

# The Dynamics of Entry, Exit and Profitability: An Error Correction Approach for the Retail Industry

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**ABSTRACT.** We develop a two equation error correction model to investigate determinants of and dynamic interaction between changes in profits and number of firms in retailing. An explicit distinction is made between the effects of actual competition among incumbents, new firms competition and potential competition from firms outside the market. Effects of cost, demand and general income changes on profitability are investigated to gain insight in the role of retailing in the cost, demand and wage inflationary processes. The relative importance of profitability, growth and unemployment as determinants of net entry are studied. The model is tested using a panel data set of 36 Dutch shoetypes covering the 1977–1988 period.

## 1. Introduction

Investigation into the determinants of profitability and entry and exit accounts for a large share of the empirical industrial organization literature (see Schmalensee (1989)). Most studies are confined to manufacturing industries, lack modelling of the dynamic interaction between profitability, entry and exit and deal only partly with competition as a determinant of profitability. This paper makes a contribution to the existing literature with respect

to these three limitations. First, we explicitly focus on one of the major service industries, viz. the retail trade. Retailing has a strong contribution to the economy: for instance, in the Netherlands it accounts for about 23% of total number of economically active enterprises and for about 13% of total labour force in the private sector in 1988 (source: Bode (1990)).<sup>1</sup> In our investigation of the determinants of profitability in retailing we will also pay attention to the role of this industry in the inflationary process. We provide results on the influence of retail pricing practice on cost, demand and wage inflation. Second, the dynamic interaction between profitability and number of firms is modelled using a two equation error correction model. This is done because high profitability attracts new firms, whereas a rise in the number of firms creates a pressure on profitability. Third, we distinguish explicitly between three sources of competition, viz. competition of existing firms, competition of new firms and potential competition, in our explanation of changes in profits.

The model discussed in Section 2 can effectively determine the importance of different sources of competition as well as different sources of inflation and is applicable in structure-conduct-performance studies in general. Our starting point is the Kirznerian notion of entrepreneurship being the alertness to profit opportunities. From this we develop an error correction framework which extends the persistence of profits literature into a more complete dynamic market modelling.

The structure of the paper is as follows. In Section 2 we set up the model and develop a number of hypotheses concerning the effects of the variables incorporated. Section 3 describes our data set of 36 shoetypes for the period 1977–1988. Section 4 presents the empirical results of

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the model estimated on the entire data set and on selected subsets. We summarize and provide recommendations for future research in Section 5.

## 2. Modelling profitability and net entry

Entrepreneurs seek to discover and exploit hitherto unnoticed profit opportunities. This competitive activity pushes prices in directions which gradually squeeze out further profit-making opportunities. This formulation of the competitive-entrepreneurial process as used by Kirzner (1973, 1979) is of essential importance for the measurement of market competition and efficiency. As Kirzner (1973, p. 6) puts it: "The efficiency of the price system . . . does not depend upon the optimality (or absence of it) of the resource allocation pattern at equilibrium; rather, it depends on the degree of success with which market forces can be relied upon to generate spontaneous corrections in the allocation patterns prevailing at times of disequilibrium." The persistence of profits literature, which started with Mueller (1977), investigates to what extent and with what speed these competitive forces adjust profits to long-run competitive levels. In this study we extend this approach to a more complete modelling of industry dynamics, which not only allows for studying the extent of different competitive forces in an industry, but can also be used to study the role of an industry in the inflationary process and to investigate the relative importance of determinants of entry and exit.

Entrepreneurial activity is the fundamental generator of the error correction mechanism in our model. The notion that entrepreneurs restore equilibrium by a sequence of adjustments to disequilibrium situations has been expressed by various students of entrepreneurial behaviour. Schultz (1975) defines entrepreneurship as the ability to deal with disequilibria, whereas Kirzner (1973, 1979) emphasizes the perception and exploitation of profit opportunities as its main feature.<sup>2</sup> In his view competition and entrepreneurship coincide because the competitive market process is basically entrepreneurial. Essential to this concept of competition in market-process theory is "the free entry of rivals, each in a incessant race to better the others" (Ikeda (1990), p. 79).

In this study the entrepreneurs are (potential)

small independents in retailing. Our model is set up to explain changes in profits and number of firms for these small independents. Disequilibrium is expressed in terms of excess profits. As a small independent's profit generally equals his income (before taxes), we define excess profit as the difference between this profit and gross modal wage. Shoptypes with positive excess profits are assumed to be attractive to enter. This is the basic idea behind our modelling of the dynamic interaction between profitability and net entry. Our model consists of two equations and is of an error correction mechanism type (see Gilbert (1986) and Salmon (1982)).

$$\begin{aligned}\Delta\pi_{it} - \Delta Q_{it} = & \alpha_0 + \alpha_1(\pi_{i,t-1} - MI_{t-1}) + \\ & + \alpha_2\Delta NOF_{it} + \alpha_3\Delta TUR_{it} + \\ & + \alpha_4\Delta MI_t + \alpha_5(\Delta K_{it} - \Delta Q_{it}) + \\ & + \alpha_6\Delta CS_{it} + \varepsilon_{it}\end{aligned}\quad (1)$$

$$\begin{aligned}\Delta NOF_{it} = & \beta_0 + \beta_1(\pi_{i,t-1} - MI_{t-1}) + \beta_2\Delta CS_{i,t-1} + \\ & + \beta_3UN_{t-1} + \beta_4\Delta NOF_{i,t-1} + \\ & + \beta_5\Delta TUR_{it} + \eta_{it}\end{aligned}\quad (2)$$

In these equations  $\varepsilon_{it}$  and  $\eta_{it}$  are possibly correlated random errors and the variables are *logarithms* of:

- $\pi_{it}$  : average profit in shoptype  $i$  in year  $t$  in 1980 prices
- $Q_{it}$  : average value of sales in shoptype  $i$  in year  $t$  in 1980 prices
- $MI_t$  : modal income in year  $t$  in 1980 prices
- $CS_{it}$  : consumer spending for the product package sold in shoptype  $i$  in year  $t$  in 1980 prices
- $NOF_{it}$  : number of firms in shoptype  $i$  in year  $t$
- $TUR_{it}$  : sum of number of firms entering or leaving shoptype  $i$  in year  $t$
- $K_{it}$  : average value of total costs in shoptype  $i$  in year  $t$  in 1980 prices
- $UN_t$  : number of unemployed in 1,000 persons in year  $t$

The market "error" in our model, which presents an opportunity for entrepreneurial action, is the difference between profit and modal income. More precisely, in case  $\alpha_1$  is negative and  $\beta_1$  positive, we find all  $\pi_{it}$  exceeding  $MI_t - \alpha_0/\alpha_1$  in long term equilibrium to have a downward effect on profitability, while all  $\pi_{it}$  exceeding  $MI_t - \beta_0/\beta_1 -$

$\beta_3 UN_t/\beta_1$  in long term equilibrium lead to a larger number of firms, which again squeezes profitability in case  $\alpha_2$  is negative. We expect  $\alpha_0/\alpha_1$  to be negative because independents not only supply labour but also are to be compensated for their managerial responsibilities and risk borne on their capital investment. The benchmark level of profit for net entry,  $MI_t - \beta_0/\beta_1 - \beta_3 UN_t/\beta_1$ , depends on the number of unemployed. High unemployment stimulates potential independents to enter and demotivates incumbants to exit. A disequilibrium on the labour market therefore generates entrepreneurial activity which may exert a downward pressure on disequilibria in the product markets, i.e. on excess profits. Note that an error correction on the number of firms is not incorporated because of lack of a long-term benchmark for this variable.<sup>3</sup> The long-term relationship between profits, modal income and unemployment is easily derived as:

$$\pi_{it} = MI_t - \{ \alpha_0 + \alpha_2 \beta_0 / (1 - \beta_4) + \alpha_2 \beta_3 UN_t / (1 - \beta_4) \} / \{ \alpha_1 + \alpha_2 \beta_1 / (1 - \beta_4) \} \quad (3)$$

We will now discuss the effect of the variables incorporated in equations (1) and (2) and subsequently our main research questions.

High excess profit (profit minus modal income) will generally lead to increasing competitive pressures, both from within the shoptype as well as from diversifying firms in other shoptypes and even other industries (e.g. wholesale traders or manufacturers of consumer goods). The extent to which high profit levels can be maintained is an indicator of the pressure of the competitive environment. The parameter  $\alpha_1$  measures this effect of competition from existing (or diversifying) firms and is expected to be negative.<sup>4</sup>

An increase in the number of firms will lead to an increase in competition. This will be the case especially in retailing, because new firms have to gain a considerable local market share (Porter (1976)). This is caused by the limited size and strong geographical separation of markets in retailing. A negative value of  $\alpha_2$  is consistent with this view. However, entry and exit are most widespread in the group of relatively small firms who make up the competitive fringe (MacDonald (1986)). This implies that most entry and exit

decisions may have only a limited direct effect on the industry's intensity of competition.<sup>5</sup>

Large entry and exit flows in a shoptype indicate low entry and exit barriers (see Dunne, Roberts and Samuelson (1988) and Van Herck (1984)). Market turbulence,  $TUR_{it}$ , is used as indicator of the height of these barriers.<sup>6</sup> In case potential competition should have an effect on profitability in retailing, we would expect  $\alpha_3$  to be negative: rising entry barriers will decrease the threat of entry.

The profits of shopkeepers are largely a reward for their labour. A change in general income level,  $\Delta MI_t$ , may invoke shopkeepers to revalue their obtained profit level when compared to modal income. Profitability may therefore be affected as a result of economy-wide changes in wage levels. This implies a positive  $\alpha_4$ .

Short-term cost shifts are likely to be only partially passed on to customers. A negative  $\alpha_5$  would support this practice of shopkeepers.<sup>7</sup> If  $\alpha_5$  equals zero changes in the cost-output ratio do not influence the profit-output ratio: costs shifts are entirely passed on within a one year period. Long-term cost changes will be entirely passed on in the case of negative  $\alpha_1$  through the elimination of disequilibrium by the error correction mechanism.

A growing demand for retail services is assumed to facilitate increasing prices. This indicates a positive value for  $\alpha_6$ . The use of  $\Delta \Delta CS_{it}$  instead of  $\Delta CS_{it}$  is theoretically supported by Liebowitz (1982), who regards sales growth minus past sales growth as a more accurate predictor of change in profit rates than sales growth. It is also in line with the mark-up model of Nooteboom (1985), where the level of profit margins are hypothesized to be influenced positively by percentual changes in consumer spending.

High excess profits provide an incentive to enter a shoptype.<sup>8</sup> We therefore expect  $\beta_1$  to be positive.<sup>9</sup> An upward swing of consumer spending for the product package sold in the shoptype will encourage entry and discourage exit. This implies a positive value for  $\beta_2$ .<sup>10</sup> Entrepreneurs' profit expectations will not be exclusively based upon incumbants' present profits, but also upon the market room as indicated by market growth.

Shopkeepers are less inclined to exit when job opportunities are poor. Additionally, unemployed may try to become self-employed in retailing to

improve upon their financial situation. Evans and Leighton (1989a) present evidence that unemployed workers are more likely to enter self-employment than employees. Storey and Jones (1987) find local labour market conditions to influence local rates of new-firm formation much stronger than profitability: job losses seem to make way for creation of new enterprises.<sup>11</sup> A positive  $\beta_3$  is expected.

As the net entry equation (2) suffered from severe autocorrelation, we adjusted this equation by incorporating the lagged dependent variable  $\Delta NOF_{i,t-1}$ . There are also theoretical grounds for the incorporation of this variable. First, many new entrants may not be very successful. Excessive net entry can therefore negatively influence next period net entry, implying a negative value for  $\beta_4$ . Second, high entry rates, just like high profits and high growth, can be an indicator for individuals of the success of a shoctype: entrepreneurs follow the success of earlier entrants.<sup>12</sup> Examples can be encountered in the computer trade and management consultancy. This would be a reason to expect a positive  $\beta_4$ .

The change in turbulence is included in the net entry equation (2) to examine the influence of the changing importance of entry and exit barriers on net entry throughout the life cycle of a shoctype. Following Porter (1976), we expect these barriers to rise in time in view of the progressive filling of "geographical gaps". In the beginning of a life cycle a shoctype is characterized by growing turbulence and high net entry rates. At the end of a life cycle turbulence is low and net entry will be negligible.<sup>13</sup> We expect a positive  $\beta_5$ .

Our choice of specification of the model enables us to investigate the following research questions:

- (1) How important are actual competition of existing and new firms and potential competition in the determination of profitability? Is the common idea confirmed that effects of potential competition are less important than that of actual competition (see for example Gilbert (1989))? Does the process of dynamic competition indeed erode excess profits over time?
- (2) What is the role of retailing in the inflationary process? Can we consider retailing to be a

subduing factor in cost inflation? Does changing demand create changes in profit margins, the so-called demand inflation? Do changes in general income level have an effect on profitability in retailing?

- (3) Does the importance of the sources of competition differ between a period of economic growth and of decline? Can we consider short-term cost changes to be equally quickly passed on to customers over such periods?
- (4) Are larger firms capable of passing on cost changes to their customers more quickly than small firms? Is small and large firm net entry influenced by the same incentives?

The first two research questions are directly connected to the six parameters of the profitability equation (1). The effect of actual competition of existing and new firms are measured by  $\alpha_1$  and  $\alpha_2$ , respectively, and the effect of potential competition is measured by  $\alpha_3$ . If one of these parameters equals zero, the source of competition captured by this variable has no effect on profitability. The demand inflation effect can be connected to  $\alpha_6$ , the effect of wage inflation to  $\alpha_4$  and the adjustment of retail prices to changing costs, the cost inflation effect, to  $\alpha_5$ . If  $\alpha_4$ ,  $\alpha_5$  and  $\alpha_6$  equal zero, retailing can be considered to be inflation-neutral: it does not create inflation itself, but it also does not form a buffer against it. Next to these research questions we aim at obtaining some results on the determinants of growth or decline in the number of retail stores in shoctypes.

### 3. Data

We use a data set of 36 Dutch shoctypes for the period 1977 through 1988. The source of the data is an ongoing panel of independent, mainly small Dutch retailers called 'Bedrijfssignaleringssysteem' (interfirm comparison system) which is operated by the Research Institute for Small and Medium-Sized Business (EIM) in Zoetermeer. The shoctypes and the observation periods are given in Table I. It is important to recognize that the observation periods are not equal for each shoctype. We have a total of 341 data points while on average a data point is computed using observations from about seventy individual retail stores. Data concerning consumer spendings and modal

TABLE I  
Shoptypes, sample period and some averaged shoptype data

Shoptype	Period	<i>PRO</i>	<i>CAP</i>	$\Delta\pi - \Delta Q$	$\Delta NOF$
Supermarket with butcher's shop	1977-88	61.6	527.6	0.048	-0.023
Self-service grocers	1977-88	26.4	204.3	0.089	-0.023
Butchers	1981-88	40.2	183.3	-0.018	-0.008
Greengrocers	1977-88	32.5	127.6	0.071	-0.016
Dairy shops	1981-88	29.9	121.4	0.041	-0.030
Fish shops	1981-88	31.2	152.4	-0.051	0.006
Bakers	1981-88	61.5	370.1	-0.001	-0.002
Supermarkets without butcher's shop	1977-83	61.0	357.0	0.064	-0.030
Confectioners	1981-88	50.3	280.2	0.021	-0.016
Tobacco shops	1981-88	31.5	132.7	-0.025	-0.036
Textiles mens wear	1977-88	68.9	388.2	0.048	0.015
Textiles ladies wear	1977-88	56.1	394.1	0.028	0.015
Textiles ladies and mens wear	1977-88	64.3	498.6	0.010	0.015
Textiles leisure wear	1981-88	56.5	359.5	0.059	0.014
Textiles underwear	1981-88	44.0	298.4	0.066	0.014
Non-specialized textiles	1981-88	33.4	333.8	0.002	0.014
Shoes	1977-88	51.9	342.6	-0.003	-0.006
Sporting goods	1981-88	45.4	448.6	-0.108	0.021
Household goods	1981-88	32.2	324.4	-0.014	-0.002
Toys	1981-88	32.6	354.7	-0.018	0.021
Electrical appliances, more than 25% repairs	1981-87	55.9	466.7	0.022	-0.015
Electrical appliances, mixed assortment	1981-87	45.8	361.3	0.034	-0.002
Furnishing stores, mainly furniture	1977-88	82.9	643.4	0.025	-0.005
Furnishing stores, mainly clothing material	1977-88	58.0	334.5	0.055	0.015
Furnishing stores, mixed assortment	1977-88	77.1	686.7	0.008	-0.002
Paint, glass, wall-paper	1981-88	43.3	188.0	0.034	-0.033
Ironmongers/do-it-yourself shops	1981-88	43.3	313.6	0.130	-0.014
Bicycles	1977-88	31.6	248.2	0.003	-0.016
Photographer's shops	1981-88	50.0	304.3	0.030	0.002
Watches, gold, silver	1977-88	56.4	447.1	-0.000	0.003
Sewing-machines	1981-88	32.8	225.6	0.124	0.009
Stationer's stores	1981-88	57.1	453.0	0.036	0.010
Druggists	1977-88	43.2	284.1	0.008	-0.014
Florists	1977-88	24.5	136.5	-0.026	0.028
Gardening centres	1981-88	39.1	393.6	0.140	0.022
Pet shops	1981-88	23.9	161.9	0.040	0.003

*Note:* The variables *PRO* and *CAP* stand for the average level of profit and total capital in thousand Dutch guilders in 1980 prices. The variables  $\Delta\pi - \Delta Q$  and  $\Delta NOF$  stand for the average value of the change in the logarithm of profit divided by sales and the change in the logarithm of number of firms, respectively.

*Source:* Central Registration Office and Research Institute for Small and Medium-Sized Business.

income were gathered by the Central Bureau of Statistics (CBS) in Voorburg, unemployment data were retrieved from the United Nations Monthly Bulletin of Statistics and data concerning entry and exit were gathered by the Central Registration Office (CRK) in The Hague.

Table I shows that average profit (in 1980 prices) ranges from 23,900 guilders for pet shops

to 82,900 guilders for furnishing stores with mainly furniture.<sup>14</sup> The average amount of capital (in 1980 prices), defined as the value of total assets as it occurs on the balance sheet, ranges from 121,400 guilders for dairy shops to 686,700 guilders for furnishing stores with mixed assortment. The extremes for the change in profitability are -0.108 for sporting goods stores and 0.140

for gardening centres. For net entry these figures are  $-0.036$  for tobacco shops and  $0.028$  for florists.<sup>15</sup> Summary statistics for the variables in equations (1) and (2) can be found in Table II.

TABLE II  
Summary statistics of the variable used

Variable	MIN	MAX	MEAN	STD
$\Delta\pi_{it} - \Delta Q_{it}$	-1.14	0.94	0.027	0.241
$\pi_{i,t-1} - MI_{t-1}$	-1.32	1.09	0.100	0.431
$\Delta NOF_{it}$	-0.11	0.10	-0.002	0.026
$\Delta TUR_{it}$	-1.72	1.63	0.018	0.219
$\Delta MI_{it}$	-0.03	0.02	-0.001	0.016
$\Delta K_{it} - \Delta Q_{it}$	-0.19	0.56	0.000	0.065
$\Delta \Delta CS_{it}$	-0.29	0.19	0.000	0.066
$\Delta CS_{i,t-1}$	-0.22	0.24	-0.001	0.062
$UN_{t-1}$	5.32	6.71	6.176	0.533
$\Delta NOF_{i,t-1}$	-0.11	0.11	-0.003	0.026

Note: MIN, MAX, MEAN and STD stand for the minimum, maximum, mean and standard deviation.

#### 4. Empirical results

In this section we discuss the empirical results of the model estimated using the entire data set of 36 industries for the 12 year period 1977–1988, for the 6 year periods 1977–1982 and 1983–1988 and two groups of 18 industries arranged according to average amount of capital in 1980 prices (see Table I). The use of subsets enables to check on time and cross-section stability of our model. The estimation results for equations (1) and (2), using Three Stages Least Squares from the SAS-module SYSNLIN, can be found in Table III. The long-term relationship follows as:

$$\pi_{it} = MI_t + 0.533 - 0.039 UN_t \quad (4)$$

In case of an unemployment of 500,000 people (about 8% of the Dutch labour force; unemployment ranges between 150,000 and 850,000 people in the period 1977–1988) the long-term profit is equal to about 1.34 times modal income. This coefficient just above one is not unreasonable as starting and running a store is a comparatively simple entrepreneurial activity when compared to starting a firm in most other sectors of the economy.

What answers can we give to the first two research questions brought forward in Section 2?

- (1) With regard to the decomposition of sources of competition, we find  $\hat{\alpha}_1$ ,  $\hat{\alpha}_2$  and  $\hat{\alpha}_3$  to be negative as expected, but only  $\hat{\alpha}_1$  differs significantly from zero. The competition from incumbants seems therefore to outweigh competition from new firms and potential entrants. The process of dynamic competition indeed seems to erode excess profits over time.
- (2) With regard to the decomposition of sources of inflation, we find  $\hat{\alpha}_6$  to be insignificant. This would point at the absence of demand inflation.<sup>16</sup> The parameter estimate  $\hat{\alpha}_4$  is positive but not significant. This indicates that there is also no wage inflation: developments in general income level appear not to change profitability in the retail trade. A most interesting result is the significant negative effect of short-run cost changes on the development of profitability. We may consider retailing to be a subduing factor in the cost inflation process because cost rises are not immediately passed entirely on to customers.

Profitability, demand growth and unemployment all seem to have a positive effect on net entry. Like Acs and Audretsch (1989) we find demand growth to have a far stronger effect on net entry than profitability. Growing consumer spending may cause viable sub-market niches to emerge. These are especially attractive for small independents to enter. Unemployment has a significant upward effect on the number of firms. We must however be careful when making inferences on the parameter estimate  $\hat{\beta}_3$ . Unemployment measures are unreliable measures of the tension on the labour market, because of the sustained high unemployment level in the Netherlands.<sup>17</sup> Net entry influences next period net entry strongly. In case this is mainly caused by following “success stories”, it may point at a lack of rationality on the part of some individuals starting a retail store. The life cycle indicator,  $\Delta TUR_{it}$ , influences net entry positively, as expected.

In Table III the results are presented for equations (1) and (2) for the periods 1977–1982 and 1983–1988, separately. This allows investigation of whether parameters differ between a

TABLE III  
Estimation results of the profitability and net entry equations

Parameter	Variable		1977–82	1983–88	Low cap.	High cap.
$\alpha_0$	constant	0.043 (3.9)	0.073 (3.2)	0.021 (1.7)	-0.007 (0.5)	0.096 (4.2)
$\alpha_1$	$\pi_{i,t-1} - MI_{t-1}$	-0.144 (5.6)	-0.215 (4.5)	-0.071 (2.5)	-0.231 (6.1)	-0.203 (4.3)
$\alpha_2$	$\Delta NOF_{it}$	-0.575 (0.9)	0.156 (0.1)	-0.633 (0.9)	-0.968 (1.3)	-0.974 (1.0)
$\alpha_3$	$\Delta TUR_{it}$	-0.048 (0.9)	-0.122 (1.2)	-0.008 (0.2)	0.047 (0.6)	-0.062 (0.9)
$\alpha_4$	$\Delta MI_t$	0.986 (1.5)	-0.289 (0.3)	1.659 (2.1)	0.712 (0.9)	1.694 (1.6)
$\alpha_5$	$\Delta K_{it} - \Delta Q_{it}$	-1.951 (11.5)	-1.969 (7.1)	-1.942 (8.4)	-2.478 (10.6)	-1.454 (6.1)
$\alpha_6$	$\Delta \Delta CS_{it}$	-0.198 (1.1)	0.016 (0.1)	-0.053 (0.2)	-0.691 (3.4)	0.146 (0.5)
$\beta_0$	constant	-0.025 (2.1)	-0.002 (0.1)	0.038 (0.6)	-0.023 (1.2)	-0.025 (1.6)
$\beta_1$	$\pi_{i,t-1} - MI_{t-1}$	0.0048 (2.0)	0.0021 (0.7)	0.0044 (1.2)	0.0036 (0.8)	0.0011 (0.3)
$\beta_2$	$\Delta CS_{i,t-1}$	0.097 (6.1)	0.039 (1.7)	0.150 (5.8)	0.099 (4.2)	0.105 (4.5)
$\beta_3$	$UN_{t-1}$	0.0039 (2.1)	-0.0002 (0.0)	-0.0056 (0.6)	0.0035 (1.2)	0.0044 (1.7)
$\beta_4$	$\Delta NOF_{i,t-1}$	0.617 (16.1)	0.661 (13.9)	0.583 (10.1)	0.625 (10.2)	0.592 (11.1)
$\beta_5$	$\Delta TUR_{it}$	0.024 (5.3)	0.017 (2.6)	0.026 (4.1)	0.025 (3.5)	0.024 (4.0)
$R^2(1)$		0.382	0.464	0.315	0.544	0.342
$R^2(2)$		0.533	0.669	0.476	0.542	0.491
mean of $\Delta \pi_{it} - \Delta Q_{it}$		0.027	0.025	0.028	0.029	0.024
mean of $\Delta NOF_{it}$		-0.0015	-0.0032	-0.0005	-0.0074	0.0039
N		341	132	209	164	177

Note: The estimation results are for the total data set, the periods 1977–1982 and 1983–1988, the eighteen shoetypes with lowest and highest average capital, respectively.  $R^2(1)$  and  $R^2(2)$  stand for the R-squared of equations (1) and (2). Numbers in parentheses are t-statistics.

period of decline and growth, because the period 1977–1982 can be considered to be a period of constant economic decline and the period 1983–1988 of constant economic growth. The estimation of the model on distinct periods provides valuable information with regard to the third research question raised in Section 2:

- (3) Actual competition from incumbants is more intense in the period of contraction 1977–1982 than in the recovery period 1983–1988. For actual competition from new firms

we find the opposite:  $\hat{\alpha}_2$  declines from 0.156 to -0.633.<sup>18</sup> This finding can be explained as follows: In the period until 1982 firms generally employed strategies to protect market-shares in order to survive. This led to increased market competition.<sup>19</sup> An important development in retailing in the period after 1982 has been the introduction of new shop formulas, generating a kind of creative destruction in the retail trade. Entering firms employing a new shop formula presumably have a competitive advantage over “traditional” stores.

In Table III we also present the results for equation (1) and (2) estimated for the 18 shop-types with the lowest average capital and for the 18 shop-types with the highest average capital. The most important findings are as follows:

- (4) The degree to which cost changes are passed on to customers is generally higher for larger firms (measured in amount of capital). This might be a consequence of larger firms usually having a better monitoring system, making a shorter reaction time on cost change possible. Larger firms generally have higher long-term profits. This is directly visible by considering the difference in  $\hat{\alpha}_0$  across the two shop-type categories. These differences can be connected to the compensation for higher capital requirements, higher risk and higher responsibility for shopkeepers in larger stores. There is no indication of incentives for small store entry and large store entry to be different.

## 5. Summary and discussion

In this paper we empirically examine the importance of different sources of competition in retailing and the role of retailing in the inflationary process. We find potential competition to have no significant influence on changes in profitability. The results also indicate a shift from the effect of competition of existing to new firms around 1982. Retailing seems to be a subduing factor in the cost inflationary process. Cost inflation is suppressed especially in shop-types dominated by firms with low average size. Net entry is strongly influenced by lagged demand growth and moderately influenced by lagged profitability and unemployment. We find the net entry process to be highly auto-correlated and to depend on the shop-type life cycle as measured by market turbulence.

Future research should be concerned with the implementation of the model on retail data of different countries (replication) and on data of manufacturing industries or other service industries (generalization). More sophisticated panel data techniques should be pursued. An important issue when applying the model is the long-term relationship of profits to some benchmark. In this paper we used modal income as benchmark because small independents were the subject of

research. For large enterprise one may think of some function of the ratio of return on investment to the interest rate.

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## Notes

<sup>1</sup> The percentage employment shares (in 1986) of retailing in the total labour force (non-private sector included) are 7.8 for the Netherlands, 8.3 for Germany, 8.5 for the United Kingdom, 6.7 for France, 9.6 for Italy, 16.7 for Spain and 9.2 for the United States (source: Ravestloot and Vogelesang (1989)).

<sup>2</sup> Schultz and Kirzner clearly depart from the Schumpeterian notion of entrepreneurship. Schumpeter focused on the innovative aspects of entrepreneurship and regards the entrepreneur rather as creator of disequilibria than of equilibria. See Hébert and Link (1989) for a discussion of these different opinions on the nature and role of the entrepreneur.

<sup>3</sup> Variables which might play a role in establishing a long-term benchmark for the number of firms are for example mobility, urbanization, consumer preferences and scale economies. See Flath (1990) for a recent investigation of the determinants of the number of small retail firms for Japan.

<sup>4</sup> The speed of profit adjustment to its long run equilibrium value is subject of research in the persistence of profits literature. Mueller (1990) regards this speed of convergence as central to the discussion of economic competition, because "if convergence is quick and complete, then competition among existing firms within an industry, the entry and exit of firms, and the threatened entry of firms must be presumed to be sufficiently swift and strong to bring firm and industry profit rates quickly back to their long run competitive equilibrium levels" (p. 6). With the inclusion of net entry ( $\Delta NOF$ ) and ease of entry and exit ( $\Delta TUR$ ) we distinguish between the effects of these three possible sources of competition.

<sup>5</sup> Beesley and Hamilton (1984) describe however the important role of this competitive fringe as seedbed of the new initiatives from which will emerge the successful firms of the future.

<sup>6</sup> Highly turbulent industries are often characterized by low survival rates, indicating that high accessibility also implies large competitive pressure on many small new firms. For U.S. manufacturing industries, Dunne, Roberts and Samuelson (1988) find that "industries with higher than average entry rates also tend to have higher than average exit rates" (p. 508) indicating that entry induces exit through displacement (Flynn



(1991), Shapiro and Khemani (1987)). Variables of turbulence are also used in Audretsch (1991), Audretsch and Acs (1990), Beesley and Hamilton (1984) and Johnson (1989).

<sup>7</sup> Nooteboom, Kleijweg and Thurik (1988), using 16 Dutch shoetypes for the period 1976–1983, find that deviations from “normal costs” are passed on to customers for only about fifty percent.

<sup>8</sup> De Wit and Van der Winden (1990) use the difference between logarithms of profit in case of self-employment and wage in case of wage-employment to determine whether an individual chooses to become self-employed. They find a greater probability of becoming self-employed when this difference grows. The effect of excess profit on net entry at shop type level can be seen as aggregation of individuals making decisions on entry and exit on the basis of their perceived discrepancies between attainable profit as shopkeeper and wage as employee.

<sup>9</sup> See Schmalensee (1989, p. 997) for studies relating entry to profitability. The expected positive influence of profitability on net entry is found just as often as no influence. Acs and Audretsch (1989) report however that the positive influence is usually found in the empirical literature.

<sup>10</sup> See Schmalensee (1989, p. 997) for studies relating entry to growth. Some studies find a positive influence of growth on entry, others find no relation. Acs and Audretsch (1989) summarize however that the industrial rate of growth is found to positively influence entry in most studies. Their own empirical results show that the entry-inducing effect for small manufacturing firms from growth is much stronger than that from lagged profitability. This may indicate that small firms are attracted by sub-market niches rather than by average profitability (see also Bradburd and Ross (1989)). Evans and Leighton (1989b) find that the share of self-employment in total employment rises in an expanding economy.

<sup>11</sup> See Storey (1991) for a recent survey of studies of the effect of unemployment on new-firm births. He finds time-series analyses to point to unemployment being positively associated with indices of new-firm formation, whereas cross sectional studies generally indicate the reverse. Highfield and Smiley (1987) present a more comprehensive study of the influence of microeconomic and macroeconomic factors on the entry process. We expect that the effect of unemployment on the number of firms will be higher in the United States than in the Netherlands because of the well-developed Dutch social security system. There is probably a lower pressure on Dutch unemployed workers to become self-employed.

<sup>12</sup> This is related to the demonstration effect of Gort and Konakayama (1982): Perceptions of profit opportunities are positively related to the successful experience of others in the market.

<sup>13</sup> This pattern was also encountered for the number of firms selling recently developed products (Klepper and Graddy (1990)).

<sup>14</sup> In the period 1977 through 1988 the Dutch guilder ranged between \$0.30 and \$0.50.

<sup>15</sup> Data on entry and exit were not always available for each shoetype separately. In these cases we used aggregated data instead. This implies that  $\Delta NOF$  and  $\Delta TUR$  can be identical for similar shoetypes.

<sup>16</sup> In earlier studies, like Nooteboom (1985) and Nooteboom, Kleijweg and Thurik (1988), empirical evidence, however, is found for a positive effect for growing demand on retail price setting.

<sup>17</sup> Another problem is the low variability of  $UN_i$ . The estimated correlation between  $\beta_0$  and  $\beta_3$  is  $-0.996$ , making inference about the effect of the height of unemployment on the increase of the number of firms difficult.

<sup>18</sup> The decline of  $\hat{a}_2$  is not significant. We must however also take into account that the correlation of the residuals of equations (1) and (2) declines from 0.078 to  $-0.047$  (for the 1977–1988 period it equals 0.033). The OLS-estimates for  $\alpha_2$  are 0.596 (t-value is 0.7) for the 1977–1982 period and  $-0.775$  (t-value is 1.8) for the 1983–1988 period.

<sup>19</sup> Kessides (1990) finds the speed of adjustment of profits to their long-run equilibrium to be negatively related to growth of demand in an industry. He ascribes this result to greater volatility of internal market share competition and destabilizing effects of entry in slow growth industries.

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