decided to exclude 5-year panels with less than two observations in each year of the SIC industry. This results in a total sample of 4,463 observations, on average 638 observations per SIC industry. In order to check for movement towards hypercompetition in specific industries over time, we regress for every industry the composite measures of dynamism and munificence against year and check the sign and significance of the estimated slopes.

We tested our models for both heteroscedasticity and residual autocorrelation. The presence of both was confirmed in most of our estimations. Results of the Breusch-Pagan panel heteroscedasticity test, and Durbin-Watson test for panel data are available on request. In order to cope with heteroscedasticity and autocorrelation effects in our panel estimations, we decided to use a robust covariance matrix according to Arellano (1987) that allows for both heteroscedasticity and serial correlation of residuals. For the same reason we used the HAC (heteroscedasticity and autocorrelation consistent) covariance matrix according to Newey and West (1987) and Zeileis (2004) in our time series estimations.

4. Findings

In order to test hypothesis one, we first estimate equations 1 and 2 as pooled OLS regression models. Afterwards, we redo this exercise including dummies for each industry according to SIC codes. Result for these estimations are provided in Table 1 and are in line with McNamara, Vaaler, and Devers (2003) and Jacobsen (1988). The coefficient associated with the lag of ROA is significant and positive and below one ranging from 0.5602 to 0.5660 depending on the estimation setting. This indicates that business returns follow an autoregressive process that is not explosive between 1981 and 2017. Moreover, we observe a significant ($p < 0.05$) and negative linear time trend for ROA, with the year counter ($YEAR_t$) coefficient varying between −0.0588 and −0.0610. Thus we observe that business performance is influenced by its past observation and has a weak tendency to fall over the time period analysed.

The coefficients associated to the variables inflation rates and economic growth are both significant, providing evidence that the macroeconomic environment plays an important role in business returns. As expected, the coefficient associated to inflation is negative with a mean between −0.9556 and −0.9672 according to the estimation setting.

[2]We exclude the dummy for the final time period (2015–2017) and treat it is as our base.

Table 1. Autoregressive models.

Independent variables	Base model 1981–2017	Interaction Model 1981–2017	Base model with dummies 1981–2017	Interaction model with dummies 1981–2017
Constant	1.7755*	1.7842*	2.6479*	2.6483*
	(0.9044)	(0.9065)	(1.1826)	(1.1835)
Prior performance (ROA_{it-1})	0.5660***	0.5660***	0.5602***	0.5602***
	(0.0478)	(0.0478)	(0.0478)	(0.0478)
Year counter ($YEAR_t$)	−0.0588*	−0.0590*	−0.0610*	−0.0610*
	(0.0299)	(0.0299)	(0.0303)	(0.0355)
GDP growth rate (GDP_G_t)	0.7415***	0.7413***	0.7383***	0.7383***
	(0.1222)	(0.1222)	(0.1224)	(0.1225)
Inflation (INF_t)	−0.9556***	−0.9557***	−0.9671***	−0.9672***
	(0.1751)	(0.1751)	(0.1753)	(0.1753)
Interaction term (ROA_{it-1} *$YEAR_t$)		−0.00009		−0.000004
		(0.0002)		(0.0002)
Control variable (SIC_i):				
Mining, SIC1			−4.7868*	−4.7868*
			(2.2779)	(2.2780)
Construction, SIC2			−0.2151	−0.1543
			(0.7473)	(0.7477)
Manufacturing, SIC3			−1.3692	−1.3692*
			(1.0500)	(1.0497)
Transportation and Communication			0.3313	0.3313
Services, SIC4			(0.8453)	(0.8453)
Retail Trade, SIC5			0.4085	0.4081
			(1.0277)	(0.1029)
Finance, Insurance, and Real Estate, SIC6			−1.4979•	−1.4979*
			(0.7887)	(0.7897)
F	516.04***	412.748***	208.47***	189.473***
R^2	0.3298	0.3299	0.3324	0.3324
N	4,198	4,198	4,198	4,198

Significance levels: ***p < 0.001; *p < 0.05; •p < 0.1
[a]Standard error terms appear in parentheses

This indicates that higher inflation tends to be associated with lower ROAs. Analogously, higher economic growth is associated with higher ROAs as the coefficient associated to economic growth is positive and between 0.7383 and 0.7415.[3]

In order to verify hypercompetition, we need the coefficient associated to the interaction term ($ROA_{i,t-1}$*$YEAR_t$) to be significant and negative. This would indicate to us that the level of business performance is explained by an increase in the decay rate of abnormal returns along the study period which can be possibly linked to stronger competition. By looking at our results in column 2, there is no indication that this coefficient is significant. This indicates no decrease in the durability of abnormal business returns in the study period, and a lack of support for Hypothesis 1. We find a similar result in column 4 when we include industry dummies.

As a post-hoc variation on our analysis, we follow Vaaler and McNamara (2010) and run the same analysis with a control for industry concentration, using a Herfindahl-Hirschman index score ($HHI_{i,t}$). The logic is that industry concentration may affect a firm's ability to collude to maintain market performance stability. This is a more narrow control for industry factors than the previously used industry dummies. The results are found in the Appendix Table A1, and although the significance level of the year counter

[3]For a rich analysis on inflation and economic growth in Denmark and well as the consequences to business returns, see Abildgren and Thomsen (2011) and Jensen and Johannesen (2017).

increases, the interaction term ($ROA_{i,t-1}$*$YEAR_t$) remains non-significant. We conclude that there is no indication of hypercompetition.

To test for any possible differences within the 7 industries, we re-estimate equation 1 and 2. First, we divide our sample into the 7 different SIC industries. Tables A2 and A3 in the Appendix provide the estimation results when we measure each industry independently. In the Construction, Manufacturing, Retail Trade, Services and Finance, Insurance and Real Estate industries the business performance is influenced by its past observation. However, we do not find evidence of increasing hypercompetition in any of the industries.

4.1. Survival probability regression model results

In order to formally test for the existence of a time trend in the survival of companies when controlling for GDP growth and industry density, we estimate equation 4. Table 2 reports estimation results for the cross-industry sample. The coefficient associated to the time variable equals −0.2026 and is significant at the 1 % level. This indicates that the risk of a firm exit increases every year by 0.2%. In line with the findings of McNamara, Vaaler, and Devers (2003), GDP growth does not prove to be significant. The industry specific control variables for industry density and the quadratic term on density are not significant either, although the limited sample of 37 years should be noted.

To account for any possible differences within industries, we re-estimate equation 4, dividing our sample into the 7 different SIC industries. Tables A4 and A5 in the Appendix provide the estimation results when each industry is analysed independently.[4] Again, the explanatory variables GDP growth, density and density squared are not significant in any model setting. Moreover, time is significant with a lower trend in survival in the following industries: Construction, Manufacturing, Retail Trade, Finance, Insurance, and Real Estate, and Services. The survival of industries 5 and 6 (Retail Trade and Finance, Insurance, and Real Estate) are those with the most

Table 2. The overall survival probability models across the 7 SIC industries.

Independent variable	Base model	Time model
Constant	97.360***	498.90***
	(2.4208)	(114.03)
GDP growth rate (GDP_G_t)	24.350	0.0575
	(0.1640)	(0.1351)
Industry Density ($DENSITY_t$)	−0.0025	0.0787
	(0.0777)	(0.0665)
the quadratic trans. of the industry density ($DENSITY_t^2$)	−0.00008	−0.0004
	(0.0004)	(0.0004)
A year counter ($YEAR_t$)		−0.2026**
		(0.0579)
F	3.395*	5.802**
R^2	0.2358	0.4204
N	37	37

Significance levels: *** p < 0.001; ** p < 0.01; * p < 0.05
[a]Standard error terms appear in parentheses
[b]N is the number of years

[4]Note that for the Mining Industry (SIC 1) the number of observations in this regression falls to only 14 points, making interpretations difficult.

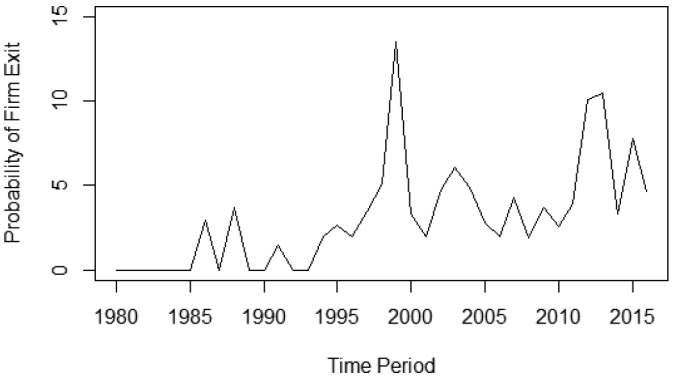

Figure 1. Business mortality rate in Denmark from 1980–2016.

significant impact in time, suggesting that these industries in general experience a higher level of competition compared to their pears.

As a post hoc analysis of the trends in business mortality during the period 1980–2016, we plotted the percentage of business mortality from year to year in Figure 1. The plot reveals that business mortality is lowest in the first 10-year period (1980–1989). In this period, a maximum of 4 percent of the firms exit an industry. Afterwards, business mortality peaks in 1999 when 14 percent of the firms exit the sample in the following year, most of these from the Finance, Insurance, and Real Estate industry. Following the burst of the dotcom bubble, the financial markets across regions experienced a global collapse of equity prices and a dramatic fall in interest rates. In Denmark, this burst had an impact on pension institutions (Van Dam and Andersen 2008). They experienced losses on their equity portfolios and an increasing present value of technical provisions (Van Dam and Andersen 2008). For some firms, this situation was so severe, that they had problems fulfiling the solvency requirement and were placed under special supervision by the authorities, or chose to merge with larger institutions (Van Dam and Andersen 2008).

Mortality peaks again in 2012 and 2013, when approximately 10 percent of the firms exit the market in the following years. Again, this is due to a high number of firms exiting the Finance, Insurance, and Real Estate industry with 15 exits and a mortality rate of approximately 20%. Moreover, this industry covers more than 50% of the firm exits in this period. This increase in firm exits could be due to changes in regulations made by the Danish Financial Supervisory Authority (FSA). In the aftermath of the financial crisis, the Danish FSA was one of the first institutions in Europe to change impairment rules on loans. This put a pressure on Danish banks and some were forced to either close or merge. Looking more deeply at the specific firms exiting the Finance, Insurance, and Real Estate industry, we found that most of these chose to merge with other firms (MarketScreener 2015; OMX 2013). Overall, the Finance, Insurance, and Real Estate industry covers more than 60% of firm exits in the 37 years.

We ran equation 4 again without the Finance, Insurance, and Real Estate industry (SIC 6) as this industry is a special case due to regulatory changes. Results found in the Appendix in Table A6 indicate that the survival rate across industries is decreasing. The coefficient associated to the year counter is significant and negative ($\beta_4 = -0.1652$,

$p < 0.01$), indicating that the risk of firm exit increases each year by 0.17%. Again, GDP growth, industry density, and the quadratic term on density are not significant. Overall, we can conclude that even when removing the Finance, Insurance, and Real Estate industry, the survival rate in Denmark decreases across industries over the period. The survival probability models support the hypothesis of increasing competition, specifically hypothesis 2.

4.2. Industry dynamism and munificence results

To test for environmental dynamism and munificence, we use panel OLS with fixed effects. Results for the dynamism and munificence analysis are reported in Table 3. In a first step, we estimate dynamism and munificence using only industry dummy variables (using the industry 'Services' as base level). We then add the time indicator variables for seven of the 5-year panels (using the final panel as base level).

According to McNamara, Vaaler, and Devers (2003), we should expect a decrease in market stability along the study period as a result of a movement towards hypercompetition. Both our results for dynamism and munificence are

Table 3. The industry dynamism (instability) and munificence model.

	Dynamism		Munificence	
Independent variable	Controls only	Time model	Controls only	Time model
Constant	2.1458***	2.4854***	−0.0060***	0.0021
	(0.000000003)	(0.1404)	(0.0000000005)	(0.0444)
Panel 1 (1980–84)		−1.7522***		0.0194
		(0.4166)		(0.0516)
Panel 2 (1985–89)		−1.1986***		−0.1700***
		(0.2083)		(0.0445)
Panel 3 (1990–94)		−0.4253		0.0078
		(0.2686)		(0.0747)
Panel 4 (1995–99)		−0.4978*		−0.0261
		(0.2262)		(0.0480)
Panel 5 (2000–04)		0.7420		0.0692
		(0.7634)		(0.1097)
Panel 6 (2005–09)		0.2869		0.0324
		(0.2112)		(0.0447)
Panel 7 (2010–14)		0.2641*		0.0051
		(0.1162)		(0.0369)
Control variable (SIC_i)				
Mining	−0.7025***	−1.2478***	0.1220***	0.1009***
	(0.000000003)	(0.1415)	(0.0000000003)	(0.0237)
Construction	−0.9189***	−0.9189***	0.0292***	0.0292***
	(0.000000003)	(0.000000002)	(0.000000000005)	(0.0000000002)
Manufacturing	−0.3133***	−0.3133***	0.0588***	0.0588***
	(0.000000003)	(0.000000002)	(0.0000000001)	(0.0000000001)
Transportation and Communication Services	−0.0153***	−0.0153***	0.0988***	0.0988***
	(0.000000002)	(0.000000002)	(0.0000000005)	(0.0020)
Retail Trade	−0.9961***	−1.2101***	0.0340***	0.0382***
	(0.000000003)	(0.0638)	(0.0000000004)	(0.0050)
Finance, Insurance, and Real Estate	1.9219***	1.8837***	0.1180***	0.1187***
	(0.00000001)	(0.0114)	(0.0000000004)	(0.0009)
F	15.0123***	14.3796***	3.5152**	7.1825***
R^2	0.2841	0.4594	0.0850	0.2980
N	234	234	234	234

Significance levels: *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$; • $p < 0.10$

[a]Standard error terms appear in parentheses

similar to those of McNamara, Vaaler, and Devers (2003). We do not find any clear evidence of an increasing level of dynamism overall (decreasing market stability), as only 4 out of 7 time periods are significant, with little indication of positive time trend. At best, we find a weak support for Hypothesis 3 along the 38 years of our study. The results in Table 3 indicate that dynamism was lower in Time Periods 1 (1980–84) and 2 (1985–89), than in Time Period 8 (2015–17), the based time period. More specifically, the coefficients in both periods are negative and significant ($p < 0.001$), and indicate increasing dynamism (decrease in market stability) in the 1980s. This could be due to the high growth in GDP in the 1980s, closely connected to the sound progress and increasing competition in the Danish export market (Abildgren and Thomsen 2011). However, this tendency reverses again, as industry dynamism in the beginning of the 1990s is not significant. In Time Period 4, the coefficient is again significant and negative ($\beta_4 = -0.4978$, $p < 0.05$), indicating a lower level of dynamism compared to the base period (2015–2017). In Time Period 7, the coefficient is significant, but positive (($\beta_7 = 0.2641$, $p < 0.05$), indicating a higher level of dynamism in the early 2010s. We thus find a fluctuating pattern, with a negative time indicator with the largest magnitude in the earliest period (1980–84), and greater dynamism in the early 2010s (2010–14) compared to the base period (2015–17). Thus, overall our results indicate increasing dynamism (market stability decreased) in the 1980s and again in the early 1990s, but this tendency stops and reverts to a decrease in the early 2010s with the market becoming more stable.

Concerning Hypothesis 4, results are similar. We do not find clear evidence of a statistically significant decrease in the level of munificence along the study period overall. Although the time indicator coefficient for period 2 (1985–89) is negative and significant ($p < 0.001$), we are unable to find clear evidence of a negative time trend across the 38 years. The largest coefficient is found in period 5 ($\beta_5 = 0.0692$), and not in period 1 (1980–84), as we would need in order to support Hypothesis 4. Thus, we can conclude that the level of munificence overall across the 38 years fluctuates with no specific time trend.

When analysing dummies for industry-specific effects, our results in both the control model and time indicator model show significant differences between industries. The Mining-, Construction-, Manufacturing-, Transportation and Communication Services and Retail Trade industries have a significantly lower market stability ($p < 0.001$). This indicates that the level of dynamism in these industries is higher overall, compared to the base group 'Services'. On the other hand, the Finance, Insurance, and Real Estate industry has a positive and significant coefficient, indicating a lower relative level of dynamism. The findings for munificence are somewhat similar. All six industries experience a significant and higher level of munificence relatively to the Service industry ($p < 0.001$).

Given these results, we performed a post hoc analysis looking for trends in the level of dynamism and munificence for each specific industry, the results of which are found in the appendix, in Tables A7 and A8.[5] For the dynamism regressions we find that 6 out of 7 industries experience an increasing level of stability over time, evidence for a negative

[5]Note that data is only available for 12 years in the mining sector (SIC 1).

trend in dynamism. These are: 'Mining', 'Manufacturing', 'Transportation and Communication services', 'Retail Trade', 'Finance, Insurance and Real estate' and 'Services'. For the munificence, only two industries present a decreasing trend in munificence over time indicating a possible increasing level of competition. These are 'Retail Trade' and 'Services'. Finally, the mining industry also indicates a trend in munificence over time, but with the wrong sign, indicating a positive trend in munificence and a less competitive environment.

5. Discussion and conclusion

Hypercompetition theory predicts a state of disequilibrium, with constant changes, low barriers to entry and exit, and intense counterattacks from competitors, creating difficulties to sustain competitive advantage. The aim of this study was to look for empirical evidence of a generalised change in the competitive environment of a small highly developed economy towards hypercompetition. Given the general scarcity of such studies, and the lack of such studies outside the United States, our results add new evidence to a debate that has been ongoing for the past two decades. Although Denmark is recognised as a highly competitive country, our results tell a story that is inconsistent with the assumptions of a universal transition towards hypercompetition (see Table 4 for an overview). There is no general evidence of a decrease in the durability of abnormal business returns, and no general increase in munificence. There is a decrease in the survival rate over time, and a temporary positive trend in the level of dynamism in the 1980s. We take this to imply that the competitive environment may vary over time, but not in the way hypercompetition theory predicts.

We conjecture that our findings of a temporary dynamic period in the 1980s may have been the consequence of new policies intended to promote economic growth following the recessions of the 1970s and early 1980s. This included the liberalisation of capital markets and the deregulation of industries in the Danish economy. Thus, we believe that our study may reflect a punctuated equilibrium process with short bursts of exogenous changes, pushing industries temporarily into more volatile time-periods, rather than a state of disequilibrium predicted by hypercompetition theory.

At the level of individual industries, the story is different. None of the industries provide empirical support for the hypothesis of a decreasing durability in the decay rate of abnormal business returns. However, most industries experienced an increase in

Table 4. Hypothesis confirmations or rejections.

Hypothesis	Overall result	Industry specific result
H1: The durability of abnormal business returns has decreased over time.	No support	No industry specific support
H2: The rate of firm survival has decreased over time.	Supported	The Construction, Manufacturing, Retail Trade, Finance, Insurance and Real Estate and Services Industries has a lower trend in firm survival.
H3: Industry dynamism has increased over time.	No support	All industries (except the Construction industry) experience an increasing market stability over time.
H4: Industry munificence has decreased over time.	No support	Only the Retail Trade and Services industries experience a decreasing trend in munificence over time.

business mortality. One can see this in Table 4 where 5 out of 7 industries have a statistically significant negative trend in survivorship.[6]

We would in particular note the relatively large Finance, Insurance and Real Estate industry, that experienced a number of crisis moments during the period studied, including a 23% firm exit from 2007 to 2011, during and after the financial crisis (Jensen and Johannesen 2017; Nationalbank 2018). Given the significance of this, as well as the manufacturing industries to the overall economy, these are also subject to more comprehensive regulations than other industries. Since the financial crisis there has been renewed focus on the regulations, leading to a tightening of the requirements especially for financial institutions (Danmarks Nationalbank 2019). This may have made the financial industries more resilient to future changes in both the task and general environment. This could also be the reasoning why particularly the Finance, Insurance and Real Estate industries have experienced an increasing market stability over the study period. Looking at the industry-level dynamics, our results confirm this, showing that 6 out of 7 industries have a positive and significant time trend. Contrary to predictions of hypercompetition, we find evidence of increasing market stability (decreasing dynamism).

When looking at munificence, results are mixed. We find significant evidence of decreasing munificence for the Retail Trade and Services industries, indicating that the capacity to sustain business growth has become smaller. The retail market in Denmark is mature, with a few big players e.g. Coop and Dansk Supermarked. However, over the years the market share of traditional supermarkets has gone down, due to the increase in consumers shopping online or through other channels than supermarkets (Nordea Trade 2020). This may have resulted in a new industry structure, with increasing competition for scarce resources.

Scholars continue to claim that 'only a few industries escape the presence of hypercompetition' (Mahto, Ahluwalia, and Walsh 2018: 232). Hypercompetition is thus said to have spread to numerous industries, including the manufacturing industries (Thomas 1996; Thomas and D'Aveni 2009), brewing industry (Craig 1996; Nath and Newell 1998), retail industry (Priporas 2019), and services (Banker et al. 2013; Mattila 2001). Our results underscore the importance of viewing competition at the industry level and suggest that the idea that all industries and firms are affected equally by macro-environmental changes is an oversimplification. Trends like globalisation, digitalisation, or even climate change, affect industries very differently. Relating to the claim of generalised hypercompetition our results are in line with other sceptics (Castrogiovanni 2002; Makadok 1998; McNamara, Vaaler, and Devers 2003; Vaaler and McNamara 2010), who find no convincing evidence of such a fundamental and universal shift in the competitive environment. This serves as a warning against the many researchers and practitioners advocating that '*hypercompetition has affected virtually every industry*' (Hanssen-Bauer and Snow 1996: 414). So how do we explain the mismatch between the advocates and sceptics of hypercompetition?

First, it may be that hypercompetition exhibits cycles of increase and decrease in individual markets (Bogner and Barr 2000; Gimeno and Woo 1996; Thomas and D'Aveni

[6]Observe that the small Mining industry in Denmark (Trading Economics 2020) is one of the industries with no significance in this time trend.

2009). Hypercompetition could be more industry specific, as we also saw a small indication of in our industry specific models. We find evidence that the 'Finance, Insurance, and Real Estate', 'Retail Trade' and 'Services' industries have the strongest competition in our sample. Industry life cycle theory suggests that entry is higher in the early stages of an industry's life cycle, while exit increases in a later shake-out. As for rivalry, this is at its most intense in mature and declining industry stages. Such insights suggest the importance of viewing industries individually, and of paying careful attention to the time period studied. For example, McNamara, Vaaler, and Devers (2003) found no general evidence of increasing hypercompetition for the entire study period, but this was not true when restricting the sample to a 10-year period. As their study goes beyond 10 years, the tendency of increasing competition disappears.

Second, there is limited research on industries across regions. Due to globalisation, it could be that hypercompetition appears in industries across regions, and are not fixed or limited to a specific region. Searching within a single market, as we and previous studies have done, may fail to pick up global trends in competition levels. Most research has focused on the US market and the manufacturing industry, but it could be that we find hypercompetition in industries across borders, including in emerging regions such as China or India.

Third, we noted earlier that previous researchers have found different results that may or may not indicate an increasing hypercompetition. This could simply be due to timing. For example, Thomas (1996) found evidence of a hypercompetitive shift in the manufacturing industry during the period 1958 to 1991. However, analysing the same industry for a longer time period, McNamara, Vaaler, and Devers (2003) found no evidence of such a fundamental shift. Our results demonstrate clearly that looking at shorter time periods makes the analysis more sensitive to short term trends, and any evidence of hypercompetition coincidental (Castrogiovanni 2002; McNamara, Vaaler, and Devers 2003; Vaaler and McNamara 2010).

Finally, the lack of consistency in findings in the literature could also be due to methodological inconsistency. Makadok (1998) was the first to question the methodology in the research field, and that the popular view of hypercompetitive markets rested on descriptive analyses, case studies, and single industry studies (Craig 1996; D'Aveni 1994; Nault and Vandenbosch 1996; Rindova and Kotha 2001). To date, only six studies that we identified have statistically investigated the assumptions of increasing hypercompetition across time. These studies yield very different results that either are consistent (Thomas 1996; Thomas and D'Aveni 2009; Wiggins and Ruefli 2005) or inconsistent (Castrogiovanni 2002; McNamara, Vaaler, and Devers 2003; Vaaler and McNamara 2010) with the assumptions of hypercompetition. Other studies have been based on case studies and used managers as informants.

5.1. Implications for practice and research

Our findings have a number of implications for both managers and scholars. Managers and scholars alike should avoid making the assumption that the world is becoming more hypercompetitive. For managers, making such an assumption may lead to poor decision-making. For example, managers may erroneously assume that the potential strategic planning horizon is shorter than it actually is. They may also put excessive emphasis on

the exploration of new opportunities, rather than the exploitation of existing competitive advantages. They may even adopt organisational designs that are poorly matched to the conditions of the environment. Our results demonstrate that the industry environment may go through cycles of more or less intensive competition. This suggests a need for managers to stay alert to industry conditions in their particular industry, rather than assume that all industries follow the same trends in the level of competition.

Scholars need to use the theory of hypercompetition with great care, as some industries may indeed be characterised by hypercompetition, at some points in time. However, the term cannot be used as a universal label across time and industries. It is also wrong to assume that firms are no longer able to create and sustain competitive advantage as suggested by the resource-based view of the firm. The suggestion of, for example, Thomas (1996) that hypercompetition has made traditional approaches to strategy obsolete, is a premature conclusion. There are still industries and time periods in and during which the forces of competition are such that firms can build lasting competitive advantages.

Our results caution how we study industry change in general. We must clearly differentiate between objective measures of industry change, such as those derived from the archival data used in our study, and subjective measures. Managers make decisions on behalf of their organisation that are based on their subjective perceptions of the industry reality (Daft and Weick 1984; Ilinitch, D'Aveni, and Lewin 1996; Sund 2015). How managers perceive the environment and competitors is not necessarily a reflection of the 'true' state of the environment. In fact, managers may not be particularly useful informants about the industry environment at all (Mezias and Starbuck 2003; Sund 2016). This could potentially explain the inconsistency in results in studies of hypercompetition. Comparing the results of studies of industry change employing perceptual measures with those employing archival measures (whether the objective is to study hypercompetition, industry velocity, uncertainty, or any other dimension of such change), is comparing two different constructs. One is the phenomenon of industry change (e.g. hypercompeition) as an objective characteristic of the environment, the other is a characteristic of a mental model of that same environment. Measure returns on assets and you may find no hypercompetition. Ask a manager, and he may tell you a very different story.

5.2. Limitations and future research

Our study has some limitations that need to be acknowledged. First, to the best of our knowledge, the literature on hypercompetition has not yielded any methodologies to directly measure hypercompetition. Instead, researchers have used a variety of instruments and techniques to measure the *effects* of hypercompetition such as the sustainability of business performance (e.g. Thomas and D'Aveni 2009; Wiggins and Ruefli 2005), business mortality (McNamara, Vaaler, and Devers 2003; Vaaler and McNamara 2010) and industry structure (e.g. Castrogiovanni 2002). Similarly to previous research, we examine the theoretically predicted effects of hypercompetition on business performance and industry structure. For example, while the key characteristic of hypercompetition is temporary competitive advantage, we are not able to directly measure competitive advantage. Instead, we measure its generally accepted effect, namely the

persistency of superior economic performance. We fail to find significant evidence of a negative time trend in the durability of abnormal business returns.

Second, we use a variety of control variables to account for macroeconomic conditions and industry specific effects, but this does not mean that we have captured all such effects. Third, we did not control for mergers and acquisitions. This information was simply not available in our dataset. As a consequence, we might be overestimating the risk of firm exit in the survival probability models. In other words, our general conclusion of missing hypercompetition would only be strengthened by the availability of such data.

Fourth, in this study we 'quasi-replicate' the study of McNamara, Vaaler, and Devers (2003) using a Danish empirical context. Since Denmark is a much smaller country than the United States, the number of firms and observations (266 firms; 4,477 observations) are naturally lower in absolute terms compared to McNamara, Vaaler, and Devers (2003). However, we collected all the available observations on Danish publicly listed firms in the Thomson Reuters Database, removing only those with less than 6 years worth of data on ROA, and a small market capitalisation, similarly to McNamara, Vaaler, and Devers (2003). Within competition studies, it is frequent to use sample sizes like ours (e.g. Hermelo and Vassolo 2010; Zucchini, Böhmer-Horländer, and Kretschmer 2019). Whilst we recognise the generic limitations of studies on small population samples, one could also point to disadvantages of larger samples such as large sample bias.

Fifth, this study focuses on the development in the competitive environment from an economy-wide and industry level. Some may argue that the institutional context would have an impact on the level of competition. In a recent study Etiennot et al. (2019) argues that for developed countries the firm-level and industry-level are most important, and the institutional context is more important in developing countries. In our study, we find significant evidence of industry specific differences, but whether changes to the Danish institutional context has an impact on level of competition is a question that remains open. We do know that regulatory changes have for example impacted the competition in the finance industry.

Sixth, this study focuses on a single developed country in Northern Europe. Using a developed country as the empirical setting, we would expect the differences in the abnormal performance to be of '*a more temporary nature [. . .] than in countries with less developed institutions*' (Etiennot et al. 2019: 815). Given that our findings did not find statistical evidence of a decay in the durability of abnormal business performance, the question of whether the performance is more temporary (increasing hypercompetition) in developed or developing countries remains open.

In the end, we do not find evidence supporting or directly rejecting the notion of increasing hypercompetition. Thus, our reasoning is ultimately conjectural. It may be that hypercompetition is more specific to context or time. In previous studies, Thomas (1996) and McNamara, Vaaler, and Devers (2003) found evidence of increasing hypercompetition when they limited their studies to a 10-year period (shorter timeframe). Vaaler and McNamara (2010) found evidence of high-performing technology-intensive firms being hypercompetitive. These studies show how the intensity of competition can vary, depending on both time and context. Therefore, the lack of support in our study for the notion of a generalise increase in hypercompetition, does not mean that some industries, regions or time-periods could not be associated to hypercompetition.

Our findings, when combined with those of McNamara, Vaaler, and Devers (2003) and Vaaler and McNamara (2010) suggest that further research could investigate several aspects. First, all three studies conclude that competition effects vary over time, inviting future research to investigate the time dimension, for example looking more deeply at periods of economic downturns such as dotcom bubbles burst, the financial crisis, or more recently Covid-19. Second, Vaaler and McNamara (2010) found evidence of high-performing U.S. technology-intensive firms being hypercompetitive. Therefore, it would be interesting to investigate the geographical dimension. Competitive intensity could vary in terms of institutional arrangements. Likewise, the business performance and level of competition may be different according to industry.

Another avenue for extending the research on hypercompetition could be to investigate whether hypercompetition comes in cycles. Scholars argue that for example the entry and exit of firms is closely related to the movement of an industry's life cycle (Andersen and Rozsypal 2018). Therefore, it could be interesting to investigate how these cycles relate to hypercompetition.

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References

Abildgren, K., and J. Thomsen. 2011. "A Tale of Two Danish Banking Crises." *Danmarks Nationalbank*: 121–142. 1st Quarter (Monetary review).

Andersen, S. G., and F. Rozsypal 2018. Firm-level Entry and Exit over the Danish Business Cycle. In Danmarks Nationalbank Working papers. No. 132.

Andrevski, G., and W. J. Ferrier. 2019. "Does It Pay to Compete Aggressively? Contingent Roles of Internal and External Resources." *Journal of Management* 45 (2): 620–644.

Arellano, M. 1987. "Computing Robust Standard Errors for Within-groups Estimators." *Oxford Bulletin of Economics and Statistics* 49 (4): 431–434.

Banker, R., Z. Ca, N. M. Menon, and R. Mudambi. 2013. "The Red Queen in Action: The Longitudinal Effects of Capital Investments in the Mobile Telecommunications Sector." *Industrial and Corporate Change* 22 (5): 1195–1228.
Barney, J. 1991. "Firm Resources and Sustained Competitive Advantage." *Journal of Management* 17 (1): 99-120.
Barry, E. J., C. F. Kemerer, and S. Slaughter. 2006. "Environmental Volatility, Development Decisions, and Software Volatility: A Longitudinal Analysis." *Management Science* 52 (3): 448–464.
Bengtsson, M., and Ö. Sölvell. 2004. "Climate of Competition, Clusters and Innovative Performance." *Scandinavian Journal of Management* 20 (3): 225–244.
Bengtsson, M., and W. W. Powell. 2004. "Introduction: New Perspectives on Competition and Cooperation." *Scandinavian Journal of Management* 20 (1–2): 1–8.
Bertola, G., A. Dabusinskas, M. Hoeberichts, M. Izquierdo, C. Kwapil, J. Montornès, and D. Radowski. 2012. "Price, Wage and Employment Response to Shocks: Evidence from the WDN Survey." *Labour Economics* 19 (5): 783–791.
Bogner, W. C., and P. S. Barr. 2000. "Making Sense in Hypercompetitive Environments: A Cognitive Explanation for the Persistence of High Velocity Competition." *Organization Science* 11 (2): 212–226.
Castrogiovanni, G. J. 2002. "Organization Task Environments: Have They Changed Fundamentally over Time?" *Journal of Management* 28 (2): 129–150.
Chen, M. –J., Lin, H. –C, and Michel, J. G. 2010. Navigating in a Hypercompetitive Environment: The Roles of Action Aggressiveness and TMT Integration. *Strategic Management Journal* 31 (13): 1410–1430.
Cleantech Group, & WWF. 2014. ***Global Cleantech Innovation Index 2014***.
Craig, T. 1996. "The Japanese Beer Wars: Initiating and Responding to Hypercompetition in New Product Development." *Organization Science* 7 (3): 302–321.
D'Aveni, R. 2010. "How to Escape the Differentiation Proliferation Trap." *Strategy and Leadership* 38 (3): 44–49.
D'Aveni, R. A. 1994. *Hypercompetition. Managing the Dynamics of Stratgic Maneuvering*. 1st ed.) ed. New York: Free Press.
D'Aveni, R. A. 1995. "Coping with Hypercompetition: Utilizing the New 7S's Framework." *Academy of Management Executive* 9 (3): 45–57.
D'Aveni, R. A. 1997. "Waking up to the New Era of Hypercompetition." *Washington Quarterly* 21 (1): 183–195.
D'Aveni, R. A., and G. B. Dagnino. 2010. "The Age of Temporary Advantage." *Strategic Management Journal* 31: 1371–1385.
Daft, R. L., and K. E. Weick. 1984. "Toward a Model of Organizations as Interpretation Systems." *Academy of Management Review* 9 (2): 284–295.
Danmarks Nationalbank. 2019. The Danish Financial Sector.
Dess, G. G., and D. W. Beard. 1984. "Dimensions of Organizational Task Environments." *Administrative Science Quarterly* 29 (1): 52–73.
Eisenhardt, K. M., and L. J. Bourgeois. 1988. "Politics of Strategic Decision Making in High Velocity Environments: Toward a Midrange Theory." *Academy of Management Journal* 31: 737–770.
Etiennot, H., R. Vassolo, F. D. Hermelo, and A. McGahan. 2019. "How Do Industry and Country Impact Firm Performance? A National and Supranational Analysis." *Review of Managerial Science* 13 (4): 791–821.
Farjoun, M., and M. Levin. 2011. "A Fractal Approach to Industry Dynamism." *Organization Studies* 32 (6): 825–851.
Foss, N. J., and T. Knudsen. 2003. "The Resource-based Tangle: Towards a Sustainable Explanation of Competitive Advantage." *Managerial and Decision Economics* 24 (4): 291–307.
Gimeno, J., and C. Y. Woo. 1996. "Hypercompetition in a Multimarket Environment: The Role of Strategic Similarity and Multimarket Contact in Competitive De-Escalation." *Organization Science* 7 (3): 322–341.

Hannan, M., and J. Freeman. 1988. "The Ecology of Organizational Mortality: American Labor Unions." *American Journal of Sociology* 94: 25–52.
Hanssen-Bauer, J., and C. C. Snow. 1996. "Responding to Hypercompetition: The Structure and Processes of a Regional Learning Network Organization." *Organization Science* 7 (4): 413–427.
Harvey, M. G., and D. A. Griffith. 2007. "The Role of Globalization, Time Acceleration, and Virtual Global Teams in Fostering Successful Global Product Launches." *Journal of Product Innovation Management* 24 (5): 486–501.
Hermelo, F. D., and R. Vassolo. 2010. "Institutional Development and Hypercompetition in Emerging Economies." *Strategic Management Journal* 31 (13): 1457–1473.
Hoisl, K., M. Gruber, and A. Conti. 2017. "R&D Team Diversity and Performance in Hypercompetitive Environments." *Strategic Management Journal* 38 (7): 1455–1477.
Huff, A. S., F. J. Milliken, G. P. Hodgkinson, R. J. Galavan, and K. J. Sund. 2016. "A Conversation on Uncertainty on Managerial and Organization Cognition." In *Uncertainty and Strategic Decision Making*, edited by K. J. Sund, R. J. Galavan, and A. S. Huff, 1–31. Bingley: Emerald Group Publishing.
Huhtala, J. 2014. "Market Orientation, Innovation Capability and Business Performance." *Baltic Journal of Management* 9 (2): 134–152.
Hunt, S. D. 1995. "The Resource-Advantage Theory of Competition: Toward Explaining Productivity and Economic Growth." *Journal of Management Inquiry* 4 (4): 317–332.
Ilinitch, A. Y., R. A. D'Aveni, and A. Y. Lewin. 1996. "New Organizational Forms and Strategies for Managing in Hypercompetitive Environments." *Organization Science* 7 (3): 211–220.
Jacobsen, R. 1988. "The Persistence of Abnormal Returns Author." *Strategic Management Journal* 9 (5): 415–430.
Jensen, T. L., and N. Johannesen. 2017. "The Consumption Effects of the 2007–2008 Financial Crisis: Evidence from Households in Denmark." *American Economic Review* 107 (11): 3386–3414.
Kim, D.-J., and B. Kogut. 1996. "Technological Platforms and Diversification." *Organization Science* 7 (3): 283–301.
Lee, C.-H., N. Venkatraman, H. Tanriverdi, and B. Iyer. 2010. "Complementarity-based Hypercompetition in the Software Industry: Theory and Empirical Test, 1990-2002." *Strategic Management Journal* 31 (13): 1431–1456.
Lockett, A., R. P. O'Shea, and M. Wright. 2008. "The Development of the Resource-based View: Reflections from Birger Wernerfelt 1." *Organization Studies* 29 (8–9): 1125–1141.
Longin, M. D. 2016. "Firm Strategic Behaviour in Hypercompetition : Is There a Link with Sustainable Competitive Advantage ?" *International Journal of Arts & Sciences* 09 (2): 667–675.
Mahto, R. V., S. Ahluwalia, and S. T. Walsh. 2018. "The Diminishing Effect of VC Reputation: Is It Hypercompetition?" *Technological Forecasting and Social Change* 133 (March): 229–237.
Makadok, R. 1998. "Can First-mover and Early-mover Advantages Be Sustained in an Industry with Low Barriers to Entry/imitation?" *Strategic Management Journal* 19 (7): 683–696.
MarketScreener. 2015. "Rella A/S: Sale of Shares in Aller Holding AS." *MarketScreener*, December 3. https://www.marketscreener.com/quote/stock/RELLA-HOLDING-A-S-1412997/news/Rella-A-S-Sale-of-shares-in-Aller-Holding-AS-20019114/
Mattila, A. S. 2001. "The Effectiveness of Service Recovery in a Multi-industry Setting." *Journal of Services Marketing* 15 (7): 583–596.
McGahan, A. M., and M. E. Porter. 1997. "How Much Does Industry Matter, Really ?" *Strategic Management Journal* 18: 15–30. (Special Issue: Organizational And Competitive Interactions).
McKinley, W. 2011. "Organizational Contexts for Environmental Construction and Objectification Activity." *Journal of Management Studies* 48 (4): 804–828.
McNamara, G., P. M. Vaaler, and C. Devers. 2003. "Same as It Ever Was: The Search for Evidence of Increasing Hypercompetition." *Strategic Management Journal* 24 (3): 261–278.
Mezias, J., and W. Starbuck. 2003. "Studying the Accuracy of Managers' Perceptions: A Research Odyssey." *British Journal of Management* 14 (1): 3–17.
Mueller, D. C. 1986. *"Profits in the Long Run"*. Cambridge, UK: Cambridge University Press.

Nath, D., and S. E. Newell. 1998. "Organizational Responses to A Hypercompetitive Environment: A Case Study of Pepsi Canada." *Journal of Business Research* 41 (1): 41–48.
Nationalbank, D. 2018. "How Has Denmark Managed since the Financial Crisis?" *Danmarks Nationalbank,* November 29.https://www.nationalbanken.dk/en/publications/themes/Pages/How-has-Denmark-managed-since-the-finansial-crisis.aspx
Nault, B. R., and M. B. Vandenbosch. 1996. "Eating Your Own Lunch: Protection Through Preemption." *Organization Science* 7 (3): 342–358.
Newey, W. K., and K. D. West. 1987. "A Simple, Positive Semi-Definite, Heteroskedasticity and Autocorrelation Consistent Covariance Matrix Published By : The Econometric Society Stable URL : Http://www.jstor.org/stable/1913610." *Econometrica* 55 (3): 703–708.
Nordea Trade. 2020. Denmark: Buying and Selling.
OMX, N. 2013. ***Svendborg Sparekasse A/S*** *- Admittance to trading and official listing of new shares due to the merger between Svendborg Sparekasse A/S and Vestfyns Bank A/S, change of face value (new ISIN) and name change.*, vol. 6.
Peteraf, M. 1993. "The Cornerstones of Competitive Advantage: A Resource-Based View." *Strategic Management Journal* 14: 179–191.
Polowcxy, J. 2012. "Strategic Management at the Beginning of the XXI Century: The Impact of Crisis Turbulences." *Poznan University of Economics Review* 12 (3): 81–98.
Porter, M. 1991. "Towards a Dynamic Theory of Strategy." *Strategic Management Journal* 12: 95–117.
Porter, M. 1996. "What Is Strategy?" *Havard Business Review* 74 (1): 61–78.
Priporas, C. V. 2019. "Competitive Intelligence Practice in Liquor Retailing: Evidence from a Longitudinal Case Analysis." *International Journal of Retail & Distribution Management* 47 (9): 997–1010.
Rindova, V. P., and S. Kotha. 2001. "Continuous "Morphing": Competing through Dynamic Capabilities, Form, and Function." *Academy of Management Journal* 44 (6): 1263–1280.
Roberts, N., and V. Grover. 2012. "Investigating Firm's Customer Agility and Firm Performance: The Importance of Aligning Sense and Respond Capabilities." *Journal of Business Research* 65 (5): 579–585.
Ruiz, S., P. Arvate, and W. Xavier. 2017. "Superior Economic Performance in Developed and Developing Countries." *International Journal of Emerging Markets* 12 (1): 93–107.
Saadatmand, M., M. Dabab, and C. Weber 2018. "Dynamics of Competition and Strategy: A Literature Review of Strategic Management Models and Frameworks." ***2018 Proceedings of PICMET '18: Technology Management for Interconnected World***, Honolulu, HI, August 2018.
Schwab, K. 2017. ***The Global Competitiveness Report 2017***.
Schwab, K. 2018. ***The Global Competitiveness Report 2018***.
Schwab, K. 2019. ***The Global Competitiveness Report 2019***.
Selsky, J. W., J. Goes, and O. N. Baburoglu. 2007. "Contrasting Perspectives of Strategy Making: Applications in "Hyper" Environments." *Organization Studies* 28 (1): 71–94.
Sharapov, D., and J. M. Ross. 2019. "Whom Should a Leader Imitate? Using Rivalry-based Imitation to Manage Strategic Risk in Changing Environments." *Strategic Management Journal* October: 1–32.
Sund, K. J. 2015. "Revisiting Organizational Interpretation and Three Types of Uncertainty." *International Journal of Organizational Analysis* 23 (4): 588–605.
Sund, K. J. 2016. "A Test of Perceptual Accuranct and Overconfidence in A Strategic Issue Context." In *Uncertainty and Strategic Decision Making*, edited by K. J. Sund, R. Galavan, and A. Huff, 101–126. Bingley: **Emerald**.
Thomas, L. G. 1996. "The Two Faces of Competition: Dynamic Resourcefulness and the Hypercompetitive Shift." *Organization Science* 7 (3): 221–242.
Thomas, L. G., and R. D'Aveni. 2009. "The Changing Nature of Competition in the US Manufacturing Sector, 1950-2002." *Strategic Organization* 7 (4): 387–431.
Trading Economics. 2020. Denmark GDP From Mining.
Vaaler, P. M., and G. McNamara. 2010. "Are Technology-intensive Industries More Dynamically Competitive? No and Yes." *Organization Science* 21 (1): 271–289.

Van Dam, R., and E. B. Andersen. 2008. "Risk-Based Supervision of Pension Institutions in Denmark." *Policy Research Working Paper* 4540: 1–35.
Wernerfelt, B. 1984. "A Resource-based View of the Firm." *Strategic Management Journal* 5: 171–180.
Westergård-Nielsen, N., and I. Neamtu. 2012. "How are Firms Affected by the Crisis and How Do They React ?" *IZA Institute of Labor Economics, Discussion Paper No. 6671*.
Wiggins, R. R., and T. W. Ruefli. 2005. "Schumpeter's Ghost: Is Hypercompetition Making the Best of Times Shorter?" *Strategic Management Journal* 26 (10): 887–911.
Zeileis, A. 2004. "Econometric Computing with HC and HAC Covariance Matrix Estimators." *Journal of Statistical Software* 11: 1–17.
Zucchini, L., S. Böhmer-Horländer, and T. Kretschmer. 2019. "Competitive Pressure: Competitive Reactions at the Group-level." *Industry and Innovation* 26 (6): 643–666.

Appendix

Table A1. Autoregressive model with HHI.

Independent variables	Base model	Interaction model
Constant	1.9366*	1.9478*
	(0.9269)	(0.9296)
Prior performance (ROA_{it-1})	0.5641***	0.5641***
	(0.0470)	(0.0470)
Year counter ($YEAR_t$)	−0.1112*	−0.1112*
	(0.046)	(0.0462)
GDP growth rate (GDP_G_t)	0.7613***	0.7611***
	(0.1253)	(0.1252)
Inflation (INF_t)	−1.1472***	−1.1478***
	(0.2400)	(0.2402)
Industry Concentration (HHI_{it})	0.0006*	0.0006*
	(0.0002)	(0.0002)
Interaction term		−0.0001
(ROA_{it-1} *$YEAR_t$)		(0.0002)
F	415.205***	345.94***
R^2	0.3312	0.3312
N	4,198	4,198

Significant codes: *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$; • $p < 0.10$
[a]Standard error terms appear in parentheses

Table A2. The abnormal business returns analysis for each of the industries (Base model).

Independent variable	Mining	Construction	Manu-facturing	Transp. and Comm. Services	Retail Trade	Finance, Insurance, and Real Estate	Services
Constant	5.2929	4.9192**	2.7475	1.0583	5.6871	1.8680	0.4249
	(19.8070)	(1.5624)	(2.6457)	(1.8776)	(5.1537)	(1.4596)	(1.8421)
Prior performance (ROA_{it-1})	0.1266	0.3663***	0.6892***	0.2096	0.5214***	0.4349***	0.5330***
	(0.1170)	(0.1033)	(0.0458)	(0.1371)	(0.0780)	(0.0859)	(0.0735)
Year counter ($YEAR_t$)	−0.4382	−0.1233*	−0.1183	0.0118	−0.0695	−0.0400	0.0035
	(0.6425)	(0.0485)	(0.0880)	(0.0579)	(0.1431)	(0.0411)	(0.0598)
GDP growth rate (GDP_G_t)	1.2902	0.4367***	0.8452*	1.0398**	0.3816•	0.5565**	0.9053***
	(1.4769)	(0.1316)	(0.3658)	(0.3684)	(0.1939)	(0.1750)	(0.2603)
Inflation (INF_t)	−0.0605	−0.5625***	−1.3082**	−0.4942	−1.4155•	−1.1530**	−0.9084**
	(3.9473)	(0.1650)	(0.4675)	(0.5807)	(0.7761)	(0.3649)	(0.3055)
F	0.3499	21.2501***	260.79***	7.2560***	20.1246***	72.9242***	80.6793***
R^2	0.0407	0.1512	0.4927	0.0652	0.2258	0.2039	0.3014
N	38	482	1,079	421	281	1,144	753

Significance levels: *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$; • $p < 0.10$
[a]Standard error terms appear in parentheses

Table A3. The abnormal business returns analysis for each of the industries (Interaction model).

Independent variable	Mining	Construction	Manu-facturing	Transp. and Comm. Services	Retail Trade	Finance, Insurance, and Real Estate	Services
Constant	2.3386	4.8343**	2.7875	0.9542	5.7880	1.8964	0.3779
	(16.0704)	(1.5665)	(2.6613)	(1.8385)	(5.2930)	(1.4400)	(1.8423)
Prior performance (ROA_{it-1})	0.1291	0.3678***	0.6893***	0.2104	0.5214***	0.4333***	0.5327***
	(0.1111)	(0.1035)	(0.0458)	(0.1374)	(0.0783)	(0.0871)	(0.0734)
Year counter ($YEAR_t$)	−0.2946	−0.1248*	−0.1193	0.0083	−0.0703	−0.0414	0.0026
	(0.4763)	(0.0485)	(0.0883)	(0.0585)	(0.1443)	(0.0400)	(0.0595)
GDP growth rate (GDP_G_t)	1.3802	0.4453***	0.8439*	1.0667**	0.3798•	0.5558**	0.9113***
	(1.3301)	(0.1325)	(0.3661)	(0.3697)	(0.1951)	(0.1744)	(0.2596)
Inflation (INF_t)	−0.7228	−0.5987***	−1.3132**	−0.5220	−1.4262•	−1.1544**	−0.9135**
	(3.6964)	(0.1708)	(0.4685)	(0.5830)	(0.7951)	(0.3631)	(0.3039)
Interaction term	0.0059	0.0019	0.0002	0.0011	−0.0005	0.0005	0.0006
(ROA_{it-1} *$YEAR_t$)	(0.0056)	(0.0012)	(0.0003)	(0.0019)	(0.0014)	(0.0007)	(0.0007)
F	0.4940	17.1752***	208.464***	5.8901***	16.0608***	58.3716***	64.5587***
R^2	0.0717	0.1528	0.4927	0.0663	0.2260	0.2041	0.3017
N	38	482	1,079	421	281	1,144	753

Significance levels: *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$; • $p < 0.10$
[a]Standard error terms appear in parentheses

Table A4. The survival analysis for each of the industries (Base model).

Independent variable	Mining	Construction	Manufacturing	Transportation and Communication services	Retail Trade	Finance, Insurance, and Real Estate	Services
Constant	90.2851*** (8.0144)	111.8747*** (12.4373)	96.7845***	102.2797***	97.9769*** (3.6317)	91.7279***	102.4984***
			(7.0908)	(1.8538)		(3.5233)	(2.1639)
GDP growth rate (GDP_G_t)	0.2128	0.1038	0.4375	−0.2491	0.1152	0.6043•	−0.1146
	(0.2272)	(0.2789)	(0.3721)	(0.1727)	(0.2844)	(0.3170)	(0.1533)
Industry Density ($DENSITY_t$)	11.7601 (10.3474)	−2.2306	−0.2772	−0.0156	0.7288	0.0912	−0.2677
		(1.9163)	(0.4885)	(0.2564)	(1.1236)	(0.2387)	(0.2052)
the quadratic trans. of the industry density ($DENSITY_t^2$)	−2.8969 (2.5774)	0.0648	0.0056	−0.0143	−0.0921 (0.0863)	−0.0014	0.0035
		(0.0624)	(0.0089)	(0.0123)		(0.0047)	(0.0050)
F	1.348	1.473	2.29•	5.987**	1.643	0.7803	2.581•
R^2	0.288	0.1181	0.1723	0.3525	0.1372	0.0682	0.1901
N	14	37	37	37	35	36	37

Significance levels: *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$; • $p < 0.10$

[a]Standard error terms appear in parentheses

[b]N is the number of years

Table A5. The survival analysis for each of the industries (Time model).

Independent variable	Mining	Construction	Manufacturing	Transportation and Communication services	Retail Trade	Finance, Insurance, and Real Estate	Services
Constant	513.8042	588.3846*	540.1374**	274.9995	676.5455*	684.7415*	493.5182*
	(475.8549)	(210.9037)	(185.5018)	(185.8274)	(290.9687)	(276.4246)	(163.5678)
GDP growth rate (GDP_G_t)	0.1948 (0.2370)	−0.4532• (0.2514)	0.3014	−0.3066•	−0.1111 (0.2215)	0.2583 (0.2663)	−0.1826 (0.1719)
			(0.3733)	(0.1676)			
Industry Density ($DENSITY_t$)	13.4367 (11.6831)	−2.0603	0.4134	0.1196	2.4032* (0.9248)	0.4590• (0.2448)	−0.1215 (0.2033)
		(1.9419)	(0.3349)	(0.2478)			
the quadratic trans. of the industry density ($DENSITY_t^2$)	−3.1342 (2.7991)	0.0558	−0.0065	−0.0161	−0.1956* (0.0730)	−0.0072• (0.0042)	−0.0042 (0.0044)
		(0.0636)	(0.0066)	(0.0107)			
A year counter ($YEAR_t$)	−0.2120 (0.2400)	−0.23730* (0.1071)	−0.2255*	−0.0869	−0.2917• (0.1465)	−0.2981* (0.1392)	−0.1973• (0.0826)
			(0.0926)	(0.0935)			
F	0.9487	1.921	3.197*	4.858**	2.47•	1.459	3.036*
R^2	0.2966	0.1936	0.2855	0.3778	0.2478	0.1584	0.2751
N	14	37	37	37	35	36	37

Significance levels: *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$; • $p < 0.10$

[a]Standard error terms appear in parentheses

[b]N is the number of years

Table A6. The survival analysis across SIC 1, 2, 3, 4, 5, and 7.

Independent variable	Base model	Time model (-SIC6)
Constant	99.311***	426.40***
	(3.1260)	(77.221)
GDP growth rate (GDP_G_t)	0.0689	−0.0715
	(0.1701)	(0.1533)
Industry Density ($DENSITY_t$)	−0.0066	0.0755
	(0.1002)	(0.0612)
Quadratic trans. of the industry density ($DENSITY_t^2$)	−0.0002	−0.0006
	(0.0007)	(0.0005)
Year counter ($YEAR_t$)		−0.1652**
		(0.0391)
F	4.524•	6.875***
R^2	0.2914	0.4622
N	37	37

Significance levels: *** p < 0.001; ** p < 0.01; * p < 0.05; • p < 0.10
[a]Standard error terms appear in parentheses
[b]N is the number of years

Table A7. The level of Dynamism in each Industry.

Independent variable	Mining	Construction	Manufacturing	Transportation and Communication services	Retail Trade	Finance, Insurance, and Real Estate	Services
Constant	−98.452*5	−13.8339	−99.6006***	−126.9091*	−38.8779*	−200.5889*	−140.2892***
	(42.9452)	(12.0148)	(16.3699)	(51.8012)	(14.7228)	(80.4425)	(21.6563)
YEAR	0.0497*	0.0075	0.0507***	0.0645*	0.0200*	0.1024*	0.0713***
	(0.0213)	(0.0060)	(0.0082)	(0.0259)	(0.0073)	(0.0403)	(0.0109)
F	2.35	5.117*	86.63***	12.55**	18.47***	4.54*	36.14***
R^2	0.1903	0.1244	0.7064	0.2585	0.3733	0.1148	0.8015
N	12	38	38	38	33	37	38

Significance levels: *** p < 0.001; ** p < 0.01; * p < 0.05; • p < 0.10
[a]Standard error terms appear in parentheses
[b]N is the number of years

Table A8. The level of munificence in each industry.

Independent variable	Mining	Construction	Manufacturing	Transportation and Communication services	Retail Trade	Finance, Insurance, and Real Estate	Services
Constant	66.2982***	−3.1252	−3.5433	−0.8496	−16.6195***	−2.0786	−8.2429***
	(5.8330)	(3.0783)	(5.0144)	(7.0608)	(3.4672)	(6.7773)	(1.2504)
Year	−0.0349***	0.00158	0.0018	0.0005	0.0083***	0.0011	0.0041***
	(0.0029)	(0.0015)	(0.0025)	(0.0035)	(0.0017)	(0.0034)	(0.0006)
F	110.9***	2.634	1.746	0.031	37.47***	0.083	24.66***
R^2	0.9173	0.0681	0.0463	0.0008	0.5473	0.0024	0.4065
N	12	38	38	38	33	37	38

Significance levels: *** p < 0.001
[a]Standard error terms appear in parentheses
[b]N is the number of years