

## Reading map :

The structure-conduct-performance paradigm is discussed in Chapter 8 of the Carlton & Perloff text book. We have followed the chapter somewhat closely in this case, and covered pages 244-259 during Lecture 2. However, your understanding of the mathematical details of the material on pages 247-249 and 254 is not essential for your understanding of the SCP theory. The discussion about the empirical validity of the proposed relationship between market structure and firm performance can be found on pages 259-267 of the Carlton & Perloff text book. The discussion about (Sutton's) modern approach to structure-conduct-performance is on pages 268-274 of the book. But you need to understand only the basic conceptual aspects of this modern approach; focus on the issues discussed in class.

<p style="text-align: center;">Structure of the market – Measurement – problems</p> <ul style="list-style-type: none"><li>• It may simply reflect the profitability of the industry</li><li>• It is difficult to measure the size of the “economic” market<ul style="list-style-type: none"><li>– Domestic vs. international</li><li>– Related products (tea and coffee)</li></ul></li><li>• Buyer concentration<ul style="list-style-type: none"><li>– US market for electronic consumer products</li></ul></li></ul>	<p>The hypothesis central to the SCP paradigm is that market structure “causes” performance. The problem, however, is that causality may well exist in the other direction; if a market is profitable, it will attract more firms, and hence its structure will change.</p> <p>It is also not easy to determine the size of the “economic” market. For example, suppose that there are only 4 firms selling tea in the UK. As such, this suggests that the market is highly concentrated. SCP would then tell us that the profitability of these tea firms should therefore be high. However, the firms might face steep competition from imports. They may also face competition from producers of other warm beverages such as coffee that are (roughly speaking) substitutes for tea. A simple measure of market concentration may not account for these complexities.</p> <p>Firm performance (when measured in terms of profitability) depends not only on the market structure but also on the bargaining power of the buyers. For example, since the US is the largest market for consumer electronics, US consumers often pay prices for electronic goods that are higher than the prices paid by their counterparts in Europe and the rest of the world. Firms charge lower prices in the US to retain control over their share of the largest market for their products.</p>
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<p style="text-align: center;"><b>Structure of the market – Determinants</b></p> <ul style="list-style-type: none"> <li>• Scale (and scope) economies</li> <li>• Cost advantages</li> <li>• Product differentiation</li> <li>• Capital requirements</li> <li>• Unionization</li> <li>• Institutions <ul style="list-style-type: none"> <li>– Incumbency: can incumbents influence regulation?</li> <li>– Democracy: is it necessarily good for market entry?</li> </ul> </li> </ul>	<p>If there are economies of scale, such that the average cost of production decreases with output, smaller firms will find it difficult to compete with larger firms, and eventually only large firms will be left in the market. That will increase market concentration.</p> <p>If some firms have cost advantage over others, the firms with higher cost will leave the market, and that too will increase market concentration.</p> <p>It is difficult, if not impossible, for firms to avoid competition if the product they sell is homogeneous. But if product differentiation is possible then firms will retain market power and there will be a deviation from a competitive market structure.</p> <p>If capital requirements are high, only a few firms might be able to enter and operate in a market. In that case, once again, market concentration will be high.</p> <p>If labourers are unionized, every firm will have to pay wages that are determined through centralized wage bargaining. But some firms may not be able to pay the (usually high) wages that unionized workers get paid, and this will reduce the number of firms in the market, and hence increase market concentration.</p> <p>If incumbents have more power relative to firms that can potentially enter (a situation that is sometimes described as undemocratic), the former might be able to lobby the government to create entry barriers, such that new firms find it difficult to enter. This is known to have happened in the context of international trade, where domestic firms lobbied to limit import competition. In such cases, market concentration can be high.</p>
<p style="text-align: center;"><b>Performance - measurement</b></p> <ul style="list-style-type: none"> <li>• Returns to asset (or equity) <ul style="list-style-type: none"> <li>– Profit per dollar of investment</li> </ul> </li> <li>• Price-cost margin</li> <li>• Tobin's <math>q</math> <ul style="list-style-type: none"> <li>– Ratio of market value of company to replacement cost of company</li> <li>– Problem: how efficient are capital markets?</li> </ul> </li> </ul>	<p>Here, the measure that requires some explanation is Tobin's <math>q</math>. Suppose that a firm owns machines etc worth £100, such that if you want to replicate the same plant you would need £100. You sell 100 shares of that firm to investors. Logically, each share should be valued at £1. Suppose, however, each share is valued at £2, such that the market value of the firm is £200. In that case, Tobin's <math>q</math> for this firm is <math>£200/£100 = 2</math>. This would happen only if investors believe that the firm's expected future performance is going to be very good, such that £100 is not a true reflection of the value of the firm. If we make the (somewhat strong assumption) that</p>

	<p>markets have all relevant information such that £200 accurately reflects the future value of the firm, then we can use Tobin's <math>q</math> as a measure of a firm's (expected future) performance. It is often used in the academic literature, much less so in other contexts.</p>
<p>THIS SLIDE WAS NOT DISCUSSED IN CLASS. IT INCLUDES MATERIAL THAT IS NOT ESSENTIAL TO UNDERSTANDING THE BASIC PROPOSITION OF THE STRUCTURE-CONDUCT-PERFORMANCE PARADIGM.</p> <p style="text-align: center;">Performance – measurement Rates of return and economic profit - I</p> <ul style="list-style-type: none"> <li>• Economic profit = Revenue – (Labour cost + Material cost + Capital cost)</li> <li>• Capital cost = annual rental fees <ul style="list-style-type: none"> <li>– Capital cost is a <i>flow</i> and not the cost of the <i>stock</i> of capital</li> </ul> </li> <li>• Capital assets should be valued at <i>replacement cost</i> for the rate of return to be an accurate indicator of whether new capital should be invested or whether the firm should be shut down</li> </ul>	<p>Recapitulate that when we say that a firm earns zero profit in a competitive market (in the long run) or positive profit in a monopolistic market, we talk about economic profit. On the other hand, when we measure rates of return, we talk about accounting profit. We have to reconcile the two.</p> <p>The formula for computing economic profit is on the PPT slide on the left. The first thing to note is that the cost of capital is a <i>flow</i> that equals the rental rate of capital times the <i>stock</i> of capital. A simple example will clear up the distinction between stock and flow. If you save have £100 in savings in a bank, and you get £1 per month in interest earnings, then £1 is a flow and the £100 is a stock.</p> <p>The next question that one has to answer is whether capital should be measured in terms of book value or in terms of replacement cost. For example, consider again the firm which would cost £100 to replicate. When the firm was set up, however, it may have cost £80 to set it up because the machines etc were cheaper at that time. Is the value of this firm's capital stock £80 (the book value) or £100 (the replacement cost)? We generally consider the latter to be more relevant, i.e., our measure of a firm's capital stock should be its replacement cost.</p>
<p>THIS SLIDE WAS NOT DISCUSSED IN CLASS. IT INCLUDES MATERIAL THAT IS NOT ESSENTIAL TO UNDERSTANDING THE BASIC PROPOSITION OF THE STRUCTURE-CONDUCT-PERFORMANCE PARADIGM.</p> <p style="text-align: center;">Performance – measurement Rates of return and economic profit - II</p> <ul style="list-style-type: none"> <li>• To be noted: <ul style="list-style-type: none"> <li>– A rental rate must provide an owner of capital with a particular rate of return after accounting for depreciation</li> </ul> </li> <li>• Algebra: <math display="block">\pi = R - \text{labour cost} - \text{material cost} - (r + \delta)p_r K</math>           Setting <math>\pi = 0</math> in a competitive market, <div style="border: 1px solid black; padding: 2px; display: inline-block; margin-top: 5px;"> <math display="block">r = (R - \text{labour cost} - \text{material cost} - \delta p_r K) / p_r K \quad (1)</math> </div> </li> </ul>	<p>This slide refers to the algebra on page 248 of the Carlton &amp; Perloff text book. What you should take away from this discussion is how one estimates the earned rate of return, given information on a firm's revenue, labour cost, material cost, replacement cost of capital and the depreciation rate.</p>
<p>THIS SLIDE WAS NOT DISCUSSED IN CLASS. IT INCLUDES MATERIAL THAT IS NOT ESSENTIAL TO</p>	<p>Consider two industries, in each of which the actual observed rate of return is 5% higher than the</p>

<p>UNDERSTANDING THE BASIC PROPOSITION OF THE STRUCTURE-CONDUCT-PERFORMANCE PARADIGM.</p> <p style="text-align: center;"><b>Performance – measurement Rates of return and price</b></p> <ul style="list-style-type: none"> <li>• Suppose that actual rate of return is 5% higher than the “normal” rate of return</li> <li>• In order for rate of return to be “normal”, revenue must decline by 5% of value of capital</li> <li>• Given the labour cost and the materials cost, the implication of this for the required change in price depends on the industry’s capital intensity <ul style="list-style-type: none"> <li>– A high rate of return on capital does not necessarily imply that a firm is overcharging its customers significantly</li> </ul> </li> </ul>	<p>“normal” return that firms earn in a perfectly competitive market. Clearly, if there is competition, the revenue of firms in both these markets should decline to restore the “normal” rate of return. Such a decline in the revenue of firms would require a fall in the price of charged by the firm that is sufficient to more than offset the increase in the sale of the product (a firm can sell more at a lower price if the demand curve facing it is downward sloping). The extent to which the price should fall will depend on the elasticity of demand. (IF YOU DON’T UNDERSTAND THIS, ASK ME DURING MY OFFICE HOURS, AND I WILL EXPLAIN.) The implication is that large differences in rates of returns across industries may actually result from relatively small differences in the price-cost margin.</p>
<p>THIS SLIDE WAS NOT DISCUSSED IN CLASS. IT INCLUDES MATERIAL THAT IS NOT ESSENTIAL TO UNDERSTANDING THE BASIC PROPOSITION OF THE STRUCTURE-CONDUCT-PERFORMANCE PARADIGM.</p> <p style="text-align: center;"><b>Performance – measurement Rates of return – problems</b></p> <ul style="list-style-type: none"> <li>• Economic vs. accounting definitions of capital <ul style="list-style-type: none"> <li>– Rental fee of all assets vs. book value of assets</li> <li>– Replacement cost vs. historical cost</li> </ul> </li> <li>• Measurement of depreciation <ul style="list-style-type: none"> <li>– Straight line formula</li> </ul> </li> <li>• Valuing advertisement and R&amp;D <ul style="list-style-type: none"> <li>– Impact of future profitability</li> </ul> </li> <li>• Adjustment for inflation</li> </ul>	<p>This slide summarizes the discussion in the section entitled “Pitfalls in calculating rates of return”, on pages 249-252 of the Carlton &amp; Perloff text book. This section is not difficult to understand. If you need clarification, seek clarification during the next tutorial.</p>
<p>THIS SLIDE WAS NOT DISCUSSED IN CLASS. IT INCLUDES MATERIAL THAT IS NOT ESSENTIAL TO UNDERSTANDING THE BASIC PROPOSITION OF THE STRUCTURE-CONDUCT-PERFORMANCE PARADIGM.</p> <p style="text-align: center;"><b>Performance – measurement Discussion – adjusting for risk</b></p> <ul style="list-style-type: none"> <li>• Capital asset pricing model (CAPM)</li> <li>• Expected return <math display="block">E(R_i) = R_f + \beta[E(R_m) - R_f]</math> where <ul style="list-style-type: none"> <li>– <math>E(R_i)</math> ≡ expected rate of return on asset <math>i</math></li> <li>– <math>R_f</math> ≡ risk-free rate of return</li> <li>– <math>E(R_m)</math> ≡ expected rate of return on the “market” portfolio</li> <li>– <math>\beta</math> ≡ “beta” of the asset, a measure of risk</li> </ul> </li> </ul>	<p>While the problems mentioned in the previous slide are pure measurement problems, this one is, in part, a conceptual problem. Suppose that you find that returns on assets (or investments) in a market is fairly high. Does it necessarily mean that the market is uncompetitive and that market concentration is high? What if the production process, or some other activity of the firms, is risky, such that the higher rate of return is simply a reflection of the higher risk? In that case, once again, it would be difficult to test the validity of the SCP paradigm. This slide summarizes a model called the CAPM which essentially says that returns from an asset should be commensurate with its risk. That is why investors get a return of 3.3% per annum when they lend to the German government for 10 years, and a return of 12.71% when they lend to the Brazilian government for the same period (Source: Bloomberg).</p>

<p style="text-align: center;">Performance – measurement Price-cost margin</p> <ul style="list-style-type: none"> <li>• Lerner index = <math>(P - MC)/P</math></li> <li>• It can be demonstrated that  <math display="block">(P - MC)/P = -1/\epsilon \tag{2}</math> </li> <li>• Check <ul style="list-style-type: none"> <li>– In a perfectly competitive market, <math>\epsilon = \text{infinity}</math></li> <li>– In a perfectly competitive market, <math>P = MC</math></li> </ul> </li> </ul>	<p>In the literature on the SCP paradigm, we generally use the price-cost margin (or Lerner index) as the measure of performance. In highlighted equation in the slide on the left, <math>\epsilon</math> is the price elasticity of demand, i.e., the responsiveness of quantity demanded to a change in price.</p> <p>How do we verify that the equation is correct? In a competitive market, <math>P = MC</math>, i.e., Lerner index equals zero. In a competitive market, the price elasticity of demand is infinite, i.e., if a seller increases the price of its product even a little bit, it will lose all its customers. (Remember that the product is homogeneous in a competitive market such that it is easy to switch sellers.) If <math>\epsilon</math> is infinity, then once again the Lerner index (this time, 1 divided by infinity) is zero. So, we get the same outcome for competitive markets using both sides of the highlighted equation.</p>
<p style="text-align: center;">Performance – measurement Price-cost margin (contd.)</p> <ul style="list-style-type: none"> <li>• Using AVC instead of (difficult to measure) MC <ul style="list-style-type: none"> <li>– Implicit assumption: long-run constant returns to scale</li> </ul> </li> <li>• This results in a measurement bias: instead of (2), the price-cost margin becomes  <math>-1/\epsilon + (r + \delta)(p_r K/PQ)</math> </li> </ul>	<p>This slide discusses something that has relevance for the discussion on econometrically estimating the relationship between structure and performance. Since we cannot generally compute marginal cost from financial statements, we often use the average variable cost instead of the marginal cost in the Lerner index. This changes our measure of the Lerner index from <math>1/\epsilon</math> to <math>(1/\epsilon)</math> PLUS something. For the moment, just note this change. We shall discuss this later.</p>
<p style="text-align: center;">Measuring price-cost margin</p> <p style="font-size: small;">     If market is competitive, price will remain <math>P_c</math>, else it will be <math>P_m</math>.      Use this principle to estimate mark ups and price-cost margin:  <math>(P - MC)/P = -1/\epsilon</math>      where <math>\lambda</math> is a measure of market power and <math>\epsilon</math> is a measure of elasticity of demand   </p>	<p>This is Figure 8.3 of the Carlton &amp; Perloff text book, and the explanation provided for this figure in the book is reasonably good. This figure has also been discussed in the voice embedded PPT file.</p>

<p style="text-align: center;">Empirical evidence – Market structure and price-cost margin - I</p> <ul style="list-style-type: none"> <li>• Model: <math>(P - AVC)/P = 0.16 + 0.10 C4 + 0.08 (p_K K/PQ)</math> (0.01) (0.02) (0.02)</li> <li>• Implication: <ul style="list-style-type: none"> <li>– Suppose <math>C4 = 0.50</math> and <math>(p_K K/PQ) = 0.40</math></li> <li>– Price-cost margin = 0.24, i.e., <math>P = 1.3AVC</math> (P is 30% higher than average variable cost)</li> <li>– If <math>C4</math> increases to 100% (or 1), then <math>P = 1.4AVC</math></li> </ul> </li> <li>• Overall, the impact of concentration ratio on price-cost margin is unstable and ambiguous</li> </ul>	<p>Here we discuss the empirical evidence about the relationship between price-cost margin and 4-firm concentration ratio (<math>C4</math>). Note that since we use AVC instead of marginal cost to compute price-cost margin, we have to add <math>p_K K/PQ</math> to the regression equation.</p> <p>The coefficient of <math>C4</math> in the regression equation is 0.10, which is positive. This suggests a positive relationship between price-cost margin and <math>C4</math>, which is predicted by the structure-conduct performance paradigm.</p> <p>Note, however, that the impact of a change in market concentration on price-cost margin is not large. Suppose that <math>C4 = 0.50</math>, i.e., the largest 4 firms account for 40% of the sales in the market, and suppose that <math>p_K K/PQ = 0.40</math>. In that case, from the regression equation, we get <math>P = 1.3 AVC</math>, i.e., price is 30% higher than the average variable cost. If now <math>C4</math> is increased to 1.00, other things remaining the same, <math>P = 1.4 AVC</math>, i.e., price is 40% higher than average variable cost. In other words, a doubling of <math>C4</math> has a relatively small impact on price-cost margin. Hence, even if the predicted relationship between market concentration and price-cost margin is statistically significant, it may not be significant from an economic standpoint.</p>
<p style="text-align: center;">Empirical evidence – Market structure and price-cost margin - II</p> <ul style="list-style-type: none"> <li>• Model: <math>PCM = - 22.3 + 0.183 S - 0.022 C4 + \text{others}</math> where <math>S</math> = market share of the firm</li> <li>• An estimated positive correlation between PCM and <math>C4</math> at the industry level may be incorrect, and does not reflect any causal relationship between the two variables</li> </ul>	<p>Here the argument is that a firm's price-cost margin is less dependent on market concentration (<math>C4</math>) and more on its own market power, as captured by its market share (<math>S</math>). The regression equation suggests that this is indeed the case. The impact of market share on price-cost margin is 0.18, which is positive. The impact of <math>C4</math> on the price-cost margin, on the other hand, is -0.022, which is negative, contrary to the prediction of the structure-conduct-performance paradigm. Also, numerically the impact of market share (<math>S</math>) on price-cost margin is much greater than the impact of <math>C4</math>. This brings into question the validity of the structure-conduct-performance paradigm.</p>

<p style="text-align: center;"><b>Sutton</b></p> <ul style="list-style-type: none"> <li>• Sunk costs are exogenous <ul style="list-style-type: none"> <li>– If firms can form cartels, profit margins are high, so new entrants are attracted and market concentration falls</li> <li>– If a market is highly contestable, profit margins are low, so new firms do not enter and market concentration remains high</li> </ul> </li> <li>• Sunk costs are endogenous <ul style="list-style-type: none"> <li>– An increase in market size will increase average quality but will not reduce market concentration</li> </ul> </li> </ul>	<p>If sunk costs are exogenous, we can think of two scenarios that are at odds with the prediction of the structure-conduct-performance paradigm regarding the (positive) relationship between market concentration and price-cost (or profit) margin. Consider next the situation where sunk costs are endogenous. As the market size increases, incumbent firms can incur sunk costs by investing in product quality. This investment results in better quality products, on average, without a reduction in market concentration. This is the case of the supermarket industry that is discussed in the following slide. To the extent that we are worried about consumer benefits – and price-cost margin is only one way to approach this issue – this suggests that there can be increase in these benefits on account of competition, even though the market concentration itself remains unchanged.</p>
<p style="text-align: center;"><b>Conduct – taking a step back</b></p> <ul style="list-style-type: none"> <li>• Conduct involves making strategic decision aimed at reducing competitive pressures</li> <li>• Strategic decisions are taken by firms’ management</li> <li>• Why do firms take many bad strategic decisions? <ul style="list-style-type: none"> <li>– E.g., mergers and acquisitions</li> <li>– “Agency” conflict</li> </ul> </li> </ul>	<p>The structure-conduct-performance paradigm does not discuss conduct. There is an assumption that competitive pressures influence behavior of firms. However, strategic decisions are taken on behalf of firms by their managers, and economists argue that the interests of managers are not always consistent with that of profit maximization. This divergence in interests of managers and firms (and their owners) is known as agency conflict. A simple example is that of mergers and acquisitions. These involve strategic decisions made by managers, and are expected to augment a firm’s profitability. But in most cases mergers and acquisitions fail to add to a firm’s value.</p>