THE STRUCTURE-CONDUCT-PERFORMANCE PARADIGM REVISITED: AN EMPIRICAL ANALYSIS FOR VIETNAMESE FIRMS

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Abstract:

The Structure-Conduct-Performance (SCP) paradigm became the dominant framework for empirical work in Industrial Organization starting from the early 1950s.1 There have been a large number of empirical researches in the literature examining the SCP hypothesis for various countries in the world. Nevertheless, empirical works in this literature for Vietnamese firms are still scared. This paper shows that, in general, the SCP paradigm fits Vietnamese firm data well. Concentration level (C in SCP) of the industry and barriers to entry (S in SCP) are key factors affecting firm performance (P in SCP). We find evidence that higher concentration ratio yields higher performane of firms. This finding provides important empirical evidence on Vietnam's restructuring process, especially the stated-own enterprises. Vietnam has many economic groups that definitely posses high market power, hence enjoy higher returns. If some of these groups are not efficiently performing, this paper suggests that the government should "dillute" their industry by easing up the entry process hence to increase competitiveness of the industry. The ease of accessing different provinces in Vietnam – a special type of barriers to entry – proves to generate higher performance of firms. This finding is meaningful for provincial authorities in designing policy to promote investment in their localities. Keywords: debt crisis, policy implications

Keywords: *Industrial Organization, Structure – Conduct – Performance, Concentration Ratio, Barrier to Entry, Economic Groups*

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1. Introduction

The relationship between firm behavior and market structure has been a central focus of study in the field of industrial organization (IO). Historically, the discipline's emphasis on firm behavior and market structure is, to a large extent, influenced by the work of a group of economists at Harvard in the 1930s. The Structure-Conduct-Performance (SCP) paradigm became the dominant framework for empirical work in IO between the early 1950s until the early 1980s. Its influence only began to wane in the 1980s with the emergence of game theoretical analysis of oligopolistic markets - an approach labeled as the `New Industrial Organization' (NIO).

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[1] The prominent Industrial Organization economist, Jean Tirole, has won the 2014 Nobel Prize in Economics for his analysis of market power and regulation.

There have been a large number of empirical researches in the literature examining the SCP hypothesis for various countries in the world. Nevertheless, empirical works in this literature for Vietnamese firms are still scared that motivate us to do this paper.

The paper is organized as follows: Section 2 provides an overview about SCP paradigm; Section 3 sketches the theoretical framework and empirical specifications of the model; Section 4 presents the SCP model for Vietnam; Section 5 describes data; Section 6 shows empirical results; Section 7 concludes the paper.

2. The SCP paradigm - an overview

The origin of the SCP paradigm can be traced to the work of the Harvard economist Edward Mason in the 1930s. The theoretical work of Mason's colleague Edward Chamberlin provided inspiration for both Mason and his student Joe Bain to study empirically how pricing and production policies of firms are determined. Mason (1939)'s (p.63) starting point was that market share is important in determining production and pricing policy of a firm. Mason argued that empirical analysis is essential to ensure that the theories of firm are useful. This is because theories are based on mathematical constructs such as demand and cost functions which are not ascertainable (in Mason's words, p.64). Thus, it is not that theories are not important; rather their relevance cannot be determined without empirical observations. This leads to the question of the set of empirical observations that are useful. Interestingly, Mason argued that the price and production decisions of a firm are influenced by both the internal organization of the firm and market structure.

Mason challenge for future empirical-policy work was subsequently taken-up by his Ph.D. student, Joe S. Bain. Despite being inspired by the work of Mason, the research methodologies of Mason and Bain were a bit different. Bain used industry-level data - an approach which Mason was a bit skeptical of. In contrast, Mason was more in favor of case studies involving specific firms or industries. It was Bain's work which proved to be more influential in charting the course of empirical IO after the 1930s.

The Structure-Conduct-Performance (SCP) Paradigm comprises of three major elements: (i) Structure refers to market structure. The variables that are used to describe market structure include seller concentration, degree of product differentiation and barriers of entry; (ii) Conduct refers to a firm's behavior. The variables used to capture firm behavior include pricing strategies, collusion, advertising, research and development and capacity investment. Some have interpreted conduct as whether firms collude or compete; (iii) Performance refers to outcome or equilibrium assessed in terms of allocative efficiency. The variables mostly used to measure performance are profitability and price-cost margin.

The SCP paradigm posits specific causal relationships between market structure, conduct and performance. In particular, market structure determines conduct and conduct in turn determines performance:

Structure $\rightarrow$ Conduct $\rightarrow$ Performance

3. Theory and Econometric Specifications in SCP

The theoretical connection between market structure, conduct and performance can be formalized using a Cournot duopoly model. It

can be shown that there is a direct link between the Lerner Index (L) and various variables such as a firm (i)'s market share (si), price elasticity of demand (ε)and its conjectural variation (λi):

$$L_i = \frac{P(Q) - MC(q_i)}{P(Q)} = \frac{s_i}{\varepsilon}(1 + \lambda_i)$$

where $\lambda_i = dq_j / dq_i$. Theoretically, the conjectural variation variable λi measures the output response of the firm's rivals. Scherer and Ross (1990) further suggest that the conjectural variation is also a measure of the degree of coordination (or collusion) between firms in the industry. The conjectural variation variable is determined by other factors:

$$\lambda_i = f_1(C_j, B_j, X_{ij})$$

where Cj is a measure of seller concentration, Bj a set of entry barrier measures and Xij other industry or firm characteristics affecting the conjectural variation. The above equation provides the link between market structure and conduct. Substituting the second equation into the first, we obtain a link between structure and performance (the Lerner Index)[2] for firm i:

$$L_i = f_2(s_i, \varepsilon, C_j, B_j, X_{ij}).$$

In reality, the Lerner Index may not be observable. If there is a correlation between the Lerner index and measures of profitability (πi), the above equation can be reformulated as:

$$\pi_i = f_2(s_i, \varepsilon, C_j, B_j, X_{ij}).$$

The industry-level version can be written as:

$$\pi_j = f_3(C_j, B_j, X_j). \qquad (*)$$

It should be clear from the above specifications that the empirical test of the SCP entails testing for the relationship between structure and performance, taking conduct as either a black box or theoretically proven. The hypothesis underlying the above specifications is that concentration determines profitability.

Measuring Performance (π)

A key issue in the empirical literature in SCP is the measurement of performance. A number of measures of performance have been used. Theory suggests that the Lerner Index is a good measure of the extent of a firm's market power. However, it is not always possible to derive the Lerner index empirically. It may be difficult to obtain marginal cost data. Furthermore, firms may have numerous products, each priced differently. A measure for performance that is conceptually closest to the Lerner index is the price cost margin (PCM) or the Tobin's q ratio. Moreover, accounting measures of performance such as profit ratio (comparing to revenue, capital or equity etc.) are also used. There is no consensus on which is the best measure of performance. The choice of measure obviously depends on data availability and the desired aggregation level of analysis i.e. industry, firm or plant. In this paper, due to data availability, we will use profit and profit ratio to measure firms' performance.

Market Concentration (C)

The theoretical link between the Lerner Index (L) and market share (si) implies that

[2] Lerner Index = (Price – Marginal Cost) / Price. When the Lerner index > 0, firms are said to have market power.

we can measure market power by measuring market concentration as described in (*). Since si is directly related to the Lerner index, an obvious measure of concentration is the total market shares (Σsi) of firms. One such measure is the concentration ratio (CR) which measures the total market share of a given number of (m) firms with the largest market shares: $CRm = \Sigma si$

One critique of the concentration ratio is that it does not take into account the distribution of market share across all firms in an industry. A concentration index that does not have this weakness is the Herfindahl-Hirschman Index (HHI): $HHI = \Sigma si^2$.

The HHI is also directly related to the Lerner Index.[3]

The CR and HHI are the two most commonly used concentration indices used in empirical SCP studies. In this paper, we are going to use both SI and HHI to measure concentration of relevant industries.

Barriers to entry (B)

The functional specification for SCP includes also barriers to entry as an explanatory variable for performance. Barriers of entry can be either structural or strategic in nature. Structural barriers of entry are exogenously determined. They include scale economies and product differentiation. In contrast, strategic barriers of entry arise from strategies that deter entry (e.g. limit pricing) or force rival firms to exit (predatory pricing). The empirical literature on SCP has concentrated mostly on quantifiable structural barriers of entry.

One such barrier to entry is the minimum efficient scale (MES) of production in relation to the size of market demand. This has been measured by the ratio of sales of plants at the midpoint of industry plant size distribution to total industry sales. An alternative measure is the cost disadvantage ratio which is the ratio of value-added per worker in plants below MES to that in larger plants. Another type of barrier to entry that is widely used in empirical SCP studies is product differentiation which is proxied by the ratio of advertising expenditure to sales.

The work of Bain (1956) is considered as the first thorough study of entry barriers in which an entry barrier is defined as anything that allows incumbents to earn above-normal profits without inducing entry. More recently, Mata (1991) when studying the entry barriers to new firms in Portugal finds that all the conventional entry barriers such as economies of scale, product differentiation and capital requirements have negative and significant in the small-scale equation, but not in the large-scale equation. With regard to sunk costs, however, they seem to be important only for large entrants. These empirical results are also found in the studies of von der Fehr (1993) on the domestic entry in Norwegian manufacturing industry and Schwalbach (1993) on German firms.

Balcerowicz et al. (2003) argues that new firms have to go through two stages before being established in the market: the initial creation and the early development. New entries not only face a number of important and relatively severe barriers to entry, but also face

[3] For an industry with n firms, the industry's weighted average Lerner Index is $L = \Sigma siLi = \Sigma [si^2 (1 + \lambda i) / \varepsilon]$. If we assume that for all firms, $\lambda i = \lambda$, then: $L = [(1 + \lambda) HHI / \varepsilon]$.

continued difficulties even when they have succeeded in overcoming the early barriers. In each stage, they face a number of problems and impediments specific to that stage. New firms need a conductive environment and a supportive institutional framework for one to two years before they can spread roots and develop their own relationships with customers and suppliers. Nurturing and support is not achieved by subsidization but by the creation of level playing field, the provision of information, and minimizing the unnecessary restrictive procedures.

In this paper, we use the entry costs in the market at provincial level to proxy the BTE.

Other Independent Variables (X)

Aside from industry concentration and barrier to entry, other independent variables that have been used in empirical investigation of SCP includes buyer concentration (which affects seller's profit margins), industry growth (to capture industry disequilibrium), ratio of imports to domestic production or consumption (to capture the influence of imports), and geographic dispersion measures (to capture the effect of regional or local markets). Firms' characteristics are also included as the explanatory variables as they are theoretically well established to explain performance.

In this paper, as set of firms' characteristics variables are captured to explain firms' performance .

4. The SCP model for Vietnam enterprises

Theoretical equation (*) provides framework for empirical analysis. In this work, we revisit the SCP paradigm for Vietnamese firms as a whole. Firm performance (π) is measured by profit and ratio of profit to asset of firms. Market concentration (C) is measured by market share and HHI. Barrier to entry(B) is proxied by entry costs in the market in provinces that is calculated from the Provincial Competitiveness Index survey. Remaining explanatory variables are firm characteristics.

We hence adopt the following econometric equations:

$$profit = \alpha_0 + \alpha_1 si + \alpha_2 hhi + \alpha_3 labor + \alpha_4 bte + \alpha_5 limited + \alpha_6 cooperative + \alpha_7 state + \alpha_8 jointstock + \alpha_9 fdi + u \quad (1)$$

$$roa = \beta_0 + \beta_1 si + \beta_2 hhi + \beta_3 labor + \beta_4 bte + \beta_5 limited + \beta_6 cooperative + \beta_7 state + \beta_8 jointstock + \beta_9 fdi + u \quad (2)$$

Where:

Profit is the profit before tax of firms

ROA is the ratio of profit to asset of firms

S_i is the market share of firms in the industry

Hhi is the concentration index of the market that is measured as followings:

$$HHI = \sum_{i=1}^{N} s_i^2$$

wheres_i is market share of firms in the industry and N is number of firms in the industry. The values of HHI fall in the interval of [1/N, 1]. A small HHI implies that there are no dominant firms in the market, the larger the HHI, the larger the industrial concentration.

- Labor is total number of labors of firms

- Limited is a Dummy variable that takes the value of 1 if firms are limited liability companies, zero otherwise.

- Cooperative is a Dummy variable that takes the value of 1 if firms are cooperative,

zero otherwise.

· State is a Dummy variable that takes the value of 1 if firms are state-owned enterprises, zero otherwise.

· Jointstock is a Dummy variable that takes the value of 1 if firms are joint stock companies, zero otherwise.

· Fdi is a Dummy variable that takes the value of 1 if firms have foreign direct investments (wholly-owned foreign enterprises and joint venture enterprises), zero otherwise.

· Private is a Dummy variable that takes the value of 1 if firms private enterprises, zero otherwise.

· BTE: barrier to entry in the market.

5. Data

This paper uses the data from the surveys on the enterprises in Vietnam conducted by the General Statistics Office of Vietnam from 2008 to 2011. An enterprise in these surveys is defined as "an economic unit that independently keeps business account and acquires its own legal status. It may be set up and operate under the regulations of State Enterprise Law, Cooperative Law, Enterprise Law, Foreign Investment Law or the Agreements between the Government of Vietnam and the Governments of Foreign Countries" (The GSO, 2012). There are three types of enterprise in the surveys:

+ The state enterprises at central level and at local level, including also enterprises which are under the control of the Communist Party and mass organizations of which the capital is provided by the government.

+ The non-state enterprises: enterprises set up by Cooperative Law except cooperatives of agricultural, forestry, and fishing sectors; private enterprises; collective name enterprises; limited liability companies; joint-stock companies including also privatized state enterprises and companies which have the capital share of the Government less than 50%.

+ The foreign enterprises: wholly-owned foreign enterprises and joint venture enterprises.

These enterprises belong to all industries excluding cooperatives of agricultural, forestry, fishing sectors and business households. Industrial classification is based on main activity of the enterprise that contributes the largest share to total gross output of the enterprise. The number of enterprises in the surveys and their statistical indicators are counted only when they are still operating by the 31st of December every year, excluding enterprises that had received business licenses, tax codes but still do not operate; enterprises that were dissolved or jointed to other enterprises; enterprises that got operation licenses but do not locate in local area; economic units that do not independently keep business account such as branches, dependent economic units and other noneconomic bodies.

The contents of the surveys cover indicators to identify enterprises including their name, address, type, and economic activities of the enterprises, and indicators to reflect production situations of the enterprises such as their employees, income of employees, asset and capital source, turnover, profit, contributions to the state budget, investment capital, taxes and other obligations to the government, job training, and evaluations on the investment

environment. Therefore, all of the variables (except the variable BTE) in our study can be measured by using the data source of these surveys.

The variable BTE reflecting barrier to entry in the market is proxied by the entry costs in the market in different provinces in Vietnam. Entry cost is one of ten sub-indices to construct the composite index PCI (The Vietnam provincial competitiveness index). The PCI was developed at the first time in 2005 by the Vietnam Chamber of Commerce and Industry (VCCI) and the U.S. Agency for International Development (USAID)-funded Vietnam Competitiveness Initiative (VNCI). The PCI is an effort to explain the reasons why some parts of the country perform better than others in terms of private sector dynamism and growth.Each sub-index is standardized to a ten-point scale, whereby the best and worst performing provinces are awarded the scores of 10 and 1 respectively, and the other 62 provinces distributed somewhere along scale between these two scores. The sub-index "entry costs" reflects:

+ Percentage of firms waiting over 01 month to start a business

+ Percentage of firms waiting over 03 months to start a business

+ Effective land wait days (determined by government efforts, not supply/demand conditions)

+ Length of business registration in days

+ Length of business re-registration in days

+ Number of licenses and permits required to operate

+ Percentage of firms having difficulty to obtain all licenses/ permits to start a business

Table 1 presents the descriptive statistics of the variables.

Estimation results and robustness tests

Table 2 shows the results of Breusch-Pagan/ Cook-Weisberg test for heteroskedasticity in model (1) and model (2). Test results indicate that heteroskedasticity is present in the models.

Table 1: Descriptive statistics

No.	Variable	Obs.	Mean	Std. Dev.	Min	Max
1	profit	868523	1319	144187	-39100000	48400000
2	roa	867496	-0.0789	263.4512	-196820	144062
3	si	868511	0.0004	0.0073	-0.0032	1
4	hhi	868511	0.0180	0.0437	0.0017	1
5	labor	868523	39.97	367.96	1	87279
6	bte	868093	7.7245	1.0790	5.07	9.52
7	limited	868523	0.0103	0.1011	0	1
8	cooperative	868523	0.0511	0.2202	0	
9	state	868523	0.0047	0.0684	0	
10	jointstock	868523	0.1870	0.3899	0	1
11	fdi	868523	0.0250	0.1560	0	