

The Long-Run Equilibrium of Industry Population and Bottom Lines: Analysing the Near-Perfect Restaurant Industry

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The establishment and bankruptcy of businesses is a crucial aspect of the market economy. The market in which restaurants compete is characterized by few barriers to entry, strong competition, low marginal rates of profit, and high levels of bankruptcy. Using publicly available panel data of all Norwegian restaurants, we examine the determinants of market levels of entry and exit. In theory, the driving force in the space of market turnover is the marginal rate of profit in the industry. There is a strong link between the profit rates in the sector and number of firms leaving and entry the market.

Keywords: market dynamics, turnover, restaurants, entry, bankruptcy, exit, marginal rate of profit

INTRODUCTION

A key factor for a market to function is the opportunity for new companies to enter the market. The motivation is to make a profit. As firms enter the market, prices fall because of increased competition. If the reduction in price is not due to increases in efficiency, profit margins must fall. The firms that cannot lower their price and keep a persistently positive profit will leave the market, while the most effective firms survive.

Since this is at the heart of classical market economics, many researchers have investigated the topic of entry and exit. Especially in dynamic markets that face fast changes in demand and innovation, there is a considerable degree of turnover, and the survival and growth of some firms often come at the expense of others. The size of profit margins varies across industries and an important determinant of the level of margins is the degree of turnover in the industry. High turnover is known to contribute to higher productivity, as outdated firms are outcompeted by those that are better suited for the position (Gatti et al., 2003).

While the turnover of firms in all sectors is related through economy-wide factors, the variation of turnover between sectors is much larger than that within sectors (Agarwal & Gort, 1996). That is, sector-specific factors are more important than cyclical forces in determining the level of turnover. The barriers to entry and exit vary among industries (Carree & Dejardin, 2007), and compared to other industries the restaurant industry has low entry and exit barriers. The fixed costs are low, but the variable costs are high (Hua & Templeton, 2010), meaning that the sector allows for entry without much of the planning nor the risk that accompanies entry in other sectors. An unsuccessful venture can be given up without large losses.

The strong turnover and competition, combined with the low fixed costs and the even playing ground of the restaurant sector, explain why the degree of profit persistence is low for restaurants (Luca & Luca, 2019; Opstad et al., 2022).

The characteristics of the dining industry, namely low barriers to entry and margins of profit, make it ideal for the analysis of perfect market theories. Kaya and Ucdogruk (2002) show that industries with low barriers to entry have high rates of turnover. From an analytical standpoint, the stable demand and low innovation mean that simple methodologies, such as descriptive data and graphs, can explain much of the dynamics at hand.

Restaurants have different menus in different countries, but their structure, markets, and customers are very similar. They primarily depend on local demand (Carree & Dejardin, 2007), its only form of outside demand being visitors from other areas. If the maximum efficient size of a restaurant is reached, it must open a new location. Most restaurants do not reach this point, however, as most new restaurants face bankruptcy in their infant stages of business. By considering Norwegian restaurants over the past fifteen years, this article provides insight into how the market economy functions for sectors with simple technologies and homogenous products. The barriers to entry and marginal rates of profit are small, which allows us to document the close relationship between profitability and the number of entries into and exits from the market.

The purpose of this article is to gain more insight into how the market works for the restaurant industry, especially the discussion about the link between profitability in the industry and the number entering the market and leaving the market. An important contribution of this paper is the model that shows that there is a significant lag between the level of average profit and number of newcomers, while there is no corresponding time lag for those leaving the market.

LITERATURE REVIEW

A rich body of literature investigating the reasons for firms' exits is available (Cefis et al., 2021). Wennberg et al. (2010) suggest there are three types of firms exit from the market: mergers and acquisitions (M&A), voluntary liquidation, and bankruptcy. The economic situation of firms that exit can thus vary according to how and why they leave the market. M&A can suggest a well-run business, while a voluntary liquidation or a bankruptcy suggests the opposite. From an analysis of 5,164 companies between 2006 and 2012, Ma et al. (2022) report that firms with poor strategies and deficits tend to give up production. These companies lose their positions in the market, and with weak financial performance, they will be forced to cease trading. Unprofitable firms cannot survive in the long run. According to Mansfield (1962), the exit rate is connected to the industry's profitability. He estimates that if the average profit doubles, the exit rate will decrease by 15%. The sensitivity to market dynamics affects smaller firms more severely, as these mostly young firms are already less stable, with higher levels of both growth and bankruptcy.

Some researchers focus on the difference between sell-off/closure and bankruptcy (Bhattacharjee et al., 2009; Fortune & Mitchell, 2012). There is substantial difference between M&A/sell-off and bankruptcy, with exit via acquisition often being a planned strategy for restructuring or receiving cash. It is linked to the reallocation of resources in a dynamic process, and there are different kinds of exit strategies to service the debt, or parts of it (Lemley & McGreary, 2019). Voluntary closures are more common for small firms, and are often related to individual circumstances, like retirements, family situation, or changes in preference.

Luca and Luca (2019) have investigated the restaurant industry. Due to the average profit margin being rather low in this sector, combined with the low barriers to entry and exit, the survival of the fittest dynamic is particularly strong for restaurants. The marginal rate of profit can serve as a measure of firm-specific factors (Mueller, 1968), and the persistence of profits can thus be interpreted as the importance of firm specific factors. Opstad et al., (2022) estimate that the degree of profit persistency is .25, which is higher than for primary producers of food, and similar to other service sectors (Hirsch, 2018).

Parsa et al. (2011) indicate three factors to explain the exit of restaurants: location, affiliation (independent versus chain), and size. They find that larger restaurants are less likely to exit the market,

while 26% of new restaurants fail within their first year. The failure rate is higher among smaller firms (Anyadike-Danes & Hart, 2018; Dunne & Hughes, 1994; Mansfield 1962), which are usually younger. Hubbard (2018) suggests that almost half (48%) of all food and accommodation businesses do not survive the first five years. These tendencies are found in most industries, but rarely to the same degree. In an earlier article, Parsa et al. (2005) suggest that independent restaurants have a higher closure rate than chain restaurants. A high level of debt is often an issue for restaurants (Hua & Tempelton, 2010), often because of their tendency to be run by inexperienced investors with high hopes. The family-run restaurant is a cornerstone of the industry, but these restaurants can often struggle with inexperienced workers who are hard to fire. Alternatively, outside workers in chain restaurants have a famously high turnover and are costly to train. Self et al. (2015) find that restaurants that are struggling to find the right workers are more likely to leave the market.

According to Myran (2010), the effect of old capital equipment explains why many firms must leave the market, following the vintage theory. On the other hand, active learning and experience improve the quality of firms. Salvanes and Tveteras (2004) report that the learning impact dominates the first years of business and decreases with the years, until capital vintage dominates as firms grow older. In firms in which the barriers to entry are high, or correspondingly, the sunk cost is high, the chances of exit increase as firms age. They will choose to keep the company operating for longer if the capital is large. Jovanovic (2006) points out that in highly technological industries, the rate of exit is high if the price falls. On the other hand, increased market growth through exports will help reduce the number of companies leaving the market (Namini et al., 2013) as the market expands, that is, if the country's industry is internationally competitive.

Mansfield (1962) links the entry to a market to the rate of profitability for the sector, the capital requirement, and the minimum efficient size, describing margins of profit, barriers to entry, and the importance of size. Anyadike-Danes and Hart (2018) suggest that the growth of firms is much stronger in the first five years of business, while Schiff (2015) shows the relationship between market size and population structure.

Some of the challenges for start-ups firms are (Aspelund et al., 2021; Forbes & Kirsch, 2011):

- The level of risk and uncertainty (performance, financing)
- Complexity (technical solutions, business model, etc.)
- High transaction cost (the cost is typically high in the first phases of production)
- Disadvantages of scale (must reach a minimum level of profitability)

If a new firm is to succeed, it must expand its operations fast and without gaining too much leverage. Smaller firms have higher and more variable growth, while the difference is not great between those that succeed and those that do not. New firms grow twice as fast as old ones, and Fitzsimmons et al. (2009) find that small and young firms that grow fast have a low death rate, although such firms often close down. A firm's ability to be productive is thus important for its survival (De Monte, 2020). For restaurants, some key factors are physical location, speed of growth, and strategy regarding competition (Parsa et al., 2005). In larger cities there is greater diversity, and restaurants are often clustered in parts of the city. Restaurants of similar type often cluster to attract specific customers, where the importance of satisfying the needs of the customer increases (Self et al., 2015). Hua and Templeton (2010) also describe restaurant management, financing good capital structure, and controlling cost as important factors, which is true for any business.

Among Swedish firms, Eriksson (1984) finds a close link between growth and exit of firms, but most of the growth comes from existing companies with a long-run equilibrium with positive profits. That is, surviving firms drive most of the growth. To survive, Plehn-Dujowic (2009) suggests that companies must change their product mix continuously to keep up with the new entrants to the industry.

RESEARCH QUESTIONS

In this paper, we seek to answer to questions using our Norwegian sample of restaurants. Following the economic theories describing the market entry and exit of firms, and the previous literature which applies it, we pose the two questions, or statements, of research which are examined in this paper:

1. The number of restaurants entering and exiting the market is tightly connected to the average marginal rate of profit for the industry.

Carree and Dejardin (2007) report that the rate of entry is positively linked to room in the market and also suggest that firms will enter markets in which there are profits to be made. In addition to being important for each firm, the mean profitability of the industry is important for the structure of the market. Depending on economic conditions and outside factors, firms may enter or exit. We research the degree to which the industry profit rate dictates the number of entrants and leavers and at what time scale this dynamic occurs. Market theory suggests that firms enter when profitability is high, while the opposite is true when profitability is low. We investigate whether there is a lag between profitability and the number of exits and entries in this sector.

2. For new firms in the restaurant sector, growth in their first years of business is crucial for their fate. The firms that survive grow faster than those that do not and continue to grow faster than their older competitors.

Luca and Luca (2019) suggest the strongest companies in the restaurant industry will survive. The companies with negative profit will be forced to exit the market. There may be periods when companies are struggling and running deficits, but if they are going to survive in the long term, they are dependent on recovery and adaptation to a situation with normal operations and profits (Haas et al., 2020). Many new companies can have a weak financial foundation and are started by people with rather little experience of the market. A critical factor for success is learning how to act, by gaining and applying experience. If a firm fails in the initial phase, it can quickly experience financial problems and become unable to survive. The first years of a business are crucial. The firms that survive are expected to have high levels of growth, as they often fill a niche in the sector or have technical advantages in production (Erikson, 1984). Not only do they grow faster than the firms that face bankruptcy, but they also beat their older competitors. Established enterprises tend to grow less than those that have just entered the market (De Monde, 2020).

METHODOLOGY

To investigate these research questions, we employ three models. First, we aggregate the firm data into yearly data containing the total number of entries and bankruptcies, together with the average marginal rate of profit. This analysis of market dynamics is of macroeconomic interest. We want to estimate and understand the relationship of all three parameters, but the direction of effect is clear from economic theory. The number of entries into the market will increase as the marginal rate of profit increases. In turn, these new firms will compete the profitability away, reducing the marginal rate of profit. When this occurs, the firms with the slimmest margins must file for bankruptcy, as the lower industry profitability pushes their marginal rates below zero.

The result is three equations, but since the data are aggregated from the firm to the sector level, we are left with few observations. Those few observations that we do have are of high quality, but we accompany the regression estimates with descriptive data and graphical representations to illustrate the relationship in Model 1. Three equations describe Model 1, and they are all estimated separately:

$$En_t = \alpha_0 + \beta_1 \bar{\pi}_t + \beta_2 \bar{\pi}_{t-1} + \beta_3 \bar{\pi}_{t-2} + \varepsilon_t \quad (1a)$$

$$\bar{\pi}_t = \alpha_0 + \beta_1 En_t + \beta_2 En_{t-1} + \beta_3 En_{t-2} + \varepsilon_t \quad (1b)$$

$$Ex_t = \alpha_0 + \beta_1 \bar{\pi}_t + \beta_2 \bar{\pi}_{t-1} + \beta_3 \bar{\pi}_{t-2} + \varepsilon_t \quad (1c)$$

This model includes the average profit rate ($\bar{\pi}_t$) on entry (En_t), the effect of entry on the profit rate, and the effect of the profit rate on exit (Ex_t), respectively. Economic theories of market competition suggest that the following dynamic dictates the relationships above: as the marginal rate of profit increases, more firms will enter, which, through competition, lowers the marginal rate of profit, causing more firms to exit the market. As it takes time for firms to become established and gain a foothold, we expect that the two

first relationships both start the equation with a time lag, while the mechanism that increases bankruptcy through lower profitability occurs contemporaneously due to the low exit costs of the industry.

The second model we use is in the framework of Mueller's theory of profit persistence (Mueller, 1986). By estimating the yearly persistence of the profit rate, we obtain a parameter describing the ability of firms to maintain their marginal rate of profit. To estimate this parameter, we use the dynamic panel data estimator proposed by Arellano-Bover (1995) and Blundell-Bond (1998), known as the system-GMM estimator. While the parameter describes the persistence of firm profit rates, the interpretation of this measure is one of the firm-specific factors. If the measure is high, firms maintain their profit rates for a longer period, indicating that the profit rates of firms are determined by some firm-specific factors. Within industries, there is no theory explaining why this measure should vary between firms with different levels of success. The importance of independent factors is likely to be industry-specific rather than firm-specific. The long-run fate of firms, however, can vary according to the success of firms. Mueller states that firms that are expected to survive will be estimated to have a positive long-run equilibrium while those that are expected to file for failure do not have a long-run equilibrium, being estimated to have a negative value. Following our definition of restaurant-types, we expect to see that the firms that enter successfully reach long-run equilibrium while those who face bankruptcy do not. By estimating the long-run equilibrium of young and old restaurants, we can see what the expected fate of restaurants is in different parts of their life cycles. By estimating the autoregressive parameter for each of the four sub-categories using Model 2, we seek answers to research question 2:

$$\pi_{it} = \alpha_0 + \lambda\pi_{it-1} + \varepsilon_{it} , \quad (2a)$$

where π_{it} is the profit rate for firm i at time t . α_0 is the constant which describes the expected profit rate for the category in question, while ε_{it} is a random error, which is usually assumed to be independent and identically distributed. Valenta et al. (2021) show that this assumption often does not hold, but that it can be modelled for. λ is the short-run estimator of trends in the profit rate and is thus a measurement of the speed of adjustment to the sector profit rate after an initial shock, which usually has a value in the range [0, 0.4] (Opstad et al., 2021).

By applying the estimated persistence of profit rate and the constant profit rate, we can calculate the long-run equilibrium of different segments of the restaurant sector. It is calculated in Model 2b, where the subscript i again denotes the different segments:

$$\hat{P}_i = \frac{\hat{a}_i}{1-\lambda_i} , \quad (2b)$$

We expect the long-run equilibrium to be positive for the restaurants that have successfully entered the market and negative for those facing bankruptcy. Restaurants less than four years old are a different story, with forces pulling in either direction. The older restaurants may be expected to have a long-run equilibrium as they have survived the infant stages of business.

The business cycle, and the market turnover that follows, is both a symptom and a cause of technological development and innovation, as stated by Schumpeter's theory of creative destruction. As new firms enter the market, introducing new methods of production to the market, old firms must keep up to avoid being outcompeted. Depending on the industry, the firms that make it can constitute a new set of firms in every business cycle. In the restaurant industry, mostly new firms exit the market, while older firms are at less risk, having built their customer base. We expect restaurants to expand more in their early stages than in their later stages, while only those with the strongest growth can survive. Growth is thought to be essential for a firm's survival, while the age of firms is one of the most important determinants of growth. To understand whether restaurants grow significantly faster in their early stages, in addition to the gradual decline in growth with age, we estimate Model 3, which also includes the difference between firms facing bankruptcy while they are young and in general, and how these factors are linked to the firms' growth-rate:

$$Growthrate_{it} = \alpha_0 + \beta_1 Age_{it} + \beta_2 Bankruptcy_i + \beta_3 Young_i + \beta_4 YoungBankruptcy_i + \varepsilon_{it} \quad (3)$$

By investigating the two research questions, using Model 1 for the first and Models 2 and 3 for the second, we seek to understand the market turnover dynamics of the restaurant industry and of the economy at large.

DESCRIPTIVE STATISTICS AND GRAPHS

By looking at the Norwegian restaurant industry, we can begin to answer these questions. Using Norwegian tax data covering nearly 10000 restaurants in business from 2006 to 2019 (Wahlstrøm,2022), we cover all types of restaurants: those facing bankrupt and those entering the market, and for all sizes, big or small. Table 1 provides an overview of these restaurants, with descriptions of some of their main variables.

TABLE 1
DESCRIPTIVE STATISTICS BY FIRM

Restaurants	All Firms	Successful Entry	Facing Bankruptcy	Young	Old
Profit Rate	1.01%	0.09%	-5.27%	-3.24%	3.94%
Market Share	.025%	.019%	.023%	.017%	.030%
Growth Rate	9.25%	13.11%	9.78%	17.62%	3.47%
Debt Rate	102%	90%	60%	83%	115%
Age In Years	7.92	4.19	5.70	1.98	12.02
Bankruptcies	2,986	0	2,986	1,960	1,026
Observations	55,789	26,281	10,247	22,786	33,0003
Firms	9,789	4,203	2,986	6,084	2,260

The mean marginal profit rate in the industry was on average just above 1% between 2006 and 2019. The average restaurant had a debt rate of above 100%, meaning that the average debt burden was more than equivalent to the average yearly revenue. The growth rate is very high for the average firm, largely since the industry has a very high turnover, being built by many young and fast-growing firms. Of the restaurants that were present during the period, nearly a third went filed for bankruptcy.

We use four categories to further analyse what characterizes the market: first, those that have entered the market and stayed there, and second, those that have gone bankrupt, which amount to 4000 and 3000 firms with 26,000 and 10,000 observations each, respectively. The two categories differ greatly in marginal rates of profit, with the successful entries averaging a marginal rate of profit of 0.09%, while those facing bankruptcy face a negative marginal rate of profit. On average, the profit rate for these failing restaurants was -5.27%. The firms facing bankruptcy grew 20% slower than their successful counterparts and were slightly larger. Interestingly, the surviving restaurants have a debt burden that is a third heavier.

The restaurants that have entered and are still in the market are half as old as the market average and two years younger than those facing bankruptcy. The last two columns represent firms in their first four years of business (Young) and those older than that (Old), respectively. There are two striking statistics here: the growth of the young firms and the profitability of the old. Firms that have newly entered the market expand at the rate of 20% each year, twice the speed of the average restaurant. In contrast to the high-growth negative-profit structure of young restaurants' balance sheets, restaurants older than four years

are four times as profitable as the market average, while only growing at one third of the speed. These old restaurants are twice as large as their younger counterparts, while also being the most indebted segment.

Though these differences may seem natural, they define the restaurant industry and its near perfect competition. Its young participants can enter the market due to its low barriers to entry, keeping the sector profitability low. The descriptive statistics may suggest that the young restaurants keep the average profitability low by having a negative marginal rate of profit, while the restaurants that survive their stage of infancy enjoy a relatively high profit rate. Two thirds of restaurants that face bankruptcy go bankrupt in their first four years.

TABLE 2
DESCRIPTIVE STATISTICS BY YEAR

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Entries	287	268	256	250	274	324	619	513	593	569	557	491	510	499
(Who Exited*)	(37)	(40)	(36)	(40)	(29)	(40)	(60)	(56)	(75)	(62)	(65)	(63)	(52)	(28)
Exits	174	192	176	153	167	175	193	218	228	238	290	299	352	131
(Spanned Lifetime)	(4.4)	(5.2)	(5.4)	(4.3)	(4.9)	(5.0)	(4.4)	(4.2)	(3.1)	(4.0)	(4.5)	(4.2)	(5.2)	(5.6)
Total Firms**	3082	2952	2964	2986	3074	3181	3602	3879	4313	4638	4989	5219	5432	5478
Avg. Profit Rate	1.1%	2.4%	0.4%	0.7%	1.3%	1.6%	1.7%	1.7%	1.1%	1.3%	0.7%	0.6%	0.3%	0.1%
Avg. Growth Rate	-	8.6%	4.3%	1.1%	2.7%	5.7%	4.1%	4.7%	4.2%	4.5%	5.0%	3.9%	3.7%	4.4%

Standard errors in parentheses

*The same year

**Discrepancies in total firms is due to missing data

Being a highly dynamic industry, the restaurants face a different market situation each year. The time it takes from raising rates of profitability to plateauing and then experiencing falling profitability is expected to be short, as potential entrants and those exiting adjust quickly to the current state of the market. In Table 2, we present descriptive statistics concerning the number of entrants, bankruptcies, and total firms in the market, with the corresponding average profit and growth rates for each year.

The first two years saw a high marginal rate of profit, falling to 0.5% in 2008. In the following four years, the profitability increased continuously and then plateaued in 2012. In 2012, the number of entrants jumped, doubling to reach a total of 620 new restaurants. This was equivalent to a fifth of the existing firms, and the high level of entries continued through 2019. In those seven years, the number of restaurants in the market doubled, and the marginal rate of profit was pushed down to its low point of 0.1% for the industry.

The year 2012 thus represents a persistent shock of entries to the market representing nearly 100%. As expected, the marginal rate of profit was gradually competed away. At the same time as the competition tightened and profits fell, the number of bankruptcies also rose steadily, almost doubling in the seven-year period. The average rate of growth does not seem to be connected to the other variables.

FIGURE 1A
ENTRY-PROFIT-RATE-EXIT EQUILIBRIA

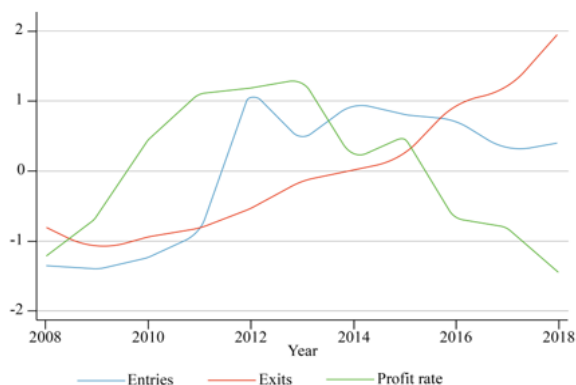


FIGURE 1B
TURNOVER-AND-PROFIT RATE EQUILIBRIUM



The graph in Figure 1a shows the business cycle described above, with the three key variables: the marginal rate of profit in green, entries in blue, and exits in red, all in their standardized values. From 2010 to 2012, the industry profit rate increased by one standard deviation, and then from 2014 to 2018 it fell by two standard deviations. After the 2012 shock in the number of entries into the market, the level of new

entries stabilized. This persistent influx of new firms was potentially the reason for the decreasing profit rate. Furthermore, the level of bankruptcies intensified as the marginal rate of profit dropped.

In the second graph, Figure 1b, we divide the number of entries by the number of bankruptcies to produce an entry– exit, or turnover, ratio (purple). With the level of exits being relatively stable before 2012 and the level of entries being relatively stable after 2012, we can more clearly see the dynamic described above. First, the population increases as newcomers react to the increased marginal rate of profit. This reduces the profitability of the sector, at which point more firms must seize business.

FINDINGS AND DISCUSSION

Research Question 1: Long-run Equilibrium of Industry Population and Marginal Rate of Profit

To investigate this issue further, we turn to econometric analysis. Using only the 14 market observations, however, a convincing econometric analysis can hardly be done. A simple regression can illustrate the market dynamics, however, giving numbers to the graphical representation above. Using the three equations in Model 1, we estimate the following relationships in Table 3.

TABLE 3
MARKET DYNAMIC OF PROFIT RATES, ENTRIES, AND BANKRUPTCIES

Standardized Variables	1a Entry	1b Profit Rate	1c Exit
Profit Rate	-0.497* (0.233)		-0.960*** (0.214)
L1. Profit Rate	0.490 (0.332)		0.0199 (0.305)
L2. Profit Rate	0.533* (0.242)		0.286 (0.221)
Entry		0.397 (0.358)	
L1. Entry		0.254 (0.351)	
L2. Entry		-1.015* (0.296)	
R-squared	0.784	0.739	

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

The linear regression reveals significant effects in all three relationships and in accordance with economic theory: the number of entering restaurants increases by half a standard deviation following a standard deviation increase in the marginal rate of profit, but only significantly so after two years. Firms need time to react to the available profit. Firms also need time to gain a foothold in the market and cannot compete the profit away instantly. Instead, as seen in Model 1b, an increase of one standard deviation in the number of new firms leads to an equivalent decrease in the average rate of profit in the industry. Since only nine observations are available with this number of lags and excluding the first and last years of the sample, this should not be taken as an economic fact but rather as evidence supporting the economic free market theories of competition. Lastly, we can see that the rate of profit enters the exit-equation negatively, and its effect is felt in the same year. If the average sector profit rate falls by a standard deviation in one year, it is expected to be reflected in an equivalent and contemporaneous increase in the number of bankruptcies. A fall in profitability is fully reflected by increased bankruptcies in the same year. The profitability to bankruptcy effect happens in the same year, in contrast to the relationship between profitability and entry. An increase in profitability takes one or two years to be reflected in the number of

new restaurants. While restaurants exit the market fast, they need time to enter the market, as planning, financial approval, acquiring premises, and the like are needed.

The market competition dynamic, like that seen in the Norwegian restaurant industry, is of major interest to policy makers, potential and actual business owners, and financial institutions. Consequently, many authors have described why the turnover within industries behaves as it does. The argument for the relationship in Model 1a is that firms follow profit opportunities (Penender, 2008), since a rise in the average profit rate attracts new firms (Roper, 1999; Kaya & Ucdogruk, 2002). The flow of firms entering will continue, at large scale, until the market is no longer profitable and is approaching a long-run equilibrium (Baldwin, 1993).

It takes time to establish a new business, however, as the company needs to gain public approval, find suitable premises, arrange financing, and recruit employees (Miller, 2006). We find that this takes two years, in line with the research by Salamin and Hermawan (2019), who suggest that it takes around two years to plan for opening a new restaurant.

In a sector with low profitability and considerable cost competition, many companies are vulnerable (Penender, 2008). For instance, a higher real wage level will have a negative impact on the rate of entry and exit (Kaya & Ucdogruk, 2002). Restaurants that start up often have a small number of staff, potentially made up of family members, and long working hours. The barriers to entry are low, with most restaurants renting all the equipment and premises. This also means that the barriers to exit are low, as firms leaving the market do not leave large unrealized investments. In Table 1, we saw that the restaurants facing bankruptcy had the lowest debt burden, suggesting that many entrepreneurs do not invest enough to succeed or are not able to obtain enough capital from financial institutions. Decreases in the industry profit rate are reflected in corresponding increases in the number of restaurants leaving the market.

Research Question 2: Properties of Restaurants That Enter and Exit and Business Cycles

Understanding when firms enter and exit is important, and due to the similarity of the restaurant industry to the theoretical perfect market, our results closely match what economic theory predicts. Keeping our results thus far in mind, we continue our analysis of the properties and determinants of restaurant fates, investigating the difference between firms that survive and those that die.

By estimating the persistence of profits, we can gain a measure of firm-specific factors by analysing the time it takes for firms to return to the mean profit rate of the industry. The constant in this equation indicates the average deviation from the industry mean, with a positive constant indicating that most firms are above the average and that the distribution of firm profit rates is skewed with a heavy negative tail. In Table 4, we have divided the sample into four categories: entries, exits, young, and old.

TABLE 4
PERSISTENCY OF PROFIT

VARIABLES	All Profit Rate	Entry Profit Rate	Exit Profit Rate	Young Profit Rate	Old Profit Rate
L1. Profit Rate	0.221*** (0.020)	0.186*** (0.029)	0.154*** (0.055)	0.166*** (0.041)	0.240*** (0.023)
Constant	0.021*** (0.001)	0.015*** (0.002)	-0.021*** (0.003)	-0.002 (0.002)	0.029*** (0.002)
Observations	41,841	18,859	6,544	12,040	29,801
Number of Firms	8,539	4,662	1,957	6,302	5,737

The degree of short-run profit persistence (λ) is positively significant with a value between 0.1 and 0.3, where the ranking according to value from lowest to highest is: restaurants facing bankruptcy, young restaurants, restaurants that entered and stayed, and old restaurants, which have the highest persistence of

profits. None of the parameters for the four categories are significantly different from the estimate for the whole sector, which is to be expected. Even though they experience different levels of success, they still operate in the same market and with the same constraints and demand, with firm-specific factors being of the same importance (Hirsch, 2018). The differing parameters do suggest, however, that these factors are more persistent in the older restaurants, as these businesses are less dynamic.

The constants follow the same order as the parameters: the restaurants that fail have negative constants, the young ones have constants with values of zero, and the successful entries and old restaurants have positive constants. By dividing the constant by unity minus the autoregressive parameter, we calculate the expected long-run equilibrium of the profit rate. Gswandtner (2005) argues that negative values are not a stable equilibrium solution, as they signify firms facing bankruptcy in the long run. In Table 5, we see that the restaurants facing bankruptcy have a long-run equilibrium profit rate of -2.5% , while successful entries and old restaurants have rates of almost 2 and 4%, respectively.

TABLE 5
LONG-RUN EQUILIBRIUM OF PROFIT RATES

	All	Entry	Exits	Young	Old
\hat{p}	.027	.018	-.025	-.025	.038

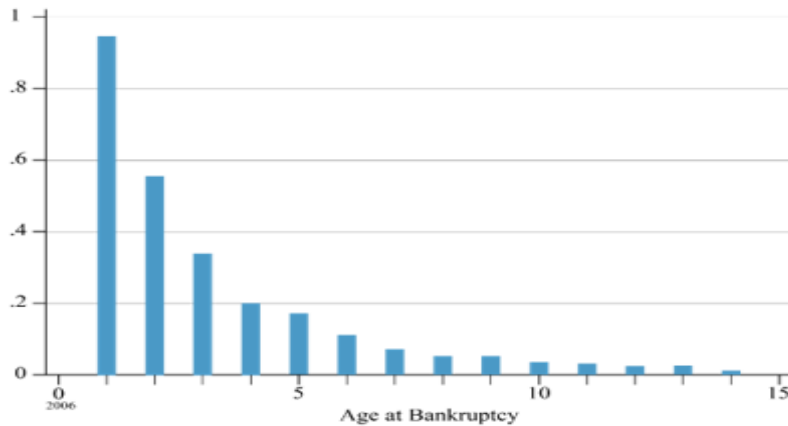
The restaurants under the age of four years, however, have an expected long-run profit rate of zero. If the survival of firms is decided by the sign of the long-run marginal rate of profit, this would mean that the future of a newly opening restaurant truly is a coin-flip.

As we have seen, the restaurant industry is characterized by strong competition. Any advantage is crucial for survival. The satisfaction of customers is an essential variable, but such information is hard to come by. Consequently, most literature on the survival of restaurants – and businesses in general – analyses the information contained in the balance sheet.

The cost management of restaurants is crucial, with those that are efficient logically having a better chance of survival (Mun & Jang, 2018). The variable costs of labour, rent, utilities, and equipment must be of the greatest concern for the manager (Self et al., 2015). If the restaurant businesses cannot be cost-effective, they will not be able to make a profit. Hence, the debt becomes so large that sooner or later they are not able to handle it (Jiang & Dalbor, 2020).

Dahl and Reichstein (2007) report that the first few years are challenging, and many companies cannot survive the first years. The results from newly established companies in the Norwegian restaurant industry are in line with this result. Small businesses with low equity depend on achieving desired financial results. Competition is fierce and many businesses need time to enter the market and attract enough customers. Many companies give up after a short time. The histogram in Figure 2 shows the distribution of age at bankruptcy for Norwegian restaurants during the past 13 years, starting in 2006. The vast majority of restaurants file for bankruptcy in their first years, while the probability of bankruptcy decreases exponentially as they age. In a forthcoming article, Valenta and Opstad examine the determinants of these bankruptcies in addition to the age and growth effects analysed here.

**FIGURE 2
DISTRIBUTION OF AGE AT BANKRUPTCY**



Since many firms have limited capital resources as well as high variable costs, they are vulnerable to higher costs, unexpected events, or a fall in demand (Mun & Jang, 2015). Due to the weak financial situation, these firms depend on success in the first phase. Approximately 25% of Norwegian establishments in the restaurant industry must quit after four years. Although these are high figures, significantly higher percentages have been registered in other studies (Parsa et al., 2011).

Several researchers have pointed out that many small and newly established enterprises are struggling to survive (Mansfield 1962). Many of the companies start on a small scale, and economic theory suggests that high growth is necessary to reach an effective production level (economics of scale). Table 1 shows that the established enterprises have near-zero growth, while there is considerable growth among newcomers. The companies that handle the initial phase will eventually learn how to act and the likelihood of success increases.

To understand the growth of firms, we must find its determinants. Table 6 shows the growth of firms according to the phase of their life cycle and whether they faced bankruptcy in these phases.

**TABLE 6
PHASES OF GROWTH**

Growth Rates	Under 4 years	4-8 years	Over 8 years
Survivor	.190	.047	.031
Exits	.177	.017	-.032

The differences are striking. After initially having yearly growth rates of nearly 20%, firms aged between four and eight years show only a fifth of their previous growth. After growing as fast their surviving competitors, firms failing in this middle stage grow at a pace only a tenth as fast as before. Restaurants facing bankruptcy in a late stage of the business cycle deteriorate by 3% each year, while those that survive to this age grow almost fast as they did in their middle stage. Our data suggest that many new firms fail in the first year, while others must give up after a few years due to inefficiencies.

One explanation for the strong growth of the young restaurants and the equality between those that survive and those that do not is that the common strategy is to aggressively invest in the business to grow fast and survive. As the long-run equilibrium of the marginal rate of profit showed, the question of survival is reminiscent of a coin-flip for new restaurants. A bad investment or year or unfortunate circumstances can be fatal, and it seems that growth plays a minimal role.

In Table 7, we investigate when and which firms enjoy the fastest rates of growth by estimating Model 3 using a random effects framework. We estimate two models. The first model only uses the age of the business to explain its growth. A restaurant one year older than another restaurant grows 1.5% slower than its counterpart. The regression is linear, estimating that restaurants will stop growing at thirteen years in business. After this point, restaurants are estimated to shrink, which seems unlikely.

TABLE 7
GROWTH AND THE BUSINESS LIFE CYCLE

VARIABLES	OLS Growth Rate	OLS Growth Rate
Years in Business	-0.015*** (0.000)	-0.004*** (0.001)
Facing Bankruptcy		-0.036*** (0.009)
Young Restaurants		0.131*** (0.007)
Young Bankruptcy		0.021* (0.012)
Constant	0.189*** (0.003)	0.071*** (0.008)
Observations	44,764	44,764
Number of firm	8,260	8,260

Robust standard errors in parentheses
***p<0.01, ** p<0.05, * p<0.1

Including those firms under the age of four as a separate variable reduces the yearly aging effect to near to 0.5%. Young restaurants are estimated to grow 13% faster than their old counterparts. Looking at the expanded model, we see evidence for the existence of a starting phase for restaurants in which they grow explosively before either filing for bankruptcy or continuing with stable growth. By calculating the effect of the interactive term describing young restaurants facing bankruptcy, we can see that these firms grow only 1% slower than those that are young and successful. This difference is not significant, indicating that the probability of failure is not determined by growth for young firms, but rather the growth is better explained by the restaurant's stage of development. The determinants of closure within these early stages of the business life cycle should be investigated in further research.

For older restaurants, however, the rate of growth is much lower for those facing bankruptcy. Whether this result is just a correlation or in fact a causal relationship is beyond the scope of this article, but the fact that old restaurants fall behind from the competition in terms of growth is interesting itself. It indicates that the period of competition through rapid expansion is over, perhaps replaced by competition through cost effectiveness.

LIMITATIONS

Despite restaurants not varying much in structure across countries, one limitation of our analysis is that it is based on public data from only one country. This restricts our analysis, but we argue that much is learned by looking at the Norwegian sample, especially since the sample stretches beyond the peak of the last business cycle, back to 2006.

Our sample only contains bankruptcy as a reason for leaving the market, meaning that we lack data for reasons why companies are leaving the market. There may be reasons other than bankruptcy, but as reasons for non-bankruptcy exit can vary largely, the introduction of firms leaving by choice may help keep our analysis interpretable. We also do not have data on which strategies the different companies choose to

survive in the market, a variable that seems hard to collect, although it would enrich future research in the field of firm-level market dynamics.

CONCLUSION

The restaurant industry is one of the largest industries in any national economy, and restaurants operate in a market which has many of the properties that describes the perfect market taught in the undergraduate curriculum and used when modelling the economy that we live in. There are many small firms competing for a marginal rate of profit, which is low due to the low barriers to entry. The market is extraordinarily dynamic, with a young and ever-changing set of firms.

In this article, we have used Norwegian restaurant data for this close-to-perfect market in the period from 2006 to 2019 to analyse three research questions, all related to the entry and exit of firms. The marginal rate of profit was thought to be a driving force in this space on the macro and micro levels of the economy. On the macroeconomic level, the evidence shows that the number of entrants into the market increases as the marginal rate of profit increases, although with a lag. After a while, estimated as two years, the marginal rate of profit begins to decrease as competition by the newly established firms forces it down, at which point the least fit of the firms will not survive. The bankruptcy of the least fit firms occurs contemporaneously with the decreasing mean rate of profit.

The profit rate is not the only factor that decides which firms survive and which die, with the age of firms having one of the strongest effects. We find that it is a coin-flip whether restaurants under the age of four years have a long-run equilibrium that permits survival, while older firms enjoy relatively high rates of profit. The infant stages of restaurants are eventful and crucial. In these years they grow incredibly fast, and about half do not make it past this stage. As they age, the probability of facing bankruptcy decreases exponentially, as does their rate of growth. In their fourth year, both the probability of bankruptcy and the rate of growth are only a fifth of what they were in the first year.

Although growth is very strong in these early stages, when bankruptcy is high, growth does not seem to be a determinant of bankruptcy. Those that face bankruptcy and those that survive the stage grow at almost the same pace. Statistically, the difference is not significant, suggesting that the common early life cycle shows fast growth for restaurants but that growth itself does not affect which firms go bankrupt and which do not. A bad investment, unfortunate circumstances, missed opportunities, or miscalculated strategies are possible determinants for the survival of the fittest under competition. Further research should investigate these determinants to understand how firms grow, since measuring the speed of growth for young firms is inconclusive.

As the restaurants reach their middle and latter stages of age, however, the rate of growth for those firms facing bankruptcy is clearly slower than that for those that survive. Having survived the stage of gaining a foothold in the market, restaurants move toward a period of stable growth and, hopefully, a positive marginal rate of profit. Filing for bankruptcy at this stage is characterized by near-zero or sub-zero growth, which reflects a business structure that cannot last. These firms must leave the market as their profitability dwindles away.

REFERENCES

- Agarwal, R., & Gort, M. (1996). The evolution of markets and entry, exit and survival of firms. *The Review of Economics and Statistics*, 78(3), 489–498.
- Anyadike-Danes, M., & Hart, M. (2018). All grown up? The fate after 15 years of a quarter of a million UK firms born in 1998. *Journal of Evolutionary Economics*, 28(1), 45–76.
- Aspelund, A., Bjørgum, Ø., & Saether, E.A. (2021). Entering a brave new world: Market entry assessments into a born global industry. In *Advanced perspectives on global industry transitions and business opportunities* (pp. 111–134). IGI Global. <https://doi.org/10.4018/978-1-7998-4303-0.ch006>
- Baldwin, R. (1993, September). *A domino theory of regionalism*. NBER Working Paper No. 4465.

- Bhattacharjee, A., Higson, C., Holly, S., & Kattuman, P. (2009). Macroeconomic instability and business exit: Determinants of failures and acquisitions of UK firms. *Economica*, 76(301), 108–131.
- Carree, M., & Dejardin, M. (2007). Entry thresholds and actual entry and exit in local markets. *Small Business Economics*, 29(1), 203–212. <https://doi.org/10.1007/s11187-006-6860-9>
- Cefis, E., Bettinelli, C., Coad, A., & Marsili, O. (2021). Understanding firm exit: A systematic literature review. *Small Business Economics*, pp. 1–24. <https://doi.org/10.1007/s11187-021-00480-x>
- Dahl, M.S., & Reichstein, T. (2007). Are you experienced? Prior experience and the survival of new organizations. *Industry and Innovation*, 14(5), 497–511. <https://doi.org/10.1080/13662710701711414>
- De Monte, E. (2020). *Entry, Exit and Productivity: Evidence from French Manufacturing Firms*. Working paper, University of Strasbourg.
- Dunne, P., & Hughes, A. (1994). Age, size, growth and survival: UK companies in the 1980s. *The Journal of Industrial Economics*, 42(2), 115–140.
- Eliazar, I. (2017). Lindy's law. *Physica A: Statistical Mechanics and its Applications*, 486, 797–805. <https://doi.org/10.1016/j.physa.2017.05.077>
- Eriksson, G. (1984). Growth, entry and exit of firms. *The Scandinavian Journal of Economics*, 86(1), 52–67.
- Forbes, D.P., & Kirsch, D.A. (2011). The study of emerging industries: Recognizing and responding to some central problems. *Journal of Business Venturing*, 26(5), 589–602. [doi:10.1016/j.jbusvent.2010.01.004](https://doi.org/10.1016/j.jbusvent.2010.01.004)
- Fortune, A., & Mitchell, W. (2012). Unpacking firm exit at the firm and industry levels: The adaptation and selection of firm capabilities. *Strategic Management Journal*, 33(7), 794–819
- Gatti, D.D., Gallegati, M., Giullioni, G., & Palestrini, A. (2003). Financial fragility, patterns of firms' entry and exit and aggregate dynamics. *Journal of Economic Behavior & Organization*, 51(1), 79–97. [https://doi.org/10.1016/S0167-2681\(02\)00138-5](https://doi.org/10.1016/S0167-2681(02)00138-5)
- Gschwandtner, A. (2005). Profit persistence in the 'very' long run: evidence from survivors and exiters. *Applied Economics*, 37, 793–806.
- Hirsch, S. (2018). Successful in the long run: A meta-regression analysis of persistent firm profits. *Journal of Economic Surveys*, 32(1), 23–49. <https://doi.org/10.1111/joes.12188>
- Hua, N., & Templeton, A. (2010). Forces driving the growth of the restaurant industry in the USA. *International Journal of Contemporary Hospitality Management*, 22(1), 56–68. <https://doi.org/10.1108/09596111011013471>
- Hubbard, L.J. (2018). *Small Business Restaurant Marketing Strategies for Sustainability*. Doctoral dissertation. Walden University.
- Haas, S., Kuehl, E., Moran, J.R., & Venkataraman, K. (2020, May). How restaurants can thrive in the next normal. *McKinsey & Company*, pp. 1–8.
- Jiang, L., & Dalbor, M. (2020). The monitoring effects of debt in the us restaurant industry. *Journal of Hospitality Financial Management*, 28(2). <https://doi.org/10.7275/yjaz-pk93>
- Jovanovic, B., & Tse, C.Y. (2010). Entry and exit echoes. *Review of Economic Dynamics*, 13(3), 514–536.
- Kaya, S., & Ucdogruk, Y. (2002). *The dynamics of entry and exit in Turkish manufacturing industry*. Middle East Technical University, Ankara, ERC Working Papers in Economics, 2(02).
- Lemley, M.A., & McCreary, A. (2019, December). *Exit Strategy*. Stanford Law and Economics Olin Working Paper #542. Retrieved from SSRN: <https://ssrn.com/abstract=3506919>
- Luca, D.L., & Luca, M. (2019). *Survival of the fittest: The impact of the minimum wage on firm exit*. No. w25806. National Bureau of Economic Research.
- Ma, T., Fraser-Mackenzie, P.A., Sung, M., Kansara, A.P., & Johnson, J.E.V. (2022). Are the least successful traders those most likely to exit the market? A survival analysis contribution to the efficient market debate. *European Journal of Operational Research*, 299(1), 330–345. ISSN: 0377-2217; <https://doi.org/10.1016/j.ejor.2021.08.050>

- Mansfield, E. (1962). Entry, Gibrat's law, innovation, and the growth of firms. *The American Economic Review*, 52(5), 1023–1051.
- Miller, D. (2006). *Starting a Small Restaurant: How to Make Your Dream a Reality*. Houghton Mifflin Harcourt. Harvard Common Press.
- Mueller, D.C. (1986). *Profits in the Long Run*. Cambridge: Cambridge University Press.
- Mun, S.G., & Jang, S.S. (2015). Working capital, cash holding, and profitability of restaurant firms. *International Journal of Hospitality Management*, 48, 1–11. <https://doi.org/10.1016/j.ijhm.2015.04.003>
- Mun, S.G., & Jang, S.S. (2018). Restaurant operating expenses and their effects on profitability enhancement. *International Journal of Hospitality Management*, 71, 68–76. <https://doi.org/10.1016/j.ijhm.2017.12.002>
- Myrann, A.G. (2010). *Survival of the fit and the fat: Decomposing the exit hazard of Norwegian firms*. Master's thesis, Department of Economics, University of Oslo.
- Namini, J.E., Facchini, G., & López, R.A. (2013). Export growth and firm survival. *Economics Letters*, 120(3), 481–486. <https://doi.org/10.1016/j.econlet.2013.05.025>
- Opstad, L., Idso, J., & Valenta, R. (2021). The degree of profit persistence in the tourism industry: The case of Norwegian campsites. *International Journal of Economics & Business Administration (IJEBA)*, 9(4), 140–155.
- Opstad, L., Idsø, J., & Valenta, R. (2022). The dynamics of the profitability and growth of restaurants; the case of Norway. *Economies*, 10(2), 53. <https://doi.org/10.3390/economies10020053>
- Parsa, H.G., Self, J., Sydnor-Busso, S., & Yoon, H.J. (2011). Why restaurants fail? Part II – The impact of affiliation, location, and size on restaurant failures: Results from a survival analysis. *Journal of Foodservice Business Research*, 14(4), 360–379. <https://doi.org/10.1080/15378020.2011.625824>
- Parsa, H.G., Self, J.T., Njite, D., & King, T. (2005). Why restaurants fail. *Cornell Hotel and Restaurant Administration Quarterly*, 46(3), 304–322. <https://doi.org/10.1177/0010880405275598>
- Peneder, M.R. (2008). Firm entry and turnover: the nexus with profitability and growth. *Small Business Economics*, 30(4), 327–344. <https://doi.org/10.1007/s11187-007-9048-z>
- Plehn-Dujowich, J.M. (2009). Entry and exit by new versus existing firms. *International Journal of Industrial Organization*, 27(2), 214–222. <https://doi.org/10.1016/j.ijindorg.2008.07.003>
- Roper, S. (1999). Modelling small business growth and profitability. *Small Business Economics*, 13(3), 235–252.
- Salamin, P.P., & Hermawan, F. (2019). Financial planning model for establishing a new business: A case study on “Blue Ocean” restaurant. *Jurnal Manajemen Bisnis*, 10(2), 246–255.
- Salvanes, K.G., & Tveteras, R. (2004). Plant exit, vintage capital and the business cycle. *The Journal of Industrial Economics*, 52(2), 255–276.
- Schiff, N. (2015). Cities and product variety: Evidence from restaurants. *Journal of Economic Geography*, 15(6), 1085–1123. <https://doi.org/10.1093/jeg/lbu040>
- Self, J.T., Jones, M.F., & Botieff, M. (2015). Where restaurants fail: A longitudinal study of micro locations. *Journal of Foodservice Business Research*, 18(4), 328–340. <https://doi.org/10.1080/15378020.2015.1068670>
- Wahlstrøm, R.R. (2022). *Financial statements of companies in Norway*. arXiv:2203.12842. <https://doi.org/10.48550/arXiv.2203.12842>
- Wennberg, K., Wiklund, J., DeTienne, D., & Cardon, M. (2010). Reconceptualizing entrepreneurial exit: Divergent exit routes and their drivers. *Journal of Business Venturing*, 25(4), 361–375.