

# PROFITABILITY DIFFERENCES, MARKET POWER AND COMPETITION POLICY IN TRANSITION COUNTRIES

## AN OVERVIEW OF METHODOLOGY AND ECONOMETRIC MODELS OF MARKET POWER AND CONCENTRATION\*)

Karl Aiginger<sup>\*\*)</sup>, Michael Pfaffermayr<sup>\*\*\*)</sup>

### Abstract:

This study intends to offer very short remarks on the competition policy in transition countries, indicating the progress made and the problems coming up in a second stage of liberalisation. As examples for more comprehensive studies on this topics we want to refer to Fingleton et al. (1995) and the literature cited there and to European Economy (3/1997). Our methodological contribution asks what we can learn from empirical industrial economics for competition policy, which continues to refer to concentration measures as indication of market power. For competition policy reference to market concentration is not sufficient, however. The height of entry barriers, potential competition, predation, foreclosure, etc. form important additional aspects.

Competition policy is that tool of public policy that facilitates the creation and growth of efficient and effective firms. In this broader sense competition policy includes measures to open markets to foreign competition, to set pro-competitive rules in sectors of natural monopoly, to curb subsidies, to stimulate capital markets and finally the tools of a more narrow type of competition policy, sometimes referred to as antitrust policy. This narrow defined competition policy incorporates restrictive practices by firms like explicit or implicit cartels, predation, foreclosure, vertical restraint, refusal to deal, abuse of market power and merger control. The transition countries in principle follow the international rules of competition policy, those created by the international bodies (Uruguay Round, World Trade Organisation) as well as those set by the European Union.

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However, differences exist in the economic systems inherited from the socialist system, arguments for a more resp. a less stringent competition policy exist for transition countries, and the rules as well its use change over time and across countries as it does in the individual countries of the European Union.

The legal framework for competition policy has been uncontroversial in the beginning, let us say in the time where monopolies were still dominating the transition economies. Restructuring at that time meant that the large combines were divided, viable parts were formed into new firms, concentration decreased. In the middle of the nineties the case emerges, that firms which had been separated plan to merge. Up to now nearly all mergers had been approved, most without any restriction. The question arises if this can be the case if the number of attempted mergers increases and concentration may start to increase again, as it often happens after a deconcentration phase in the first stage of liberalisation. The test will come whether and to which degree the competition authorities will be able to set the rules and how special interest will interfere. The old discussion between allocative efficiency and the possible productivity advantages of large firms will come up, as well as the defence that international competition and globalisation need strong firms. There are at least three arguments additional to those in EU countries supporting a strict competition policy in transition countries: the market for corporate control is still underdeveloped, secondly foreign competition is limited by hidden barriers and by differences in income and taste, and thirdly concentration is still high and small firms entry does not provide enough competition.

The measurement of market power and the explanation of differences of firms and industries in terms of market concentration is a seminal topic in industrial organisation. Competition policy aims at establishing open, competitive markets taking high market concentration as indication of market power. In particular, highly concentrated industries are monitored more closely by antitrust authorities, decisions on mergers likewise are based on this criterion. Myriads of papers (see Schmalensee, 1989, for a survey) are available on the relation between concentration and profits. A variety of additional variables determining profitability are tested to explain profit differences across firms and industries including entry barriers (to measure potential competition) as well as product differentiation. Empirical models mainly have been based on the structure conduct performance paradigm which is formalised in the conjectural variation model. Cross section industry data at various levels of aggregation usually formed the database for testing the structure conduct performance paradigm. In the last decade the number of studies decreased due to the rising critique against cross section studies and maybe also due to the process of integration and internationalisation which decreased the interest and importance of concentration as measured on a national market. The main critique, however, concerns the lack of game theoretical foundation of the CV model. CV models do not consider the strategic interaction among competing firms, but envisages an adjustment process which would never be followed by profit maximising firms.

Industrial organisation reacted in several ways all with the aim of a more sound game theoretic foundation for the analysis of competition in oligopolistic markets. Bresnahan (1981) derives consistent conjectures by analysing rational reaction patterns. The supergame literature (confer Martin, 1993, for an overview) investigates the conditions for implicit collusion. There are arguments that the traditional CV model can be interpreted as reduced form of a supergame (or dynamic differential game with adjustment costs) summarising the strategic interaction represented by the "best collusive response" relationship in the CV parameter (Dockner, 1992, Cabral, 1995 and Pfaffermayr, 1997). Yet another approach has been to concentrate on specific markets and model strategic interaction by specific multi stage games including entry and exit. Sutton (1990) argues that the main road of theoretical and empirical research in industrial organisation and competition policy should be the search for robust results which can be derived in wide class of games. This leads him to the important distinction between exogenous and endogenous sunk costs as determinants of market structure and profitability (Sutton, 1992). With endogenous sunk costs, his models imply a breakdown of the inverse relationship between concentration and market size in entry games as firms bear a higher level of endogenous sunk costs the larger the markets and thereby endogenously raise entry barriers for new firms.

On the empirical side, there are several problems with the old cross section approach. Maybe the most important is that concentration is endogenous. There is feedback from profits to concentration at least in two ways. First the basic equation is an equilibrium relationship derived from the conditions of profit maximisation. The exogenous variables are the unit costs, the price elasticity of demand and in the short run the number of firms which determine both profitability and concentration. At the industry level, in a CV model the existence of low cost firms implies both, higher average profits and higher concentration as these firms capture a higher market share. As Scherer, Ross (1990) have put it: "However, recent work has demonstrated that most, if not all, of the correlation between profitability and concentration found by Bain [and his successors, MP], was almost surely spurious - the result of aggregating a positive relationship between sellers' market share and profitability to the industry level. This finding complicates the evaluation of the structure conduct performance paradigm, because, as we will see below, it is consistent with several alternative explanations of firm behaviour and industrial performance". Secondly, in long run we should observe entry in profitable industries reducing the degree of concentration. Therefore, in estimating the profitability concentration relationship proper instrumentation, or even better, a structural model (Schmalensee, 1989) is essential. Additionally, cross section studies have the drawback that they assume that firms are in equilibrium in the sense they hold their profit maximising position and do not adjust to a new long run equilibrium with temporary deviations from this path.

The alternative to the old cross section studies over a broad range of industries became to focus on very narrow markets to exploit the variability of price and output data over time. This fashion was labelled as New Empirical Industrial Organisation by Bresnahan (1989) and has undoubtedly

some merits. Among the shortcomings is, that if we are interested in the question of profit differences which persist across industries, it does not help to focus on a few extremely narrow markets. Surveys about NEIO studies which try to compare the results for example by tabulating the "degree of conjectural variation" are available (Bresnahan, 1989, Aiginger, Brandner, Wüger, 1995), but restricted to some randomly chosen industries and the techniques used (the equations, exogenous variables, time, country) are so different that we can not really draw conclusions about intersectoral differences. Furthermore, this approach again is based on the old structure conduct performance paradigm and does not overcome its weaknesses.

Yet another alternative is to apply panel analysis on a set of 3 digit industries or firm data. 3 digit industries are still more aggregated than the markets, that the industrial organisation expert ideally wants to analyse and can only be viewed as a rough approximation of the relevant market. Panel data analysis has primarily two advantages: it allows to correct for latent variables and it enables us to exploit simultaneously cross section and time series information to get more accurate parameter estimates. Furthermore, from the time dimension we can learn more about the dynamic behaviour of profits over time. Both objectives seem to be extremely necessary according to past research. Profit persistence is an important stylised fact (Mueller, 1986, Geroski, Jacquemin, 1988, Mueller, 1990). We cannot maintain that annual data reflect equilibrium positions (as is done in cross section and in time series research). Furthermore, the degree of explanatory power of the proposed economic determinants (excluding past profits and capital intensity) is usually very small.

Concentrating on robust results in a wide class of games the endogenous sunk cost approach of Sutton (1992) leads to extreme bound analysis. In this type of studies lower bounds in the relationship between concentration and market size (profits) are estimated. This strand of empirical studies is not referred to in the methodological overview, as it concentrates on the use of traditional structure conduct performance framework, which still forms the basis of competition policy.

## I. Introduction

Competition policy is that tool of public policy that facilitates the creation and growth of efficient and effective firms. In this broader sense competition policy includes measures to open markets to foreign competition, to set pro-competitive rules in sectors of natural monopoly, to curb subsidies, to stimulate capital markets and finally the tools of a more narrow type of competition policy, sometimes referred to as antitrust policy. This narrow defined competition policy incorporates restrictive practices by firms like explicit or implicit cartels, predation, foreclosure, vertical restraint, refusal to deal, abuse of market power and merger control. The transition countries in principle follow the international rules of competition policy, those created by the international bodies (Uruguay Round, World Trade Organisation) as well as those set by the European Union. However, differences exist in the economic systems inherited from the socialist system, arguments for a more resp. a less stringent competition policy exist for transition countries, and the rules as well its use change over time and across countries as it does in the individual countries of the European Union.

The measurement of market power and the explanation of differences of firms and industries in terms of market concentration is a seminal topic in industrial organisation. Competition policy aims at establishing open, competitive markets taking high market concentration as indication of market power. In particular, highly concentrated industries are monitored more closely by antitrust authorities, decisions on mergers likewise are based on this criterion. Myriads of papers (see Schmalensee, 1989 for a survey) are available on the relation between concentration and profits. A variety of additional variables determining profitability are tested to explain profit differences across firms and industries including entry barriers (to measure potential competition) as well as product differentiation. Empirical models mainly have been based on the structure conduct performance paradigm which is formalised in the conjectural variation model. Cross section industry data at various levels of aggregation usually formed the database for testing the structure conduct performance paradigm. In the last decade the number of studies decreased due to the rising critique against cross section studies and maybe also due to the process of integration and internationalisation which decreased the interest and importance of concentration as measured on a national market. The main critique, however, concerns the lack of game theoretical foundation of the CV model. CV models do not consider the strategic interaction among competing firms, but envisages an adjustment process which would never be followed by profit maximising firms.

Industrial organisation reacted in several ways all with the aim of a more sound game theoretic foundation for the analysis of competition in oligopolistic markets. Bresnahan (1981) derives consistent conjectures by analysing rational reaction patterns. The supergame literature (confer Martin, 1993, for an overview) investigates the conditions for implicit collusion. There are arguments that the traditional CV model can be interpreted as reduced form of a supergame (or dynamic differential game with adjustment costs) summarising the strategic interaction represented

by the "best collusive response" relationship in the CV parameter (Dockner, 1992, Cabral, 1995 and Pfaffermayr, 1997). Yet another approach has been to concentrate on specific markets and model strategic interaction by specific multi stage games including entry and exit. Sutton (1990) argues that the main road of theoretical and empirical research in industrial organisation and competition policy should be the search for robust results which can be derived in wide class of games. This leads him to the important distinction between exogenous and endogenous sunk costs as determinants of market structure and profitability (Sutton, 1993). With endogenous sunk costs, his models imply a breakdown of the inverse relationship between concentration and market size in entry games as firms bear a higher level of endogenous sunk costs the larger the markets and thereby endogenously raise entry barriers for new firms.

On the empirical side, there are several problems with the old cross section approach. Maybe the most important is that concentration is endogenous. There is feedback from profits to concentration at least in two ways. First the basic equation is an equilibrium relationship derived from the conditions of profit maximisation. The exogenous variables are the unit costs, the price elasticity of demand and in the short run the number of firms which determine both profitability and concentration. At the industry level, in a CV model the existence of low cost firms implies both, higher average profits and higher concentration as these firms capture a higher market share. As Scherer, Ross (1990) have put it: "However, recent work has demonstrated that most, if not all, of the correlation between profitability and concentration found by Bain [and his successors, MP], was almost surely spurious - the result of aggregating a positive relationship between sellers' market share and profitability to the industry level. This finding complicates the evaluation of the structure conduct performance paradigm, because, as we will see below, it is consistent with several alternative explanations of firm behaviour and industrial performance". Secondly, in long run we should observe entry in profitable industries reducing the degree of concentration. Therefore, in estimating the profitability concentration relationship proper instrumentation, or even better, a structural model (Schmalensee, 1989) is essential. Additionally, cross section studies have the drawback that they assume that firms are in equilibrium in the sense they hold their profit maximising position and do not adjust to a new long run equilibrium with temporary deviations from this path.

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intersectoral differences. Furthermore, this approach again is based on the old structure conduct performance paradigm and does not overcome its weaknesses.

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The following chapters intend to offer very short remarks on the competition policy in transition countries, indicating the progress made and the problems coming up in a second stage of liberalisation. As examples for more comprehensive studies on this topics we want to refer to Fingleton et al. (1995) and the literature cited there and to European Economy (3/1997). Our contribution is also a methodological one. From empirical industrial economics a lot can be learned for competition policy, which continues to refer to concentration measures as indication of market power. For competition policy reference to market concentration is not sufficient, however. The height of entry barriers, potential competition, predation, foreclosure, etc. form an important additional aspects.

## **2. Theoretical foundations of the profitability concentration relationship**

### **2.1 The conjectural variations model and its extensions**

The structure conduct performance paradigm holds that structure affects conduct which in turn determines ultimate performance (Scherer, Ross, 1990). It was pioneered by Bain (1951, 1956)

who found that concentrated industries exhibit higher average profit rates and, more generally, that industry performance is positively correlated with concentration and a subjective estimate of the height of entry barriers. Since then hundreds of studies were conducted in this field. The basic hypothesis underlying competition policy aiming at trade liberalisation and removing of entry barriers as well as antitrust regulations like merger approvals, removal of entry barriers, forbidding price fixing in vertical relations etc. is that the welfare loss arising from misuse of market power is higher and more likely in concentrated industries. Formally, the structure conduct performance paradigm and its empirical counterparts usually have been modelled by simple conjectural variations models. It serves as basis for the calculation of the welfare loss of monopoly (Cowling, Mueller, 1978, 1981, Aiginger, Pfaffermayr, 1997A). As a starting point, it is useful to discuss this model in more detail, especially its extensions and limitations (concerning both the lack of game theoretical foundations and the interpretation empirical studies). Assume an industry with a given number of firms ( $N$ ) facing demand for a homogenous product given by  $p(Q)$  with price elasticity  $\varepsilon$  and  $Q = \sum_{i=1}^N q_i$ . Firms are assumed to produce at constant, but different marginal (and average) costs  $c_i = \frac{wL_i + p^M M_i + \gamma^K K_i}{q_i}$  using intermediates, labour, and capital as inputs (in obvious notation; note  $\gamma$  represents user costs of capital). To model interaction among firms conjectural elasticities  $\lambda = \frac{d \log q_j}{d \log q_i}$ , constant for all firms are introduced.  $\lambda$  summarises the expected reaction of a rival firm a particular firm conjectures if it increases its output by 1%. With these assumptions profit maximisation of firm  $i$  leads to the following first order condition - the well known Cowling-Watson equation (Cowling, Waterson, 1976). It serves as the basic specification in econometric studies on profitability and concentration. Denoting the market share of firm  $i$  by  $s_i = \frac{q_i}{Q}$  we have

$$(1) \quad \frac{\partial \Pi_i}{\partial q_i} = p + p' \left( 1 + \sum_{j \neq i} \frac{\partial q_j}{\partial q_i} \right) q_i - c_i = p + p' Q \left( \frac{q_i}{Q} + \sum_{j \neq i} \frac{\partial q_j}{\partial q_i} \frac{q_j}{Q} \right) - c_i = p + p' Q (s_i + \lambda (1 - s_i)) - c_i = 0$$

or

$$(1') \quad \frac{p - c_i}{p} = \frac{\lambda + s_i (1 - \lambda)}{\varepsilon}$$

Equation (1) is an equilibrium relationship, thus prices and market share are endogenously determined by marginal costs, the elasticity of demand, the number of firms and the intensity of competition as measured by the conjectural variations parameter  $\lambda$ . Aggregation of (1') over all firms using their market shares as weights gives an equivalent equation at the industry level. Note that from a theoretical point of view, the Herfindahl-Hirschman Index is the proper measure of market concentration.



$$(2) \quad \frac{p - \bar{c}}{p} = \frac{\lambda + H(1 - \lambda)}{\varepsilon} \text{ with } \bar{c} = \sum_{i=1}^N c_i s_i \text{ and } H \text{ the Herfindahl}$$

The main advantage of this approach for empirical research lies in the fact that it covers the whole range in the spectrum of possible conduct - from tough Bertrand competition ( $\lambda = -\frac{H}{1-H}$ ) to joint profit maximisation in a cartel ( $\lambda = 1$ ) with Cournot Competition in between ( $\lambda = 0$ ).

Empirically, profits are usually measured as price cost margins in a gross concept deducting labour and material costs from sales but not user costs of capital. This gives the following econometric specification:

$$(2) \quad \frac{pQ - wL - p^M M}{pQ} = \frac{\lambda + H(1 - \lambda)}{\varepsilon} + \gamma \frac{p^K K}{pQ}$$

Note that this simple version of the CV model is restrictive in several ways. It assumes equal user cost of capital across firms. If this assumption does not hold, the parameter  $\gamma$  has to be interpreted as capital share weighted average (Martin, 1993, p. 499). Another important restriction is the assumption of equal conjectural elasticities across industries and firms as well as constant marginal costs or economies of scale: Introducing  $FC_i = \frac{AC_i}{MC_i}$  and using  $\frac{p - AC_i}{p} = 1 - \frac{AC_i}{FC_i p}$  or  $\frac{AC_i}{p} = FC_i \left[ 1 - \frac{p - MC_i}{p} \right]$  we get a generalisation for increasing returns to scale (Martin, 1993).

$$(3) \quad \frac{pq_i - AC_i}{pq_i} = \frac{pq_i - wL - p^M M}{pq_i} = 1 - FC_i + FC_i \frac{\lambda + s_i(1 - \lambda)}{\varepsilon} + \gamma \frac{p^K K}{PQ}$$

instead of (1'). Since  $\frac{\partial}{\partial FC_i} \frac{pq_i - AC_i}{pq_i} = \frac{\lambda + s_i(1 - \lambda)}{\varepsilon} - 1 = -\frac{MC_i}{p} < 0$ , an increase in returns to scale reduces the firm's price cost margin, all else equal. If returns to scale are increasing, a profit maximising firm increases output to drive average costs down. With a downward sloping residual demand curve higher output means lower prices and thus a lower price cost margin. This does not imply that decrease in overall profits, rather the reduction in average costs is sufficient to bring an increase in overall profits (Martin, 1993). The problems for empirical estimation are obvious. Either one has to estimate a non linear relationship introducing the function coefficient ( $FC_i$ ) as additional variable or one estimates the traditional Cowling-Watson equation, using the function coefficient as outside information to calibrate equation (3). In any case, "If returns to scale are not constant, one must be able to say something on about the function coefficient to test for market power". (Martin, 1993). Principally, (3) can also be aggregated over firms using market shares as weights. Interpretation and estimation are not straight forward anymore, however. A generalised measure of concentration which accounts for economies of scale has to be introduced.

Other extensions of the basic model include product differentiation, advertising expenditures, taxes, capital structure, growing markets and risk of bankruptcy, etc. Most of these issues imply the introduction of a properly specified variable without changing the basic structure of the model (Schmalensee, 1989, Martin, 1993), but mainly raising issues of measurement. The most important generalisation in empirical work seems to be the introduction of imports as national markets, today are a too narrow concept. Most of the larger firms produce and sell in more than one country, specifically within the European Union. The concentration measures for a single country have to be corrected for imports which is done by premultiplying with  $1 - \frac{IMP}{Q}$  (Salinger, 1990). Exports on the other hand should be deducted from sales in calculating profit margins and market shares or introduced as a control variable. The main assumption behind this approach is that markets are segmented by nationality which seems to be a reasonable approximation given the still existing differences in institutional characteristics across countries. There exist also other approaches to incorporate trade (Jacquemin, 1982). For example, exporting firms could be modelled as competitive fringe. In this case, the CV model has to be formulated with concentration defined on domestic firms, but augmented by the import penetration ratio. Exports may also have feedback effects on home market performance. For example, firms may be price takers in foreign markets (with perfect elastic demand), but hold a dominant position at home. The level of export is then determined by the level of world prices together with domestic costs and capacity. If domestic firms are able to price discriminate (i.e. prevent re-exportation) domestic allocative efficiency could be distorted as it may pay for domestic firms to restrict output in the home market. For this reason trade liberalisation can amplify the consequences of a failure to implement an adequate competition policy (European Economy, 1997).

The CV model has been heavily criticised for lack of game theoretic foundation. Conjectures are defined as the belief of a firm how the other firms will react as a response on the extension of its own output. But this belief is only correct if conjectures are consistent with optimal response in equilibrium (Bresnahan, 1981). Furthermore, theoretical industrial economists tend to be critical of conjectural variation models of oligopoly because conjectural equilibria cover the whole range of market outcomes from perfect competition to monopoly. Thus parallels the multiplicity of equilibria in game theoretic models of oligopoly. This wide range of possible equilibria shrinks if one imposes some sort of consistency requirements, but notions of consistency are often not satisfactory. From an empirical point of view, the fact that CV models can capture the whole range of outcomes are very valuable. There is every reason to think that oligopolies in different markets interact in different ways, and it is useful to have models that capture a wide range of interactions (Martin, 1993, p. 30).

The shortcomings of the CV model are not as severe as it seems from a static point of view. Following Dockner (1992), Cabral (1995) and Pfaffermayr (1997) CV models may be seen as static representation of a dynamic game. To give a simple illustration assume a market with two firms that produce with constant unit costs  $c$  and, for simplicity, assume linear demand with

$p = 1 - Q$ ,  $Q = q_1 + q_2$ . (A more general analysis including  $N$  firms, product differentiation, growing market size, the possibility of bankruptcy and optimal punishments in the sense of Abreu (1988) is given in Pfaffermayr, 1999). Defining the CV parameter in absolute terms for convenience ( $\phi = \frac{\partial q_i}{\partial q_j}$ ), we have the following first order condition for the CV model.

$$(5) \quad q_i = \frac{1-c-q_j}{2+\phi}, \quad i = 1, 2$$

On the other hand, assume that the firms play a supergame using grim trigger strategies. That means firms produce quantity  $q_i^*$  in every period in case of collusion and revert to the static Bertrand game with zero profits once one of the firms deviates from this collusive output level. No firm will deviate if it gains more from collusion than from a one period deviation with zero profits due to the adaptation of punishment strategies thereafter. The present discounted value in period

0 in case of collusion for firm 1 amounts to  $\sum_{t=0}^{\infty} \theta^t \Pi^1(q_1^*, q_2^*) = \frac{1}{1-\theta} \Pi^1(q_1^*, q_2^*)$ . The profits from

deviation in the current period is given by the optimal response to  $q_2^*$ :  $\Pi^1(q_1^D, q_2^*) = \frac{1}{4}(1-c-q_2^*)^2$ .

Profits are zero from then onwards.  $\theta$  denotes the discount factor. Collusion is sustainable if the present discount value of the collusive profits outweighs the profits from a one period deviation. Thus firm 1 (and the same holds for firm 2) will not deviate if

$$(6) \quad \Pi^1(q_1^D, q_2^*) \leq \frac{1}{1-\theta} \Pi^1(q_1^*, q_2^*) \text{ or}$$

$$(6') \quad \frac{1}{4}(1-c-q_2^*)^2 - \frac{1}{1-\theta}(1-c-q_2^*-q_1^*)q_1^* \leq 0$$

As known from the folk theorem, there are many subgame perfect equilibria in this supergame. It seems reasonable, however, that firms settle at an "optimal" equilibrium<sup>†</sup>. That means each firm produces the highest quantity, which does not trigger punishment by the other firm and which maximises total industry profits. If the discount factor is sufficiently small so that joint profit maximisation is not sustainable, but not too small so that it does not pay to deviate we get a collusive equilibrium obeying restriction (6). It lies in the intermediate range between joint profit maximisation and Cournot competition as the CV model with positive conjectures does. Cabral (1995) demonstrates for a similar game that for optimal equilibria, which maximise joint profits under the restriction (6') (i.e. deviation is not profitable) inequality (6) is binding. In this case this restriction defines "the best collusive response" as a firm produces the highest output which does not trigger retaliation, given the collusive output of the other firms. Especially, we can interpret the

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<sup>†</sup> Note that this equilibrium is not optimal in a general sense, since the punishment strategies are not optimal in the sense of Abreu (1988).

CV model as a reduced form representing the "best collusive response" of the underlying more complex dynamic game. There exists a one to one correspondence between the supergame and CV model with identical solutions and the same comparative statics. Solving (6') for  $q_1^*$ , taking the lower root because of the requirement of optimality, one gets

$$(7) \quad q_1^* = (1 - c - q_2^*) \frac{1 - \sqrt{\phi}}{2}$$

so that the first order condition of the CV model and the "best collusive response" coincide if and only if

$$(8) \quad \phi = \frac{2\sqrt{\theta}}{1 - \sqrt{\theta}}$$

Condition (8) is simple and instructive: It states that the CV parameter will be higher and thus the CV equilibrium will be more collusive the higher firms value future profits as measured by the discount factor. The CV parameter, therefore, summarises an important characteristic of the supergame and it is itself explained by the underlying parameters of the supergame. Depending on the discount factor the CV parameter covers the whole range from Cournot competition to joint profit maximisation. In this simple model firms will play Cournot if they don't value future profits at all ( $\theta = 0$ ) and will collude on output levels higher than that of joint profit maximising quantities if  $0 < \theta < \frac{1}{9}$ . For values of  $\theta$  above  $\frac{1}{9}$  firms never deviate so that condition (6) does not form any restriction and firms just maximise joint industry profits.

Of course the model is much too simple to be empirically implemented. However, this result carries over to more richer and general models with more elaborate punishing strategies (Pfaffermayr, 1999). For example, it is possible to introduce a price setting supergame in a differentiated product market with heterogeneous firms. In this more general framework it can be shown - again using a linear oligopoly - that the CV parameter is higher (i) the larger the discount factor proper, (ii) the higher the growth of profits (i.e. the faster each firms' market grows), (iii) the lower the risk of bankruptcy and (iv) the higher degree of product differentiation<sup>‡</sup>. So several additional hypotheses about the degree of collusion as measured by the CV parameter can be derived. The draw back for empirical implementations is that the CV parameter derived from the supergame in differentiated products is non linear in general once optimal punishments are introduced. This implies that the corresponding "best collusive response" depends on the considered Nash equilibrium of the supergame. The CV parameter, therefore, is firm specific. This raises some doubts on the aggregation to industry level and the pooling assumption of panel models.

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<sup>‡</sup> This finding, however, depends on the way the supergame and product differentiation is modelled.

## 2.2 Market power vs. efficiency, cost differences and competition

The assertion of a positive relationship between profitability and concentration as an indication of market power is not generally accepted. The Chicago school, most prominently Demsetz (1973, 1974) argues, that it may reflect differences in the efficiency of firms. The basic assumption is that efficient firms face capacity constraints so that low cost firms are not able to capture the whole market and to shake out the inefficient firms in a tough competitive environment. If large firms have higher profits but small firm do not, the efficiency school argues, a positive correlation between profitability and market concentration reflects superior efficiency of the large firms. Demsetz (1973) states: "Profits do not arise because firms create "artificial scarcity" through a reduction in output. Nor does it arise because of collusion. Superior performance can be attributed to the combination of great uncertainty and plus luck or analytical insight by the management of a firm". The argumentation of the Chicago school is extreme. It views markets competitive and in long run equilibrium with firms, large and small ones, acting as price takers with no attempt to restrict output or exert market power. In this regime low cost firms earn accounting profits, economically rents, due to superior efficiency. These cannot be counted as economic profits and thus as a welfare loss. If, furthermore, low cost firms hold higher capacities than high cost firms, at the industry level we observe higher concentration *and* higher average market share weighted profitability. Note that this also implies that the marginal firm, which operates with highest costs, earns no profits in equilibrium under constant marginal costs.

The contrasting view - which seems to be the consensus in modern industrial economics and in competition policy - assumes that low cost firms principally could supply a larger share of the market, but restrict their output in exercising market power. High cost firms may be either price taking fringe firms or also exert some form of market power. In this setting low cost firms also earn accounting profits. But it is not an efficiency rent but economic profit, so it induces a welfare loss. The main difference lies in the assumption on capacity constraints. In the competitive environment of Demsetz the low cost firm will exhaust all its capacity and is not able to drive high cost firms out of the market. In the alternative scenario the high cost firms would be able to supply a larger share of the market, but it doesn't in order to preserve high prices. In this way low cost firms create niches for less efficient firms. This approach also predicts a positive relationship between average profits and concentration. But now the reason is the exercise of market power with the usual consequence of the demand side dead weight loss.

The efficiency interpretation of the Chicago School envisages a regime of perfect competition with a unique price, that is products are standardised. If products are horizontally or vertically differentiated, things change considerably as *all* firms are able to exert some form of market power. The positive relationship between profitability and the degree of product differentiation found in oligopoly models as well as in a variety of empirical studies support this view.

For competition policy the long run persistence of profits is the all important indication of market power and the resulting welfare losses. Oligopolistic competition is a dynamic process involving innovation and adaptation of new technology, entry and survival of firms. Especially accounting profits are affected by transitory factors and short run disequilibrium dynamics. In the short run high concentration may not be a proper indication of market power if incumbent firms face the threat of new entry or imitation. Mueller et al. (1990) argue that the long run or permanent profits form the proper concept. Intervention of competition policy to reduce the welfare loss from oligopolistic co-ordination should be based on the notion whether in the long run profits are persistently over the competitive level and whether market forces suffice to induce the fast adjustment to this long run competitive level. "That is, the persistence of profits reflects both the strength of competition as a process that drives profits towards their long run equilibrium and the extent to which these long run values differ from zero." (Mueller et al., 1990). From a dynamic point of view, both permanent long run profits and the speed of adjustment to this level reveal important information on market power for competition policy.

Long run profits depend on unobservable potential entry and are not directly observable. They have to be derived from an econometric model that is able to distinguish between short and long run effects of various exogenous factors (e.g. that suggested by the structure conduct performance paradigm). The speed of adjustment can be measured by the autocorrelation of profits in subsequent periods. In the persistency literature, a careful distinction is drawn between business cycle effects affecting all firms in the same way by correcting for overall mean.

The presence of persistent profit differences in the absence of capacity constraints suggests, furthermore, that output is produced by high cost firms which could have been produced by low cost firms in a competitive environment. Cost differences, therefore, form a second component of the welfare loss of oligopoly (Dixit, Stern, 1982, Daskin, 1991, Aiginger, Pfaffermayr, 1997A). Empirically, it turns out that the cost side welfare loss is far more important than the dead-weight loss triangle. The claim that all cost differences form a welfare loss cannot be generalised to all product markets and has to be modified in several ways. There are alternatives to explain persistent cost differences, which do not involve oligopolistic co-ordination, each of them consisting of various strands of literature. One alternative is to interpret cost differences as innovation premia or to maintain that innovation is a complex process so that firms differ substantially in their ability to adopt a new technology, or to claim that imitating firms may even have to go through many of the same design and development activities as the innovator. The first part of this explanation may be called Schumpeterian explanation, the second and third come from Nelson (Nelson, 1991). An alternative explanation is to focus on managerial skills or that the low cost firm owns specific intangible assets which cannot be copied by others. Examples for such rents range from a location on a specific river (implying optimal transport and low energy costs) to superior management capacity. But the theory in the last years has shown that rents can and will be transformed into costs, if the competition is tough and not softened by government or firm

strategies. The most excellent manager will be lured by other firms and/or can charge a salary (from the old firm or the new one) up to the value of his specific knowledge. The management culture of an excellent firm (e.g. Toyota) could be analysed by the competitors and eventually be copied by less efficient firms; the excellent firm could open new plants or initiate joint ventures. The cheap energy at a specific location can be used in alternative production so that the price is driven up. All these strategies blur the old distinction between rents and costs<sup>§)</sup>.

On the other hand, if we maintain that these sources of cost differences are persistent, the question remains as to why the low cost firm does not capture the entire market. With unlimited capacity, it could price its product slightly below the costs of the next best firm. Limits in capacity exist however, diseconomies of scale or the fear of antitrust could play a role. This leads to the question which model of competition and which model of oligopoly is consistent with persistent cost differences and a stable pattern of market shares (without giving up profit maximisation). In the standard model of competition with many firms, freely available technology and free entry all firms have the same cost curves and produce at the same point. But there are also models where firms have different, upward sloping marginal cost curves and price at marginal costs. The marginal firm has zero profit, the non marginal firms have positive profits. This is not the standard type, but a "price taking plus heterogeneity type". But entry is not free and technology is private, so its long run persistence has to be questioned (and the difference in the average costs may be considered as a welfare loss). In the long run the question of entry arises and why firms do not use the best technology. A plausible story could be told in a supergame setting. After an oligopoly has been established by some historical reasons (a collusive price has been agreed upon), in which costs are different across firms, each firm could increase short or medium term profits by switching to the best technology, but this would endanger the stability of the system. If all firms switch to the best technology a Bertrand or Cournot non co-operative game might be played. This is of course only one possible story, but it shows that it could be individually profitable not to use the best technology, while this would be beneficial from the society's point of view<sup>\*\*)</sup>.

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<sup>§)</sup> The stylised fact that real world profit differences are large and persistent has led to the foundation of a new field in economics ("strategy" or "strategic management", whose research question asks why profits can differ within an industry over a longer time). Its development nicely shows the thesis and antithesis in this discussion: on the one hand there is something different between successful firms and the average (otherwise the profit differences would not persist), but on the other hand, there is no reason why this difference if known, should not be copied rapidly in a tough market. See Barney (1986), Peteraf (1993), Ghemawat (1991).

<sup>\*\*)</sup> Traditional pre-game theoretic game theory stressed that collusion is more difficult to organise, if firms have different costs. This prediction is no objection against the supergame story, since the supergame refers to the incentives to destabilise an existing collusion scheme, however firms agreed on the starting point of the scheme (the candidate equilibrium). Another story could be transaction cost based, firms do not switch to the low cost technique because transaction costs are high. The welfare evaluation of this depends then on the exact type of the transaction cost, if the main part is due to mobility barriers, government regulation, red tape, managerial slack we would be inclined to assess them as loss, if transaction costs are of the more objective type like delivery lags, uncertainty etc., then there is no feasible alternative to reduce cost differences and we would not speak of a loss to society.

### **3. Research trends in the profitability area**

#### **3.1 Measurement issues**

At firm level, usually balance sheet data are used to derive profits for estimating CV models. At the industry level data on three or four digit level from official statistics are more or less standard. National markets seem today to be a too narrow concept; most of the larger firms produce and sell in more than one country, especially within the area of the European Union. As mentioned above, it is therefore important to account for exports and imports (Salinger, 1990).

A sensitive task is defining a proper measure of profits. Economic profit is the surplus of revenue over costs including user costs of capital. Many studies define costs as the sum of expenditures on material, wages and interest, and divide these expenses into sales to calculate unit costs. This gives a gross concept of the margin (the difference between sales and costs is divided by the sales) neglecting the opportunity cost of equity, as well as depreciation. While this is not the only approach used in the literature, it is a quite common starting point. The CV model suggest to introduce capital intensity as right hand side variable to control for this.

There has been a long debate whether accounting data can be used for empirical research in industrial economics as they require special knowledge on reporting behaviour and accounting standards (Benston, 1982). Fisher, McGowan (1983) and Fisher (1987) argue that the only measure of market power is the internal rate of return on invested capital. This is difficult to calculate and can be approximated by the accounting rate of return only under very restrictive assumptions. If we take this critique serious empirical work on profitability and market power seems to be impossible. The consensus among industrial economists, however, tends to be less pessimistic and views the extreme point of view misleading in several ways (Martin, 1993). The basic question is how accounting rates of return should be analysed and whether they signal market power. The equivalence of the internal rate of return and the accounting rate of return is not an issue in this respect as it is not clear how the internal rate of return can be used to test for market power. The formal link to theoretical models oligopolistic co-ordination is totally missing in this respect.

#### **3.2 Empirical evidence on the profitability concentration relationship - some remarks**

Cross section evidence on the relation between profits, concentration and other determinants (risk, interest rates, market growth, product differentiation) has been a central topic of industrial organisation. See Schmalensee (1989) for this assessment, and an evaluation of the advantages and limits of cross section research. Among the economic shortcomings of this approach is that



cross section research does not allow to test structural models, that it assumes that the data reflect equilibrium values (in the year for which the cross section data are taken) and, as some authors stress, that this research relies on measured profits and costs. Cross section studies usually cover a broad range of industries, often total manufacturing. This is an empirical fact, in principle also cross sections of specific industries or of firms can be analysed. The main conclusion from this early studies has been that there is a positive effect of concentration on profitability even after controlling for cost differences. This findings are consistent with the proposition that concentration enhances the possibility for firm to control prices.

The alternative emerging at the end of the eighties was a strict time series approach, called New Empirical Industrial Organisation (NEIO) by Bresnahan (1989). This approach exploits a supply relation and a demand function, to get information on the degree of market power. Undoubtedly an advantage of this approach is that it starts from a theoretical model (an oligopoly model of the conjectural variation type). It does not need measured profits or costs, but infer these from the behaviour of prices and quantities over time (which react differently to demand shocks depending on the degree of market power). This is usually claimed to be an advantage given the noisiness of empirical data on concentration and the difference between accounting profits and the concept of economic profits.

The quality of NEIO studies relies on a number of details. The *first* detail that matters is, how to identify the crucial parameter of market power. Econometric conditions are easily to be stated, in practice it is crucial to find demand shocks which shift *a n d* rotate the demand curve, and which are doing this several times without destroying the structure of the model (like the number of firms, the range of products, the degree of internationalisation). Most studies therefore add a system of input demand functions or even an ad hoc equation in which the crucial parameter is made dependant on some factors not existing in the theoretical model. All this helps to identify the parameter of interest but adds ad hoc elements to the estimation. The *second* detail is that the data on inputs, output as well as on the prices of all inputs and the output must be measured correctly. The practitioner knows how intriguing the concept of a price becomes if we speak about a real life firm supplying a wide array of differentiated and continuously adapting products. The problems are aggravated, if we want to define a price for capital input, material input and labour (the last being the easiest). The *third* detail that matters, is the level of aggregation. Ideally we want to have data for the firms which jointly supply a specific market, but nothing but this market. Actually we have firms which supply different products and regional markets, even if we restrict our investigation to a very narrow, oligopolistic and homogenous market. The *fourth* detail is the length of the period. We need long series to get hold of the structure of the model, ideally quarterly data for thirty years. But which firms and which market does not change its structure over thirty years? Finally we have the problem of cointegration. All the output and price data are trended, tripling or so over the relevant time period. Allowing for this by the application of

sophisticated econometric techniques (as done in Aiginger, Brandner, Wüger, 1995) result in a highly non linear model.

These problems with NEIO models does not tell us that this approach is a dead end. But it too has its disadvantages and the number of successful papers is not too large. And even if this approach would be successful as such, it would still not provide us with an explanation for the differences between market power across industries. Furthermore, the very logic of the NEIO approach demands that the studies rely on a specific type of industries, those with a relatively high concentration, few and stable firms, homogenous markets (this is some sort of sample selection bias).

The panel approach based on the CV models and in recent research more and more brings in game theoretic foundations. It uses both the time series and the cross section dimension of the data. The advantages can be described as follows: One gets a large number of observations even if the time span for which the data are available is not too long (which is important if we follow the argument, that firms and markets change rather quickly). Secondly, it allows to control for latent variables, like potential competition determined by the height of entry barriers. Most studies show that the explained part of profit differences is rather small, especially if we rely on proper determinants (leaving out past profits or investment which are included partly because a gross profit concept is used). If this latent variables are correlated with the explanatory variables, OLS would be biased. The third advantage is that panel analysis allows us to model dynamic adjustments. Most economists will consent that profits adjust only gradually to changes in the environment and that profits are in some industries procyclical (and maybe under some circumstances anticyclical)<sup>††</sup>. According to a large and important part of literature profit persistency is an important stylised fact. All these economic reasons strongly favour an approach in which cross section *a n d* time series properties are utilised.

Despite the growing popularity of panel data, there are not many studies in which the profitability of firms is investigated into by a thorough panel data approach. To our knowledge the first study estimating fixed effects models in industrial organisation was Domowitz, Hubbard and Peterson (1986). Mueller (1986), Coate (1989, 1991) were among the first to estimate dynamic price cost margin equations. Further recent contributions using a dynamic panel approach come from Conyon and Machin (1991), Haskel and Martin (1992), Machin and van Reenen (1994) and Haskel and Martin (1994). Screening, however, Martin (1993) or Hay and Morris (1991) as two leading industrial organisation textbooks with empirical orientation, and Hsiao (1986), Mátyás, Silvestre (1992) and Baltagi (1995) as three books on panel research, none of these books refer to a comprehensive application of panel research techniques on a core industrial organisation

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<sup>††</sup>) See the Porter- Saloner controversy, whether price wars tend to break down in troughs or peaks (see Aiginger, 1999).

question. Especially, a comprehensive study comparing the traditional static cross section approach with the estimation results of panel models seems to be lacking.

The overwhelming evidence of panel estimates suggests that (i) there exists a positive relationship between profitability and concentration with concentration endogenously determined by structural characteristics of technology and entry barriers. (ii) Concentration interacts in various ways with other variables as determinants of profitability. These findings suggest that the coefficient of conjectural variation as a measure of the degree of market power is not constant over time and industries or firms. It depends on the firm's ability to react (capacity, financial constraints), the business cycle (see the controversy whether collusion is more likely during booms or recessions, Rotemberg, Saloner, 1986, unionisation and market growth to mention a few. (iii) Dynamic panel estimates frequently find that profit differences persist over time and exhibit rather slow adjustment to long run levels. Referring to our own work (Aiginger, Pfaffermayr, 1997B) we find a drastic impact of (i) proper instrumenting the concentration rate, (ii) allowing for fixed effects, and (iii) allowing a dynamic adjustment of profits. Instrumenting the concentration rate is necessary, since we know that there could be a feedback from profits on concentration. From the economic point of view the results of panel estimates are somewhat disappointing. The explanation of profits by fixed effects and sluggish adjustment over time is not really satisfactory. Among the proper economic variables, the growth variable does exhibit a positive explanatory power. We prefer to interpret this with sluggish entry or with growth being favourable to some degree of collusion (as it could be modelled in supergames).

## 4. Competition policy in Transition countries

### 4.1 The case for competition policy in Transition countries

Competition policy in market economies is necessary since markets are not perfectly competitive and tend to result in an inefficient use of resources. If markets are concentrated, firms supply less output at a higher price. If entry is prevented the speed of innovation and cost cutting is reduced. If firms can co-ordinate market shares or prices, profits increase or cost inefficiencies do not lead to the exit of inefficient firms (Aiginger, Pfaffermayr, 1997A, C). The reasons for entry prevention or for the creation of monopolies may lie in technical facts like economies of scale, scope or even natural monopolies, in strategic moves of firms or in government rules. International competition and free trade in principle mitigates the problems, since larger market areas lead to decreasing concentration and increasing variety.

For transition countries there are several arguments why competition policy may be more important than for EU countries and some which hint at limits of the role of competition policy.

The need for competition policy is more urgent since the industries have been far more concentrated, firms are on average still larger and the segment of small and medium sized firms is lower.

Entry barriers seem to be larger in transition countries, firstly since entrepreneurship is not well developed and secondly credits to new firms are still heavily restricted. Large firms receive priority access to available funds, let it be to traditional networks, to the banks' desire to shore up existing portfolios, to investment objectives of national or international investment funds.

Markets in transition countries are still fragmented, many of the scarce assets needed by new firms are a specific challenge to incumbents, which partly are still publicly owned or monitored by the old management in one or the other way.

Imperfect enforcement of hard budget constraints on enterprises mean that driving out an old monopolist is less likely.

Consumer awareness of restricting practices is less and competing firms as well as the judicial system is not yet trained to detect restrictive practices, which is important knowing that the awareness and the potential threat of antitrust is the more effective curb of these practices than the actual decisions in court.

On the other hand the conflict between a forward looking industrial policy and antitrust exists in transition countries as well as in countries with longer experience with free markets. Industrial policy may mean to save or create new jobs or to help to build national champions. If government helps large firms to restructure, this may save a large number of jobs, which otherwise would be lost. This is usually done in large firms, whose monopoly is supported for a limited period of time. Everybody knows about the problem that this may conserve non viable structures, on the other hand it may save jobs and headquarters in "strategic industries". Industrial policy may also mean to allow firms to grow into a size in which it is internationally competitive, stimulating research is the soft version of this policy type, creating national champions the ambitious one. Most of the new large firms existing in transition countries are owned by foreign capital, there are arguments that at least some of the firms should be national firms (headquarters or at least regional headquarters should be in the transition country), some of the research should be done locally. For these firms as well as for foreign capital invited to come into the country limits on competition policy seem to exist.

## **4.2 Institutions and first experience**

The main rules for competitive policy in the EU is embodied in articles 85 to 94 of the EU treaty. Article 85 concerns agreements and concerted practices, those are forbidden if they restrict or distort competition. However, there is a productivity defence, meaning that a derogation may be granted if the contracts promote economic or technical progress and if the consumer gets a fair

share of the benefits. Article 86 forbids the abuse of dominant positions and lists them non exhaustively as unfair prices, production quotas, limitations to technical developments, discriminatory trading and ties. The merger regulation of 1989 says that mergers with a community dimension must be notified and go into effect only after approval. Mergers are prohibited if they create or strengthen a dominant position, significantly impeding competition in the common market or a substantial part of it. State aids are forbidden (article 92 to 94 of the EU treaty) if they effect intra community trade and distort competition, where derogation is possible in case of innovation, for small firms, for environmental purposes and - to a very limited degree - for rescue measures.

Agreements with the EU require transition countries to approximate EU competition policy in principle. Competition laws and institutions were introduced in all countries applying for EU membership, and a large body of case law is evolving (Fingleton et al., 1995, cite 1200 cases in the four Visegrad countries in 1990 and 1991 alone, we follow their assessment in this paragraph). "The statutes are broadly similar to the Treaty of Rome. ... The competition officers are relatively politically involved, ... and have been staunch advocates of competition policy in the public domain .... The caseload reveals a preponderance of abuse of dominance cases, a lenient approach towards mergers and a surprising lack of actions against hard core cartels (i.e. bid rigging, price fixing and market division", Fingleton, 1995, p. 14).

#### **4.3 A Comparative View Profitability and Concentration in Czech Republic, the Slovak Republic and Romania and the lessons for competition policy.**

In the 90s all three countries under investigation - the Czech Republic, the Slovak Republic and Romania - experienced a rapid and deep change in industrial organisation. The process of transition starting at the beginning of the nineties firstly lead to the privatisation of big industrial conglomerates in many cases hand in hand with a split up into smaller units. Secondly, all three countries liberalised trade and foreign investment in pursuing a liberal trade policy. Foreign direct investment has especially been welcomed as it brought capital inflows and the transfer of technology. To some extent foreign direct investment decreased concentration. Thirdly, new firms came into existence as the small businesses sector has been established. In last years in all three transition countries a new legislation for competition policy has been established. Competition policy is orientated in European standards and now controls misuse of market power, exerts an efficient merger control and regulates state monopolies which haven't yet been privatised.

Although the progress in privatisation is different in the three countries, with the Romania and the Slovak Republic lagging behind and the privatisation in the Czech Republic nearly finished we do see some clear common trends in comparing the evolution of market concentration. Table 1 provides an overview about the CR4 concentration measures (not corrected for exports and

imports)<sup>‡‡</sup> at the two digit level. Concentration ratios at the two digit industries are only very rough indicator as these never can be considered as proper defined markets. Nevertheless, broad trends can be inferred from the data. The most comprehensive data set on CR4 ratios is available for the Czech Republic. In the period 1990 to 1996 we see a marked decrease in most industries. There are only three industries with increasing concentration rates (non metal products, basic metal and business machines) in the period 1989 to 1996. Furthermore, the major adjustments took place between 1989 and 1992. Afterwards concentration exhibited a more or less stable pattern.

Table 1

**CR4-not adjusted for exports and imports in manufacturing**

	Czech Republic								Slovak Republic				Romania		
	1989	1990	1991	1992	1993	1994	1995	1996	1993	1994	1995	1996	1992	1994	1995
FOOD, BEVERAGES	20	16	16	19	19	16	18	17	9	11	11	12	n.a.	15	14
TABACCO	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	76	100	100
TEXTILES	21	17	17	17	15	17	18	19	35	33	36	39	11	11	11
WEARING APPAREL	61	57	56	54	57	51	53	46	65	56	50	49	n.a.	37	37
LEATHER PRODUCTS	80	92	75	53	48	46	38	34	79	64	60	45	n.a.	45	44
WOODEN GOOD	56	45	41	35	31	30	28	28	49	48	45	40	47	20	20
PAPER PRODUCTS	67	71	68	61	53	48	43	37	71	72	71	69	45	55	59
PRINTING, PUBLISHING	47	41	41	39	39	27	26	24	37	34	37	37	n.a.	60	58
COKE, REFINERY	98	98	99	100	100	97	98	100	100	100	100	100	86	85	84
CHEMICAL PRODUCTS	44	44	45	40	43	39	39	34	45	49	50	50	n.a.	18	17
RUBBER AND PLASTICS	48	44	46	53	46	44	40	41	87	79	80	76	84	57	56
NON-METAL PRODUCTS	23	18	23	27	23	22	24	23	34	29	30	28	n.a.	34	33
BASIC METAL	61	60	63	67	66	66	60	59	81	81	80	79	80	53	52
METAL CONSTRUCTION	25	20	21	27	19	17	19	21	35	32	27	29	24	23	19
MACHINERY	19	19	22	14	13	14	13	14	33	28	23	22	51	35	33
BUSINESS MACHINERY	61	46	40	100	100	100	98	88	95	88	84	82	n.a.	97	98
ELECTRICAL MACH.	30	27	26	24	24	21	23	22	45	39	40	43	n.a.	41	38
TV, RADIO, VIDEO	100	100	90	40	39	40	42	50	82	84	80	80	n.a.	78	80
MEDICAL AND OPTICAL	100	100	100	33	29	31	30	31	68	65	64	56	n.a.	69	69
MOTOR VEHICLES	100	95	95	76	75	70	66	65	64	67	84	84	n.a.	74	74
OTHER TRANSPORT	48	52	50	62	49	53	35	34	98	97	78	76	n.a.	39	48
FURNITURE AND OTHER	50	43	38	28	26	22	32	36	27	27	28	27	n.a.	41	44
RECYCLING	91	81	84	66	71	58	57	62	48	50	78	68	n.a.	61	60
MANUFACTURING	41	40	43	43	41	39	38	37	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

In 1992 the Slovak Republic came into existence after the split of the former Czechoslovakian Republic. Data are available since 1993. On average concentration ratios are significantly higher than in Czech Republic. The Slovak Republic inherited a major part of capital intensive industries

<sup>‡‡</sup> Concentration measures are not exactly comparable as the cut-off point for small enterprises in official statistics differ between the countries.

and privatisation took place more slowly. Between 1993 and 1996 concentration decreased in 14 of 23 industries. An increase took place in the food and beverages industry (9 to 12), textile industry (35 to 39), chemicals (45 to 50), recycling (48 to 68), more or less constant concentration is observed the paper industry, printing and publishing, and furniture.

For Romanian manufacturing data are available for the large state owned enterprises only. Although the privatisation process is under way it is still not finished. Romanian manufacturing has been characterised by an enormous degree of vertical and horizontal enterprises, most of the state owned up to now. Although firm data do not include a large number of small business, the concentration data therefore, forms a valid description of market structure in Romania. The four firms concentration ratio on average is considerable higher than in the Czech Republic and the Slovak Republic there are more industries with rising concentration rates. The evidence is preliminary, however, as concentration data for 1992 are not available for all industries.

A second important feature of the transition process is trade liberalisation. It supplements traditional antitrust policy and is viewed as important element of competition policy in a broad sense (European Economy, 1997). On the other hand competition policy can play an important part in realising the objective of trade liberalisation in creating the conditions for free trade by removing trade barriers. However, as argued in European Economy 1997, given the danger of anticompetitive behaviour of incumbent firms, a strong anti trust policy is needed to ensure that potential entrants can take advantage of free market access created by liberal trade policies.

As can be seen in Table 2 in all three countries the opening up of domestic markets and the trade liberalisation led to significant import penetration (defined as the share of imports in domestic demand) in most industries. In the Czech Republic imports represented 40% of domestic demand in 1996 and import penetration was particularly high (above 50%) in apparel, chemical products, machinery, business machinery, electrical machinery, TV, radio and video equipment and optical instruments. In most industries import penetration increased during the period of transition. In Slovak Republic on average import penetration is even higher. The pattern across industries is similar the Czech Republic. An important exemption are the high import penetration rates in transport equipment and basic metal. The import penetration data of Romania are not exactly comparable because of a different classification of the trade data. As a rough indication data point to much lower import penetration with high rates in "light industries" producing goods for end use like textile, leather and footwear. Import penetration has been extremely low at the beginning of transition. In highly concentrated, capital intensive and skill intensive industries like basic metals, appliances, electronic products and transport equipment the increase was considerable smaller as compared to the less concentrated "light industries".

### Import penetration in manufacturing

	Czech Republic				Slovak Republic			Romania			
	1989	1992	1994	1996	1993	1994	1995	1991	1992	1993	1994
FOOD, BEVERAGES	9	14	19	16	23	29	9	6	13	11	8
TABACCO	31	31	na	na	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
TEXTILES	6	12	29	39	55	60	53	n.a.	n.a.	n.a.	n.a.
WEARING APPAREL	34	51	57	61	43	48	74	n.a.	n.a.	n.a.	n.a.
TEXTILES & APPAREL								6	28	26	48
LEATHER PRODUCTS	18	21	41	45	39	46	58	9	24	19	74
WOODEN GOOD	4	12	23	29	26	33	52	6	25	16	13
PAPER PRODUCTS	12	28	41	39	44	56	52	3	16	14	29
PRINTING, PUBLISHING	9	13	18	33	22	25	39	8	7	6	13
COKE, REFINERY	39	31	37	18	64	73	43	n.a.	n.a.	n.a.	n.a.
CHEMICAL PRODUCTS	36	45	61	50	73	75	60	17	23	26	25
RUBBER AND PLASTICS	14	34	49	51	43	55	64	4	24	23	39
NON-METAL PRODUCTS	10	13	24	23	31	37	52	6	16	18	20
BASIC METAL	13	16	35	29	49	63	76	6	13	16	17
METAL CONSTRUCTION	18	26	34	35	50	58	44	n.a.	n.a.	n.a.	n.a.
MACHINERY	28	44	52	54	71	78	52	9	25	24	28
BUSINESS MACHINERY	8	98	98	97	95	98	44	n.a.	n.a.	n.a.	n.a.
ELECTRICAL MACH.	33	35	41	52	74	70	75	21	40	39	40
TV, RADIO, VIDEO	85	74	83	81	67	72	49	n.a.	n.a.	n.a.	n.a.
MEDICAL AND OPTICAL	96	70	73	72	77	81	56	n.a.	n.a.	n.a.	n.a.
MOTOR VEHICLES	38	30	42	35	68	83	77		n.a.	n.a.	n.a.
OTHER TRANSPORT	5	47	15	33	77	33	75		n.a.	n.a.	n.a.
TRANSPORT EQUIPMENT								6	24	23	29
FURNITURE AND OTHER	62	42	48	38	58	61	52	n.a.	n.a.	n.a.	n.a.
RECYCLING	n.a.	n.a.	n.a.	n.a.	46	64	21				
MANUFACTURING	41	40	43	43	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

Again it is the common to the transition process in all three countries that most of the increase in import penetration took place in the first years and there was much less change between 1993 and 1996. The high degree of import penetration, at least in the Czech and Slovak Republic forms an important mechanism to establish a competitive environment. However, liberalising trade is not sufficient and has to be combined with strict antitrust authorities. Especially in industries where there are large multinationals which are vertically integrated across borders, a large part of trade flows may be intra firm trade, an expansion of which does not lead itself to more intensive competition (European Economy, 1997).

Concerning the relationship between profitability and concentration mixed results have been found. Estimates for the Czech Republic on a cross section of firms indicate a strong positive correlation in some specifications. At the three digit industry level very weak results have been found. The estimates for Slovak manufacturing using a small cross section at the two digit industry level likewise did not find a significant relationship. Although there is a comprehensive firm data base available for Romanian manufacturing, there is doubt that the structure conduct performance



paradigm provides a useful framework for analysing the profitability concentration relationship at early stages of the transition process with most large firms owned and controlled by the state. Especially, it cannot be claimed that firms act as profit maximisers. Their actions and strategies are most likely affected by policy interventions.

On the econometric side, the estimation results are preliminary in several respects. First, the old cross section approach is put to use which suffers from simultaneity of profits and concentration. Pursuing the research with panel data taking concentration endogenously will most probably give more pronounced results. Secondly, we have to bear in mind that the period under investigation is a transition period. The market for corporate control is still underdeveloped, some of the larger capital intensive firms are still to be privatised or under a process of restructuring. In this period we may observe both high concentration and low profits or (losses in some cases). So it is essential to control for the special characteristics of the transition process properly.

## **5. Conclusions and current assessment**

The legal framework for competition policy has been uncontroversial in the beginning, let us say in the time where monopolies were still dominating the transition economies. Restructuring at that time meant that the large combines were divided, viable parts were formed into new firms, concentration decreased. In the middle of the nineties the case emerges, that firms which had been separated plan to merge. Up to now nearly all mergers had been approved, most without any restriction. The question arises if this can be the case if the number of attempted mergers increases and concentration may start to increase again, as it often happens after a deconcentration phase in the first stage of liberalisation. The test will come whether and to which degree the competition authorities will be able to set the rules and how special interest will interfere. The old discussion between allocative efficiency and the possible productivity advantages of large firms will come up, as well as the defence that international competition and globalisation need strong firms. There are at least three arguments additional to those in EU countries supporting a strict competition policy in transition countries: the market for corporate control is still underdeveloped, secondly foreign competition is limited by hidden barriers and by differences in income and taste, and thirdly concentration is still high and small firms entry does not provide enough competition.

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