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September 2004

Working Paper No: 0410

DEPARTMENT OF ECONOMICS

UNIVERSITY OF VIENNA

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Evolution of Profit Persistence in the US: Evidence from four 20-years periods

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This version: September 2004

Abstract

The present study analyzes and compares profit persistence in four different samples of US companies during the periods 1950-72, 1960-80, 1970-90 and 1980-99. While most of the previous studies perform profit persistence analysis on survivors only, the present setup allows for companies to enter and exit the analyzed sample, thus giving a more comprehensive depiction of the US economy during this half of the century. The results point towards an increase of competition after the opening of the US economy to international competition in the 60-80's, nevertheless the speed seems to have decreased in the most recent period. Key determinants of profit persistence seem to be firm's size, industry- and firm growth, and in the most recent period industry concentration, market share, and the company's merger activity.

Keywords: Profit Persistence; Competition.
JEL classification: L00.

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1 Introduction

The present study analyzes the evolution of competition in the US over the period 1950-99 in the context of profit persistence by means of studying companies profit dynamics. It does so by splitting this time period in four 20-years subperiods 1950-72, 1960-80, 1970-90, 1980-99, analyzing each period separately and finally comparing the results. There are at least four reasons to adopt this methodology. The first reason is that it can be argued that the time interval 1950-99 covers at least one period of structural break in the US economy. After the 60-70s the US economy opened more strongly to international competition and it is worthwhile to observe whether this is also reflected in the comparison of the periods 1950-72 and 1960-80.[1] In addition it is also of interest to observe if the effect of the increased competition is replicated also in the subsequent periods.[2] Moreover, structural breaks of this type might have taken place also in the later periods. The second reason for dividing the sample is to permit for firm fluctuation. Analyzing the active firms in one period and comparing them with the ones in the next period allows for firms entry and exit in the analyzed sample. This is relevant because of two reasons at least. Firstly new large firms like Microsoft, that were not in existence in 1950 can also be taken into consideration. These companies might be essential in characterizing the competition process in the US. Looking only at survivors from 1950-99 would not make it possible for such a company or other large companies that were created after 1950 to be included into the sample. Secondly it takes into consideration the effect of firm failure. Firms that are active in the first period might not be active anymore in the second. Looking only at survivors might lead to an artificial stability into the sample. The third reason for dividing the sample in four subperiods is to make it possible to apply advanced methodologies like the best lag structure, in order to compare the results and to obtain increased insight in the competition process in the US in the last half of the twentieth century. The fourth reason for the time splitting is to make use of the improved data situation for the last period 1980-99. Most of the variables that were analyzed for the last period were not available in the first ones.

Many studies have analyzed and compared the competitiveness of one or more economies using the profit persistence methodology. Starting with the seminal contributions by Mueller (1977, 1986) there is a growing and fruitful persistence of profit literature. Geroski and Jaquemin (1988), Kambhampati (1993), Goddard and Wilson (1999), MGahan and Porter (1999), Cable *et.al* (2001) are just

[1] The reason why the first period was chosen 1950-1972 and not 1950-1970 is because the pioneering contributions by Mueller (1986) and Mueller (1990) covered also this period and a comparison with the results in these studies was aimed. Although the numbers are marginally different due to the improved methodology the conclusions are similar.

[2] Average US Imports/GDP in the period 1971-2000 were 200 % higher than in the period 1950-1970. Source: Bureau of Economic Analysis, http://www.bea.doc.gov/.

some of the papers that find support for profit persistence for different economies and different time periods. In one of the most recent studies Yurtoglu (2004) analyzes the persistence of firm-level profitability in Turkey and concludes that the intensity of competition in Turkey is no less than in developed countries. Glen *et al.* (2001) analyzes the persistence of profitability and competition in seven emerging markets and concludes that the intensity of competition is, if anything, greater in emerging than in advanced countries.

What all these studies have in common is the fact that they look only at surviving companies which are usually bigger and more successful than the average firm in the market at least in one dimension: they survived. One of the first attempts made to compare two different time periods for the same economy was done in Mueller (1990) where the periods 1950-72 and 1964-84 in the US where compared and increased competition in the second period was found. Extending now the analysis to two additional periods, making use of recent advances in time series analysis and of the improved data situation will help to explain more comprehensive the competition process in the US in the last 50 years. Among other firm and industry characteristics more recently, the intensity of the company's merger activity seem to play an important role in explaining profit persistence.

The paper proceeds as follows. The methodology is presented in section 2. The database is discussed in section 3. The empirical results are presented in section 4 and the conclusions appear in section 5.

2 Methodology

The autoregressive process of order one (AR(1)) has been one of the most used representations of the dynamics of profits since Mueller (1986).

Let π_{it} denote firm i's profit rate defined as profits after taxes divided by its total assets in year t, [3] normalized by taking the difference and dividing by an economy-wide measure of profitability.[4]

The dynamic behavior of π_{it} can be modelled than as an autoregressive (AR(1)) equation of the form:

[3] In order to make the profit measure independent of the source of funds used to create total assets, interest should have been added to income before dividing by total assets. Due to data restrictions for interest especially for the beginning years (1950-1977) this variable could not be taken into account. A sensitivity analysis has been done for the period 1980-1999 when interest data was available and the results using interest were not significantly different from the ones without interest.

[4] The economy-wide measure is the median of the profit of a sample consisting of more than 175000 observations and more than 15500 companies. The number of annual observations is at least 677 and at most 10710. Note that using the sample mean (or median) might be misleading. The profits of the sample studied might be not abnormal with respect to the own sample average but might be well above (or below) the economy average (or median).

$$\pi_{it} = \alpha_i + \lambda_i \pi_{it-1} + \mu_{it} \tag{1}$$

where $|\lambda_i| < 1$ and μ_{it} is an error term with constant variance and zero mean.[5] The unconditional expectation of π_{it} in (1) is then given by

$$\hat{p_i} = \hat{\alpha_i}/(1 - \hat{\lambda}_i) \tag{2}$$

The two measures of profit persistence used in the literature are $\hat{p_i}$ and $\hat{\lambda}_i$ where $\hat{p_i}$ is a measure of permanent rents, which are not eroded by competitive forces (also called the long run projected profit rate) and $\hat{\lambda}_i$ is a measure of the speed of adjustment of short run profits. Lambda is at the same time a measure for the competitiveness of the economy (or the sample). The smaller lambda, the faster short run rents are eroded and the stronger the competition process.

The present study extends this methodology by using the "best lag model". Autoregressive models up to order four have been estimated for each company and Akaike's Information Criterion (AIC) and Schwarz Bayesian Information Criterion (SBC) have been employed in order to decide which model describes best the adjustment path. The model with the lowest AIC or SBC value is judged the best and has been chosen for the further analysis.[6]

After choosing the "best lag model" the long run projected profit rate becomes:

$$\hat{p_i} = \frac{\hat{\alpha}_i}{1 - (\sum_{j=1}^{L} \hat{\lambda}_{ij})} \tag{3}$$

where L is the number of lags of the AR process and $\hat{\lambda}_i = \sum_{j=1}^{L} \hat{\lambda}_{ij}$ is the speed of adjustment parameter.

This extension is important since the adjustment path of profitability might be more complex than a simple AR(1). Glen *et al.* (2001) find for example that AR(2) is a better method to model profitability. Cable *et al.* (2001) and Cable and Jackson (2003) use structural time series analysis on a sample of 53 UK companies and find evidence for cyclical behavior. Crespo-Cuaresma and Gschwandtner (2003) use a nonlinear modelling strategy and find a better fit to

[5] Note that the specification given by (1) can be justified theoretically as a reduced form of a two-equation system were profits are assumed to depend on the threat of entry in the market, and the threat is assumed to depend on the profits observed in the last period. See Geroski (1990).

[6] To see why it might not be proper to use the criteria of highest R^2 or even the criteria of highest adjusted R^2 when deciding among different models, see Greene (1993).

the data compared to the simple AR(1). The "best lag model" allows for more general dynamics than the simple AR(1) but still enables comparison with most of the previous literature. The tests for stationarity and convergence employed in the present study are going to be discussed in detail in section 4.

3 Data

The database contains yearly data on profits for four different samples consisting of: 88 stationary time series of US surviving manufacturing companies for the period 1950-72, 137 series for the period 1960-80, 101 series for the period 1970-91 and 92 series for the period 1980-99. The starting point 1950 was determined by necessity because this was the starting year of the Compustat data base, the main data source. Especially for the first years, missing data had to be completed from the "Moody's Industrial Manual". Profit data for the last years were compiled using the Global Vantage data base. The database for profitability is unique and has the advantage that it has never been used before in this form. [7]

The firm level data contains also the following firm characteristics used to explain profit persistence: market share (MS), the volatility of the profit rate (SDROA), industry (SIC), the size of the company in terms of assets (LnAssets) and the company's growth rate of sales (Growth). How the firm characteristics were calculated and the way one would expect them to be correlated to profit persistence is described in the next section.

The only industry characteristics for which it was possible to obtain data for all four time periods are: concentration (CR4), size (number of firms, value of shipments) and growth (of the number of firms, value of shipments). These variables are contained in the Census of Manufacturing bulletin, Concentration Ratios in Manufacturing. For the years 1947-1992 a summarized document could be obtained from the economics archive of the College of Wooster, Ohio.[8] The latest data (1997) are available online at the official Census Website.[9]. The database was split in 4 different periods of about equal coverage as the profitability data. The industry variables are means over each period.

Beginning in 1997, the census data use the new NAICS industry definitions rather then the previous SIC definitions. Therefore the SIC code found in Compustat

[7]The variable name in the Compustat Database for firm i's profit rate is *Income Before Extraordinary Items* and it represents the income of a company after all expenses, including special items, income taxes and minority interests- but before provisions for common and/or preferred dividends. *Assets-Total* represent current assets plus net property, plant and equipment plus other noncurrent assets.

[8]Available at "http://www.wooster.edu/economics/archive/indconc.html"

[9]Available at "http://www.census.gov/"

had to be translated into the NACIS code using a NACIS/SIC Codes Conversion Table.[10]

After 1980 also data about R&D, advertising, Exports/Imports and Mergers could be obtained. R&D and advertising data are from Compustat and Global Vantage. US import and export data was assembled by Robert Feenstra and updated by Peter Schott.[11] The merger data are from Gugler *et. al.* (2004b) and contain information about the average value that a company has spend on mergers in the specific period.

Descriptive statistics for the profit rates, for the firms - and industry characteristics for all four periods are available in table 9, 10 and 11 (Appendix).

4 Empirical Results

The empirical results section refers first to some properties of the profit persistence parameters $\hat{\lambda}_i$ and $\hat{p}_i$, then addresses the question of profit persistence and finally analyzes its determinants: firm and industry characteristics.

4.1 Some properties of the profit persistence parameters

The speed of adjustment parameter $\hat{\lambda}_i$ shows how quickly the firms profit rate π_{it} converges to its long run level $\hat{p}_i$. If $\hat{\lambda}_i$ is small then the degree of persistence of past profits is small and therefore short run rents are quickly eroded. The literature usually interprets this as sign of increased competitiveness. If $\hat{\lambda}_i$ is high then competition is not strong enough to bid away short run rents within one year. The economy is usually said to be less competitive. Therefore throughout the profit persistence literature $\hat{\lambda}_i$ is considered to be a measure for the competitiveness of the economy or the sample.[12] Table 1 presents the frequency distribution and the mean $\hat{\lambda}_i$ for each period. The mean $\hat{\lambda}_i$ for the period 1950-72 is 0.22 and it is the highest from all periods. This means that the speed of adjustment for this period is smaller than for all other periods and competition is weaker. In the next period the mean $\hat{\lambda}_i$ is only 0.18 meaning that the degree of persistence is smaller, therefore the speed of adjustment is higher and competition increased. This is consistent with the hypothesis that after the opening of the US economy to international competition in the 60s, competition strengthened in the US. In the next two periods competition increased even more since the mean $\hat{\lambda}_i$'s for both periods are almost ten times smaller than for the first two periods. Nevertheless

[10] Available at "http://www.loglink.com/sic.asp"

[11] Available at "http://www.som.yale.edu/faculty/".

[12] Lambda should take values between -1 and 1. For all samples all the values of lambda were within this statistically plausible range.

in the last period $\hat{\lambda}_i$ is on average twice as high as in the period before meaning that the intensity of competition has decreased again to a small extent. The values for mean $\hat{\lambda}_i$ are similar to the mean lambda of other economies worldwide. Singh *et al.* (2001) for example find mean $\hat{\lambda}_i$'s for 7 emerging markets between 0.013 and 0.421.[13]

It can be observed that while for the first period most of the $\hat{\lambda}_i$'s are within the interval (0.4-0.6), for the period 1960-80 most lambda's are in the interval (0.2-0.4) and for the last two periods the highest percentage of $\hat{\lambda}_i$'s is in the interval (-1-0) reinforcing the conclusion that after the 60s the degree of persistence becomes smaller and competition increases. Even if the interval with the highest percentage of $\hat{\lambda}_i$'s is for both last periods the same, the percentage of $\hat{\lambda}_i$'s within this interval is smaller for the period 1980-99 than for the period 1970-80 leading to the conclusion that competition decreased slightly in the last years.

Table 1: *Frequency distribution and panel estimate of the persistence coefficient* $\hat{\lambda}_i$*:*

	50-72		*60-80*		*70-90*		*80-99*	
Interval	# $\hat{\lambda}_i$	*%*	# $\hat{\lambda}_i$	*%*	# $\hat{\lambda}_i$	*%*	# $\hat{\lambda}_i$	*%*
-1-0	19	21.59	33	24.09	43	42.57	33	35.87
0-0.2	21	23.86	33	24.09	26	25.74	27	29.35
0.2-0.4	21	23.86	40	29.20	25	24.75	28	30.43
0.4-0.6	22	25.00	23	16.79	6	5.94	3	3.26
0.6-1	5	5.86	8	5.83	1	0.99	1	1.09
Mean $\hat{\lambda}_i$	0.22		0.18		0.02		0.04	

Numbers in parenthesis are heteroscedasticity consistent t-values.
Mean $\hat{\lambda}_i$ are significantly different from one another except for the ones of the periods 50-72 and 60-80 and of the periods 70-90 and 80-99.

A similar frequency distribution for the persistence coefficient $\hat{p}_i$ is presented in Table 2.

The results in Table 2 reveal that after the opening of the US economy to international competition the mean projected profits increased a little in the period 1960-80, then decreased substantially in the period 1970-90 and finally increased again in the most recent period. While most of the projected profit rates in the first three periods are in the interval (-0.3; 0), in the last period, the interval with the highest percentage of long run projected profit rates is (1; ∞). Finally the

[13]While the mean $\hat{\lambda}_i$ is comparable to the one of other economies the percentage of negative $\hat{\lambda}_i$ is rather high. This could be due to the high volatility in profits after 1980. If a company is oscillating between negative and positive profits a negative lambda is possible.

Table 2: *Frequency distribution and panel estimate of the persistence coefficient* $\hat{p}_i$*:*

	50-72		*60-80*		*70-90*		*80-99*	
Interval	# $\hat{p}_i$	%	# $\hat{p}_i$	%	# $\hat{p}_i$	%	# $\hat{p}_i$	%
<-1	3	3.41	6	4.38	15	14.85	14	15.22
-1 to -0.6	3	3.41	11	8.03	4	3.96	12	13.04
-0.6 to -0.3	19	21.59	30	21.90	11	10.89	9	9.78
-0.3 to 0	28	31.82	33	24.09	23	22.77	15	16.30
0 to 0.3	19	21.59	23	16.79	19	18.81	10	10.87
0.3 to 0.6	11	12.50	13	9.49	13	12.87	8	8.70
0.6 to 1	4	4.55	14	10.22	10	9.90	6	6.52
>1	1	1.14	7	5.11	6	5.94	18	19.57
Mean $\hat{p}_i$	-0.08		-0.05		-0.15		-0.06	

Numbers in parenthesis are heteroscedasticity consistent t-values.

Mean $\hat{p}_i$ are not significantly different from one another.

opening of the US economy to international competition seems to have brought not only increased competition but also higher average projected profit rates, which is unexpected.[14] Solow *et.al* (1990) find increased labor and multifactor productivity in the US manufacturing sector in the late 80s after the post 1973 slump. The surge in US manufacturing productivity was a result of more intense competition and might have contributed to the higher projected profit rates. At the same time there is evidence for improved corporate governance in the 90s which might have resulted in higher projected profitability.

4.2 Profit Persistence

In order to analyze the persistence of profits the autoregressive equation was estimated for each company in each sample.

The samples were then each divided into three sub-groups of about equal size on the basis of average profit rates enjoyed during the first three years of the sample period. [15]

[14]Mean $\hat{p}_i$ for the period 1950-72 in Mueller (1986) is -0.003.

[15]The number of groups was not chosen randomly. Ideally one would have more than three groups but since a t-test will be performed on the mean values of the groups the number of observations should be relatively high.

Table 3 presents the mean $\hat{p}$'s (the long-run projected profit rate calculated by equation 2) and the mean $\hat{\lambda}$'s for each period.

On average the long-run projected profit rate is positive and significantly greater than zero in the group with highest initial profit rate and falls uniformly as one moves to the two groups with lower average profit rates in the initial three years. In the third group (with the lowest initial profit rate), the coefficients are on average significantly less than zero.

In all periods the first group (with the highest initial profit rate) converges from a mean initial profit rate high above the norm to a level closer to the norm. The strongest adjustment in the first group seems to take place in the period 1970-90. Companies in the first group start on average with a profit rate almost 100 % above the norm and converge to a level of 40 % above it. The adjustment in the middle group is much weaker than in the first group but this result is as expected since companies that start with an average profit rate close to the norm should also stay close to it if profits should converge on the norm. Companies in the last group (with the lowest initial profit rate) start on average with a profit rate well below the norm and converge to a level much closer to it. Again the adjustment seems to be strongest in the period 1970-90. Companies in the last group start on average with a profit rate more than 200 % below the norm and converge to a level 61 % below it. The fact that the strongest adjustment seems to take place in the period 1970-90 is consistent with the fact that we have for this period the lowest mean $\hat{\lambda}_i$, therefore the highest mean speed of adjustment and therefore the most intense competition process from all periods.

But even if these values do imply convergence to the norm the regression is far from complete. The ordering of the projected profit rates across the 3 groups is exactly the same as the one of the initial profit rates for all periods suggesting that firms tend to stay in the same group and that differences in profitability across firms will persist. Moreover the mean $\hat{p}$ in the group with the highest initial profit rate is always highest and the mean $\hat{p}$ in the group with the lowest initial profit rate is always lowest suggesting persistence of positive/negative profitability in all periods. Profits observed at any time reflect the degree of competition in the market, and in this (neoclassical) sense competition is the sate which requires that the projected profits for all companies are equal $\hat{p}_i = c$. If profits would converge towards the norm then all the mean $\hat{p}$ should be equal. But this is not what we observe. The means of the three groups for the long run projected profit rates are different and using a t-test the differences are significant for all periods.

The result that differences in profitability persist is reinforced by the correlation coefficient between the initial profit rate (π_{i0}) and the long-run projected profit rate ($\hat{p}_i$). It is positive and above 0.25 in all periods (Table 4).

Another way to test and define convergence would be to regress the change in profits on the initial profits. If the coefficient of the initial profits should be

Table 3: *Mean $\hat{p}$'s and $\hat{\lambda}$'s of "Survivors and Exiters".*

	Obs.	*Group*	*Mean* $\hat{p}$	*Mean* $\hat{\lambda}$	*Mean* π_0	*Mean* π_{it}
1950-72	30	1	0.15	0.27	0.39	0.16
	29	2	-0.06	0.23	0.02	-0.06
	29	3	-0.34	0.16	-0.41	-0.35
	88	Mean	-0.08	0.22	0.00	-0.08
1960-80	46	1	0.42	0.18	0.73	0.45
	46	2	-0.19	0.18	-0.04	-0.17
	45	3	-0.39	0.19	-1.37	-0.50
	137	Mean	-0.05	0.18	-0.23	-0.07
1970-90	34	1	0.43	0.01	0.95	0.49
	34	2	-0.27	0.00	-0.20	-0.19
	33	3	-0.61	0.06	-2.33	-0.79
	101	Mean	-0.15	0.02	-0.53	-0.16
1980-99	31	1	0.70	0.06	1.06	0.71
	31	2	-0.05	0.07	0.07	-0.06
	30	3	-0.84	0.00	-1.65	-0.94
	92	Mean	-0.06	0.04	-0.17	-0.10

Mean $\hat{p}$ = Mean long-run projected profit rate
Mean $\hat{\lambda}$ = Mean speed of adjustment
Mean π_0 = Mean initial profit rate
Mean π_{it} = Mean normalized profit per company

significantly negative this would mean that firms that start with high profits will have a low growth in profits and firms that start with low profits will have a high increase in profits. In order to test this hypothesis the following equation has been estimated for each period:

$$\Delta\pi_{it} = \phi_0 + \phi_0\pi_{i0} + \varepsilon_t \tag{4}$$

The coefficients of π_{i0} of the two first periods were significantly negative implying convergence while the coefficient for the period 1970-90 was insignificant and the one for the period 1980-99 was significantly positive. This means that firms in the last period that start with low profits will also have a low profit growth while firms that start with high profits will also have a stronger growth in profits.[16]

[16]Note that convergence in this sense is not the opposite of profit persistence. Profit persistence and convergence could exist at the same time.

The other very important measure in the analysis of persistence is the the speed of adjustment $\hat{\lambda}_i$. In general all the mean $\hat{\lambda}$'s are similar for each period and suggest no systematic pattern from subsample to subsample. This is not what one expects to find if all deviations from the norm are short-run rents. If this were true then the $\hat{\lambda}_i$'s for companies earning normal returns would be relatively high meaning that that their normal returns will tend to persist. In contrast, companies with initially very high or low profits should have lower $\hat{\lambda}_i$'s, since their returns should be converging more rapidly on the norm. But this is not quite what we observe. The smallest mean $\hat{\lambda}_i$'s are for the group with the lowest initial profit rate of the period 1980-99 and for the middle group of the period 1970-90. On the contrary the highest mean $\hat{\lambda}_i$ and therefore the highest degree of persistence is in general in the groups with the highest or with the lowest initial profit rate meaning that firms that started with the greatest positive and negative deviation from the norm exhibit a slower average decline towards it. For example in the first period the highest mean $\hat{\lambda}_i$ is in the group with the highest initial profit rate (0.27) suggesting persistence in positive profitability. In the periods 1960-80 and 1970-90 the highest mean $\hat{\lambda}_i$ is in the group with the lowest initial profit rate suggesting persistence in negative profitability.[17]

Table 4 table summarizes some persistence parameters in order to have a better comparison between the four periods analyzed.

Table 4: *Persistence Parameters:*

	50-72	**60-80**	**70-90**	**80-99**
# of firms	88	137	101	92
% of $\hat{p}_i$'s significantly different from 0	68.18	62.77	40.6	47.83
% of $\hat{p}_i$'s significantly positive	26.14	29.20	19.80	28.26
% of $\hat{p}_i$'s significantly negative	42.04	33.57	20.80	19.57
% of $\hat{\lambda}_i$'s significantly different from 0	37.5	24.82	7.92	9.78
Mean $\hat{\lambda}$	0.22	0.18	0.02	0.04
Correlation coefficient between $\hat{p}_i$ and π_0	0.48	0.57	0.38	0.27
% of equations with $R^2 > 0.1$	56.82	57.66	57.94	30.1
Mean STDROA	0.41	0.63	1.7	2.04
Correlation coefficient between STDROA and GRWASS	0.13	0.23	0.01	0.30

The lower the percentage of long run projected profit rates significantly different from zero, the more firms will converge to the norm, the more intense the competition process. One can observe that this percentage is highest for the first period reinforcing the conclusion that in this period competition was rather weak. In

[17]The mean $\hat{\lambda}_i$ for the period 1950-72 in Mueller (1990) is 0.183.

the 50-72s almost 70 % of the companies had a projected profit rate significantly different from zero. In the next two periods this percentage decreases to 62.77 and finally to 40.6 suggesting that with the opening of the US economy competition increases. In the last period the percentage of long run projected profit rates significantly different from zero increases slightly again to 47.8, supporting the assumption that recently the intensity of competition decreased, but is still much higher than in the 50-72s.

The percentage of significantly positive ($\hat{p}_i$) is smaller than the percentage of significantly negative ($\hat{p}_i$) in the first two periods, in the third period the two are almost equal and in the third the situation is reversed. This reinforces the conclusion that the opening of the US economy to international competition brought not only increased competition but also a better profit performance. This might be also a result of improved corporate governance. The corporate governance heading usually includes: the identity and degree of concentration of ownership; the institutional structure by which owners control managers and finally the legal and political institutions that affect managerial behavior. There is evidence that these features have improved in the US in the last years.[18]

The higher the percentage of $\hat{\lambda}_i$'s significantly different from zero, the higher the number of firms for which the competitive process was not strong enough to bid away profits within one year and therefore the more profit persistence. This percentage also decreases with time. It is highest in the first period and then decreases from almost 40% in 1950-72 to 7.9 % in 1970-90 and then rises slightly again to 9.78 % in the last period. The pattern of $\hat{\lambda}_i$ significantly different from zero tells the same story as the one of $\hat{p}_i$. At the beginning competition is low and both percentages are the highest from all periods. After the opening of the US to international competition both percentages decrease strongly. In the last period both percentage increase again but to a much smaller extent revealing a small weakening of the competition process. And this results are also consistent with the development of mean $\hat{\lambda}_i$, the profit persistence parameter used in the literature to compare competitiveness between economies. The average degree of persistence is in the first period highest (0.22), it decreases then to 0.18 in the period 1960-80 and further to 0.02 in the period 1970-90 and then rises to 0.04 in the most recent period analyzed. [19]

The correlation coefficient between initial and projected profits is always positive, above 0.25 and highly significnat in all periods meaning that although competition increases there is still also a high degree of profit persistence in all four periods.

[18]See for example Gugler, Mueller and Yurtoglu (2004a).

[19]Even if not perfectly comparable the percentages of $\hat{p}_i$ and $\hat{\lambda}_i$ significantly different from zero in Mueller (1986) for the period 1950-72 are very similar to the present results (67% and 35,5% respectively).

The percentage of equations where the autoregressive process explains more than 10% in the variation in profits is in the first three periods above 55 % and then falls to 30.1 % in the last period.[20] This might be because of the fact that in the most recent years the variation in profits can be explained also by increased merger activities in the 80s and 90s which is not reflected in the present autoregressive relationship.

The average standard deviation of π_{it} (STDROA) is almost five times higher in the last period than in the first. Could this increased volatility of profits be caused partly by the increased merger activity in the 80s and 90s? This is an interesting question that deserves further investigation. One way to answer it is to look at the correlation between the growth of assets and the volatility of profits. Companies with increased merger activity usually experience a growth in assets above average. The years with the highest frequency of companies with growth rates of assets above average are 1968, 1988 and 1998 which are exactly the peaks of the merger waves of the 60s, 80s and 90s.[21] The correlation between the volatility of profits and the growth rate of assets (Grwass) is above 0.3 and highly significant in this period. In all other periods it is smaller. Another way to answer this question is to look at the importance mergers have for each company and see if this is correlated to the volatility of profits. For this the average merger value (normalized by mean assets)- M1 - has been constructed for each company and it's correlation to the standard deviation of profits has been analyzed.[22] The correlation takes a value of 0.29 and is highly significant. In order to get more insight in the relationship between the volatility of profit rates and the merger activity of the company, STDROA has been regressed on two measures of merger activity (Grwass and M1) . Both coefficients are positive and highly significant. Therefore we can conclude that the increased volatility of profits observed in the last period can be explained at least partly by the increased merger activity in this period.[23]

Finally the hypothesis has been tested that all long run projected profit rates ($\hat{p_i}$) converge to a common competitive level c by restricting all firms to have the same ($\hat{p_i}$). The F-statistics for all periods were above the critical value of 1.36 for a one percent level significance test. Hence the hypothesis that all long run projected profit rates converge to the same level could be easily rejected in all periods. Therefore one can conclude that even if the hypothesis that competition has increased in the US since the 1950 has been supported, and even if we do observe convergence of profits towards the norm in every period, there is still also

[20]Mueller (1990) finds for the period 1950-72 a percentage of only 21.2 %. The higher explanatory power in the present study might be due to the "best lag structure".

[21]See for example Gugler, Mueller, Yurtoglu (2004b).

[22]The average merger value is the average value that the company has spend on mergers in the analyzed period.

[23]The two proxies for mergers explain more than 18% in the volatility of profits.

considerable degree of profit persistence.

4.2.1 Explaining Profit Persistence

This section performs an integrated second stage analysis aimed to explain profit persistence. Dividing the time period 1950-99 in four subperiods enables us to analyze how the impact of industry and firm characteristics on profit persistence evolves over time.

First the effect of industry characteristics is analyzed. Compustat provides for all companies used in the present study SIC (Standard Industry Codes). Even if not perfect, the SIC codes are an indicator of the industry in which the main production of the companies is at the moment. For each period the number of industries has been first identified. Next, a set of industry dummies has been constructed for each period and their effect on the two profit persistence parameters ($\hat{\lambda}_i$ and $\hat{p}_i$) has been analyzed.[24] The explanatory power of industry dummies on both profit persistence parameters has increased over time. While the industry dummies explain 21% of the variation of the long run projected profit rate ($\hat{p}_i$) in 1950-72, they explain almost twice as much of its variation in 1980-99. The increase of the explanatory power of the industry dummies of the speed of adjustment parameter ($\hat{\lambda}_i$) is even stronger. While industry dummies explained only 1 % of the variation of ($\hat{\lambda}_i$) in 1950-72, they explain more than 50 % of its variation in 1980-1999. If in in the 50s industry affiliation did not seem to play such an important role for profit persistence this situation seem to have recently changed. Companies belonging to specific industries do seem to have a higher degree of profit persistence. We conclude that the importance of industries in explaining profit persistence is at constant increase from 1950-1999 and therefore the attempt to place the companies in their industry context is crucial for explaining profit persistence.

Concentration is the industry characteristic that one would most obviously expect to be related to profit persistence. Highly concentrated industries might be able to construct entry barriers and therefore might be able to enjoy a higher degree of profit persistence. Many studies have found a positive relationship between concentration and different measures of profitability. Kambhampati (1995) and Yurtoglu (2004) are just two of many examples. It is however also possible to find a negative and significant relationship between concentration and profit persistence explained by the inefficiency of highly concentrated industries or by the entry-inducing effect.[25] In the present study the percentage of industry output

[24]Note that looking for industry level patterns in the estimated $\hat{\lambda}_i$ and $\hat{p}_i$ imposes an unique $\hat{\lambda}_i$ and $\hat{p}_i$ level for each industry assuming that the firms in an industry are all alike. The dummy approach used here allows for firm level differences as the "new learning" literature emphasizes.

[25]See Scherer and Ross (1990).

produced by the largest 4 firms in the industry (CR4) has been analyzed.

The second industry characteristic that could be obtained data for was the size of the industry as measured by the mean number of establishments (NF). One might expect that the higher the number of establishments in the industry, the stronger the competition and therefore the less profit persistence is to be found. Therefore a negative relationship between the two measures of persistence and the size of the industry is expected.

The growth rate of the industry is also important in explaining profit differentials but its net effect is ambiguous. In industries with rapid growth it might be more difficult for incumbents to maintain their market share and oligopolistic discipline thereby profits might decrease. On the other hand, if output is growing fast, firms are not under pressure to reduce prices in order to increase sales and therefore profit differentials might be maintained over time. Rapidly growing industries, like pharmaceutical for example, are sometimes characterized by persistent high profitability. Kambhampati (1995) finds a positive small but highly significant coefficient for industry growth when analyzing its impact on the profit persistence parameter $\hat{\lambda}_i$. Two different measures for industry growth have been used in the present study: the growth in the number of establishments (Growth NF) and the growth in the industry value of shipments (Growth VS).

Ideally more industry characteristics should have been used in order to explain profit persistence. Exports and imports have often been found to be related to profitability. Advertising and research and development set up entry barriers for new firms and therefore enable high profits for incumbents over time. At the same time they are a form of nonprice competition that can often lead to lower profitability. Unfortunately these data were available only for the last period (1980-99). They will be discussed in more detail when the results for this period are presented.

While the traditional structure-conduct-performance model emphasizes the role of the industry, the so called "new learning" literature points out the importance of firm characteristics in explaining the variations of firm level profitability.[26]

Market share (MS) is an important determinant of profitability. The higher the market share the higher the expected profitability. The relationship between market share and profitability has often been found to be positive and highly significant.[27] As a proxy for market share the ratio of firm's sales to industry sales has been used.

Another variable that seems to be positively correlated with profitability is the standard deviation of annual rates of return (SDROA). This can be interpreted as the fact that part of the differences in profitability are due to differences in

[26]See S.Martin (1993) for a comprehensive synopsis of the "new learning" literature.

[27]See for example Yurtoglu (2004) and his references.

risk. However this is valid only if markets work competitively, if competition is low the situation could be reversed.

The impact of the growth rate of the firm (Grw) on profitability is not always unambiguous but in general seems to be positive. It can be negative because of agency problems that lead to the growth of the company at the cost of it's profitability. Growth is measured as the growth rate of the company's sales.

In order to control for size the total assets (lnAssets) were included. As in the case of sales growth, the effect of size might be positive or negative. A company might have grown because of its good performance. At the same time the inefficiency of of big companies can lead to a negative relationship between size an profitability.

Table 5 reports the results for industry characteristics, Table 6 presents the results for firm characteristics and Table 7 includes both industry and firm characteristics for each of the four periods analyzed. The first equation explains the impact of the determinants on the long run projected profit rate $\hat{p}_i$ and the second on the speed of adjustment parameter $\hat{\lambda}_i$.

While the industry characteristics analyzed seem to play no role for the period 1950-72, firm characteristics do seem to explain about 7% in the variation of the speed of adjustment parameter $\hat{\lambda}_i$. This seems to be mainly due to the small positive but highly significant impact of the logarithms of assets (Lnassets). Big companies seem to have a higher mean lambda and therefore a higher degree of persistence. The coefficient stays significant when both industry and firm characteristics are added to the regression (Table 7) although it's significance decreases marginally.

In the period 1960-80 the analyzed industry characteristics do seem to play a small role in explaining profit persistence. They explain around 5% in the variation of $\hat{\lambda}_i$ and this is mainly due to the small positive and significant coefficient of the growth in the number of firms. Firms being active in fast growing industries seem to be able to avoid price competition and therefore achieve a higher degree of profit persistence. [28] Firm characteristics explain about 10 % of the variation in $\hat{p}_i$ and about 9% of the variation in $\hat{\lambda}_i$. The volatility of the return on assets seem to influence both profit persistence variables. Companies with a higher volatility in profits (as expressed by the variable STDROA) seem to converge to a lower profit level and seem to reach this level relatively fast. This is in contradiction with risk theory, which states that companies with higher risk (and therefore with higher volatility of profits) should have on average a higher profit level than companies with lower risk. However many companies before exiting the market experience a period of oscillation between positive and negative profits. Therefore the negative coefficients of STDROA might be a result of the increased competition in the period 1960-80 which might have forced many companies out of the market. A firm characteristic that had a positive and significant influence

[28] A similar result was obtained by Kambhampati (1995) and by Coate (1989).

on profit persistence is firm growth (Grw). The faster the firm is able to grow the higher it's ability to sustain profits. Together industry and firm characteristics explain about 16 % of the variation in $\hat{p}_i$ and $\hat{\lambda}_i$ (Table 7) in this period.

In the period 1970-90 neither the industry- nor the firm characteristics analyzed seem to play an important role in explaining profit persistence. One reason could be the fact that in this period profit persistence decreased and reached its lowest level from all periods. Another reason could be the fact that the variables analyzed are not the right ones in order to explain profit persistence in this period. For the intense merger activity of this period for example, unfortunately no data is available. We shall see that in the next period, where the data situation improves, the merger activity plays an important role in explaining profit persistence.

In the last period firm- and industry characteristics together explain more than 22 % of the variation of the long run projected profit rate $\hat{p}_i$ and more than 14 % of the variation of the speed of adjustment parameter $\hat{\lambda}_i$. The effect of the growth in the number of firms is in this period reversed. Industry growth has a negative and significant impact on $\hat{\lambda}_i$ meaning that industries with a higher growth rate have a lower degree of profit persistence. The reason could be more intense competition in these industries. The volatility of profits (STDROA) has also a negative and significant impact on $\hat{p}_i$ meaning that firms with a low volatility converge to higher profit levels. The fact that the volatility of profits has a significant coefficient could also be explained by the more intense merger activity in this period. Therefore the impact of the two merger related variables M1 and Grwass on profit persistence was analyzed.[29] The impact on both profit persistence measures is positive and highly significant (Table 8) meaning that companies that have a more intense merger activity converge to a higher profit level and have a higher degree of profit persistence. Gugler *et. al* (2003) analyze the effects of mergers around the world in the last 15 years and are able to "identify mergers that increase profits by either increasing market power or by increasing efficiency". The present results seem to relate to these type of mergers. For the most recent period also data about the R&D and advertising intensity (Ad) in the industry and about Imports/Exports could be obtained. Their impact on profit persistence is summarized in Table 8 together with the one of the other variables. Advertising has an negative impact on both profit persistence measures while R&D has a small negative but significant impact only on the speed of adjustment parameter $\hat{\lambda}_i$. This can be explained by the fact that R&D and advertising are both forms of nonprice competition. The more intense the competition (and therefore the R&D and advertising activity) the less profit is to be expected. On the other hand R&D and advertising are the basis for product differentiation that could help firms to sustain profits. Obviously in the present sample the competition effect dominates.

[29]The two merger related variables Grwass and M1 were not significantly correlated with one another. Since STDROA is highly correlated with Grwass it was left out of the regression.

Exports (Ex) are goods in which the country has a comparative advantage and if the country succeeds to make product differentiation in world markets they should be associated with higher profitability. On the other hand, exports might be negatively related to profit persistence due to increased fluctuations in internationally open markets. If the main target countries experience a period of downturn, also profitability in the exporting industries could decrease. At the same time exporting industries compete in foreign markets and therefore are subject to increased competition that could decrease their profitability. In order to control for these effects imports (Im) were also included in the regression. While the impact of imports seems to be insignificant, exports have a small negative but highly significant impact on both profit persistence measures. Companies operating in export-intensive industries have a lower degree of profit persistence.

For the last period, when the data situation is improved almost all variables are highly significant. The concentration coefficient (CR) is positive and significant indicating that concentrated industries are able to sustain a higher degree of profit persistence. The growth of the industry (Grws) has now a negative impact proving that industries that grow faster are also subject to more competition and therefore to a lower degree of profit persistence. The market share of the companies (MS) has now a small positive but significant impact. Companies with a higher market share have also a higher the degree of profit persistence. At the same time the larger the company (Ass) and the higher its growth rate of sales (Grw) the stronger its ability to to sustain profits. Together industry- and firm characteristics explain around 90% of the variation of the two profit persistence variables in the last period (Table 8).

Interpreting the results, it can be concluded that while in the first period 1950-72 only firm characteristics played an important role in explaining profit persistence, in 1960-80 both industry- and firm characteristics contributed in explaining it. While in 1950-72 only the size of the company was associated with higher profit persistence, in the next period 1960-80 both industry- and firm growth lead to a higher degree of profit persistence. In this period the volatility of profits was negatively correlated to profit persistence. While in the period 1970-90 industry- and firm characteristics did not seem to play an significant role in explaining profit persistence in the last period they explained about 90% in the variation of both persistence measures. For this period the data situation is very much improved and therefore more variables could be added to the regression. R&D, advertising and exports, being associated with a more intense competition process, have an negative impact on persistence but the two merger related variables (M1 and Grwass) have a positive impact on both the degree of profit persistence and on the projected profit level. While merger activity is often found to result in lower profitability, the present results seem to reflect rather the performance of those companies that have managed to acquire young, profitable companies and to improve their profit performance.

5 Conclusions

The present study analyzes the evolution of the competition process in the US in the second half of the 20th century by dividing the period 1950-99 in four different sub-periods (50-72, 60-80, 70-90, 80-99). This setup allows for companies to enter and exit the analyzed sample and therefore a more clear pattern of competition can be traced than looking just at surviving companies, as most of the previous literature does.

Profit persistence in 1950-72 is considerable but decreases strongly after the opening of the US to international competition in the 60-80s. The intensity of competition increases even more in the next period 1970-90 in order to decrease again marginally in the last one. Still a considerable degree of profit persistence could be found in all four periods.

In explaining profit persistence both industry and firm characteristics have been analyzed. Since the explanatory power of industry dummies is at constant increase from 1950 until 1999 it can be concluded that placing the companies into their market context is crucial to understand profit persistence.

While in the period 1950-72 being a big company seemed to be enough in order to be a successful profitable company, in the next period 1960-80 the ability to grow becomes essential. Fast growing companies operating in fast growing industries not only converge to a higher profit level but also have a high degree of profit persistence. In the period 1970-90 none of the analyzed industry- and firm characteristics seemed to play an important role - nevertheless in the last period, when the data situation improves, almost all variables analyzed have a significant impact on profit persistence. The size of the company and its ability to grow were still important in explaining profit persistence, but in addition to these factors being active in an concentrated industry and having an intense merger activity leading to a higher market share becomes essential for high profitability and high profit persistence.

Table 5: *Regressions Explaining the Estimated Parameters of Equation 1: Industry Characteristics.*

Per.	*Cons.*	*CR*	*NF*	*Grw NF*	*GrwVS*	$\bar{R}^2$
1950-72 (1)	-2.745	0.018	0.000	-0.191	-0.127	0.068
	(-0.532)	(0.310)	(0.462)	(-0.110)	(-0.923)	
(2)	2.968	-0.017	-0.000	0.013	0.0458	0.056
	(1.800)	(-0.939)	(-0.508)	(0.023)	(0.107)	
1960-80 (3)	1.723	-0.032	-0.000	-0.084	1.600	0.032
	(0.857)	(-0.789)	(-1.308)	(-0.061)	(0.954)	
(4)	1.982	-0.014	-0.000	0.717	-0.652	0.053
	(3.709)	(-1.354)	(-0.530)	**(1.947)**	(-1.462)	
1970-90 (5)	-0.110	-0.001	-0.000	0.100	-0.692	0.018
	(-0.051)	(-0.093)	(-0.864)	(0.864)	(-0.868)	
(6)	0.601	0.012	9.701	-0.331	0.106	
	(1.028)	(0.405)	(0.346)	(0.646)	(0.375)	
1980-99 (7)	1.407	0.002	0.000	-0.078	-0.255	0.031
	(0.880)	(0.043)	(0.226)	(-0.037)	(-1.196)	
(8)	0.389	0.013	-0.000	-1.318	0.071	0.072
	(0.630)	(0.851)	(-0.343)	**(-1.938)**	(0.863)	

Dependent variables: Equations (1,3,5,7):$\hat{p}_i$; Equations (2,4,6,8): $\hat{\lambda}_i$. Since the dependent variable is an estimated parameter, all equations are weighted with the inverse of its standard error. Numbers in parentheses are heteroscedasticity consistent t-values.
Industry Variables: CR=concentration ratio, NF=number of firms in the industry,
Grw NF=growth rate of NF, Grw VS=growth rate of the value of shipments in the industry.
All industry variables are averages over the sample period.

Table 6: *Regressions Explaining the Estimated Parameters of Equation 1: Firm Characteristics.*

Per.	*Cons.*	*MS*	*SDROA*	*lnAssets*	*Grw*	$\bar{R}^2$
1950-72 (1)	-3.012	-0.883	0.279	0.228	8.840	0.017
	(-0.890)	(-0.486)	(0.159)	(0.419)	(1.021)	
(2)	-0.201	-0.015	-0.264	0.337	0.971	0.074
	(0.931)	(-0.030)	(-0.548)	**2.250**	(0.408)	
1960-80 (3)	-0.500	0.561	-3.793	0.476	10.042	0.104
	(-0.167)	(0.311)	**(-2.476)**	(1.043)	(1.376)	
(4)	0.855	-0.126	-0.697	0.131	5.610	0.091
	(1.219)	(-0.297)	**(-1.940)**	(0.123)	**(3.278)**	
1970-90 (5)	0.810	-1.997	-0.169	0.235	0.794	0.058
	(0.569)	(-1.765)	(.1.043)	(1.003)	(1.251)	
(6)	0.061	0.535	0.038	-0.034	-0.097	0.033
	(0.145)	(1.607)	(0.801)	(-0.487)	(-0.522)	
1980-99 (7)	5.002	1.058	-0.358	-0.819	0.018	0.035
	(1.091)	(0.388)	**(-1.854)**	(-1.720)	(0.066)	
(8)	0.559	0.272	-0.010	-0.060	0.013	0.026
	(0.711)	(0.581)	(-0.111)	(-0.737)	(1.144)	

Dependent variables: Equations (1,3,5,7): $\hat{p}_i$; Equations (2,4,6,8): $\hat{\lambda}_i$. Since the dependent variable is an estimated parameter, all equations are weighted with the inverse of its standard error. Numbers in parentheses are heteroscedasticity consistent t-values.
Firm Variables: MS=company sales/industry sales, SDROA=Standard deviation of the return on assets, lnAssets=natural logarithm of total assets, Grw=percentage change in Sales. All firm variables are averages over the sample period.

Table 7: *Regressions Explaining the Estimated Parameters of Equation 1: All Characteristics.*

Period	*Cons.*	*CR*	*NF*	*Grw NF*	*GrwVS*	*MS*	*SDROA*	*lnAssets*	*Grw*	$\bar{R}^2$
50-72 1	-0.50	0.01	0.00	-0.19	-0.28	-1.25	0.59	-0.29	1.29	0.02
	(-0.08)	(0.20)	(0.45)	(-0.11)	(-0.20)	(-0.56)	(0.34)	(-0.37)	(0.15)	
2	2.34	-0.03	-0.00	-0.06	0.054	-0.53	-0.03	0.34	0.78	0.06
	(1.17)	(-1.32)	(-0.54)	(-0.11)	(0.12)	(-0.74)	(-0.05)	**(1.98)**	(0.28)	
60-80 3	0.06	-0.04	-0.00	-0.05	1.16	1.51	-3.18	0.12	20.40	0.16
	(0.02)	(-1.03)	(-1.21)	(-0.03)	(0.69)	(0.76)	**(-2.05)**	(0.25)	**(2.47)**	
4	1.00	-0.02	0.00	0.66	-0.61	0.11	-0.42	0.08	6.87	0.16
	(1.11)	(-1.64)	(0.77)	(1.63)	(-1.34)	(0.21)	(-1.02)	(0.60)	**(3.11)**	
70-90 5	0.35	-0.01	-0.00	-0.51	4.04	-2.53	-0.12	0.25	0.34	0.06
	(0.13)	(-0.20)	(-0.47)	(-0.94)	(1.29)	(-1.67)	(-0.58)	(0.76)	(0.29)	
6	0.37	-0.00	-0.00	0.11	-0.88	0.46	0.01	-0.01	-0.06	0.04
	(0.51)	(-0.05)	(-0.64)	(0.71)	(-1.02)	(1.10)	(0.19)	(-0.07)	(-0.18)	
80-99 7	1.92	-0.00	-0.00	-0.62	-0.26	1.15	0.61	0.04	0.01	0.23
	(0.79)	(-0.07)	(-0.188)	(-0.30)	(-1.31)	(0.71)	**(-2.17)**	(0.15)	(0.17)	
8	0.82	0.03	-7.17	-1.66	0.07	0.55	-0.07	-0.18	0.01	0.14
	(0.81)	(1.49)	(-0.15)	**(-1.92)**	(0.08)	(0.81)	(-0.61)	(-1.54)	(1.00)	

Dependent variables: Equations (1,3,5,7): $\hat{p_i}$; Equations (2,4,6,8): $\hat{\lambda_i}$. Since the dependent variable is an estimated parameter, all equations are weighted with the inverse of its standard error. Numbers in parentheses are heteroscedasticity consistent t-values.

Table 8: *Regressions Explaining the Estimated Parameters of Equation 1 for period 1980-99*

	Cons.	*CR*	*NF*	*GrwS*	*R&D*	*Ad*	*Ex*	*Im*	*MS*	*Grw*	*Ass*	*GrwA*	*M1*	R^2
1	7.8	1.4	0.01	-16.3	-0.01	-7.7	-0.01	0.0						0.8
	(7.7)	**(7.5)**	(0.6)	**(-8.8)**	(-1.4)	**(-7.4)**	**(-7.0)**	(0.5)						
2	7.5								1.1	-1.3	1.65	1.3	0.2	0.1
	(1.6)								(0.4)	(-0.9)	**(2.2)**	(0.9)	(1.4)	
3	6.2	0.04	0.0	-5.1	-0.0	-4.6	-0.0	-0.0	4.3	0.3	1.06	2.6	0.3	0.9
	(2.1)	(0.5)	(1.0)	**(-5.4)**	(-0.9)	**(-3.3)**	**(-2.0)**	(-1.1)	**(2.1)**	**(2.8)**	**(3.3)**	**(2.7)**	**(6.2)**	
4	-13.4	0.3	0.00	1.2	-0.0	1.1	0.0	-0.01						0.1
	(-2.0)	**(2.5)**	(0.5)	(0.9)	(-0.63)	(1.5)	(0.5)	(-0.6)						
5	0.7								0.6	0.04	0.1	0.2	0.01	0.1
	(0.9)								(1.2)	(1.0)	(1.0)	(0.7)	(0.04)	
6	-10.8	0.2	0.00	-0.1	-0.01	-1.2	-0.01	0.0	1.5	0.1	0.6	0.9	0.04	0.9
	(-19.8)	**(18.4)**	(0.2)	(-0.6)	**(-15.5)**	**(-4.6)**	**(-6.8)**	(-1.1)	**(4.1)**	**(3.7)**	**(10.6)**	**(5.4)**	**(5.9)**	

Dependent variables: Equations (1-3): $\hat{p_i}$; Equations (4-6): $\hat{\lambda_i}$.Since the dependent variable is an estimated parameter, all equations are weighted with the inverse of its standard error.
Industry Variables: CR=concentration ratio, NF=number of firms in the industry,GrwS=growth rate of the value of shipments in the industry, R&D=Expenditures for research and development in the industry, Ad=Advertising expenditures in the industry.
Company Variables: MS=company sales/industry sales, Ass=natural logarithm of total assets, Grw=percentage change in Sales, GrwA=Growth rate of company's assets, M1=mean merger value/mean assets.
All industry and firm variables are averages over the sample period.
Numbers in parentheses are heteroscedasticity consistent t-values.

A Appendix

Table 9: *Descriptive Statistics for* π_{it}

Sample	*Mean*	*Median*	*Std.Dev.*
1950-72	-0.08	-0.07	0.70
1960-80	-0.07	-0.04	0.98
1970-90	-0.16	0.01	3.27
1980-99	-0.10	0.23	3.00

π_{it} is the relative deviation of the firms return on assets Π_{it} from the economy wide measure $\bar{\Pi}_t$.

Table 10: *Descriptive Statistics for the Firm Characteristics*

Period	*1950-72*			*60-80*			*70-90*			*80-89*		
Variabl.	*Mean*	*Med.*	*StD.*	*Mean*	*Med.*	*StD.*	*Mean*	*Med.*	*StD.*	*Mean*	*Med.*	*StD.*
MS	0.60	0.69	0.39	0.66	0.83	0.37	0.69	0.97	0.38	0.82	1	0.34
SDROA	0.41	0.30	0.43	0.63	0.48	0.50	1.75	1.10	2.64	2.05	1.42	1.91
lnAssets	4.98	4.87	1.37	4.65	4.46	1.59	5.03	4.60	1.88	6.41	6.16	2.00
Growth	0.12	0.10	0.08	0.14	0.12	0.09	032	0.08	0.65	1.62	0.06	13.37

MS=Market Share, SDROA=Volatility of the Profit Rate π_{it}, lnAssets=Size of the Firm, Growth=Growth of firm's Assets.

Table 11: *Descriptive Statistics for the Industry Characteristics*

Period	*Statistics*	*CR4*	*NF*	*GrwNF*	*GrwVS*
50-72	*Mean*	45.05	1113.64	0.47	0.68
	Median	41.35	556	0.13	0.36
	Std. Dev.	19.72	2364.47	0.67	0.85
60-80	*Mean*	41.63	1355.13	0.29	0.53
	Median	38.67	530.06	0.09	0.37
	Std. Dev.	16.87	2906.82	0.56	0.48
70-90	*Mean*	35.85	1638.91	0.28	0.39
	Median	34.13	717.08	0.06	0.34
	Std. Dev.	12.09	2624.89	1.64	0.29
80-99	*Mean*	30.66	16850.62	0.08	1.17
	Median	27.78	2203	0.05	0.41
	Std. Dev.	15.49	46581.39	0.23	2.48

CR4=Percentage of industry output produced by the largest 4 firms in the industry,
NF=The number of firms classified in the industry, VS=Value of Shipments classified in the industry.

Acknowledgements

The author is indebted to Dennis C. Mueller, Jesus Crespo-Cuaresma and to Burcin Yurtoglu for very helpful comments and suggestions on earlier drafts of this paper.

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