Economics
The Open-Access, Open-Assessment E-Journal

Discussion Paper
No. 2012-12 | February 14, 2012 | http://www.economics-ejournal.org/economics/discussionpapers/2012-12

Evolution of Competition in Vietnam Industries over the Recent Economic Transition

Tinh Doan
Ministry of Economic Development, Wellington

Please cite the corresponding journal article:
http://www.economics-ejournal.org/economics/journalarticles/2010-19

Abstract Understanding the degree and evolution of competition across industries is an important step towards understanding the impact of economic reform and competition on economic growth in Vietnam during the economic transition. In this paper, the author investigates the evolution of competition in Vietnam during the economic transition using the price-cost margin (PCM) or mark-up that has been widely applied in the economic literature and the profit elasticity (PE) recently developed by Boone in his paper *Competition* (2000). This paper provides the first empirical study of intensity and evolution of competition across selected industries in Vietnam in the last decade using firm-level data from the Vietnam Enterprise Census (VEC) conducted annually since 2000 by the Vietnam General Statistical Office (GSO).

JEL D40, L5, L11, P20, P30

Keywords Competition; industry; economic transition; Vietnam

Correspondence Tinh Doan, Economic Development Policy Branch, Ministry of Economic Development, New Zealand; e-mail: thanhtinhdoan@gmail.com

Thanks were given to Vu Van Huong for data sharing. The opinions, findings, recommendations and conclusions expressed in this paper are those of the author. The Ministry of Economic Development, New Zealand takes no responsibility for content, any omissions or errors in the information contained in this paper. Access to the data used in this study complied with security and confidentiality provisions of the Vietnam Statistics Law 2003. Only people authorised by the Vietnam Statistics Law 2003 are allowed to see data about a particular individual, household, business or organisation. The results in this paper have been confidentialised to protect individual businesses from identification.

1. Introduction

Vietnam initiated the economic reform "doi moi" in mid-1980s. The reform was then deepened in 1990s. Introductions of the first Enterprise Law in 2000, Unified Enterprise Law in 2005, Competition Law in 2005, and more international integration such as WTO accession in 2006 have helped untie business practices and stimulated competition. These economic policies are expected to generate more competitive business environment in the Vietnam economy.

Understanding the relationship between competition and economic performance is critical to developing industries and constructing competition policy and regulations for a transition economy. However, we currently have little information on the degree of competition and its evolution in the majority of economic sectors in Vietnam during the transition to a market economy. To fill this gap, this paper examines extent and evolution of competition in the economy. This paper was expected to involve answering the following questions: (a) How competitive are across industries in Vietnam? (b) How does the competition evolve during the recent transition? To some extent, the paper provides evidence of the effects of economic reform and pro-competitive policies on the competition intensity.

This study aims to provide a broad picture of competition across the Vietnam industries rather than detailed analysis of clearly-defined, specific markets that are the provenance of competition agencies and well beyond the focus of this paper. The primary data source for the analysis is the Vietnam Enterprise Census (VEC), a micro firm-level dataset. Firms' sectors are classified according to their major economic activities rather than their products or services. Because of the available data, our primary focus for definitions of 'the market' will relate to standard industrial definition using the Vietnam Standard Industrial Classification (VSIC). From VEC2006[2] onward GSO used two VSIC classification systems, VSIC1993 and VSIC2007, but to have a unique classification for all the censuses we use the VSIC1993 to define markets.

In this paper we first discuss measures of competition. We will pay more attention to a recently developed measure of competition that is widely believed to be robust to some of the problems that the conventional measures face in the empirical analysis of competition. We calculate two measures of competition – the Price-Cost Margin (PCM) and Profit Elasticity (PE) – for a range of selected industries in Vietnam. These measurement outputs provide

[2] This census was conducted in 2007 but collected data on firm activities in 2006, for short we named VEC2006.

inputs for future research such as determinants of competition, and impact of competition on firm performance.

The remainder of this paper is structured as follows. In section 2, we discuss background on economic transition in Vietnam and key pro-competitive shocks in the current years. Section 3 briefly reviews the nature and methods for measuring competition. Section 4 is for the data and model used. In section 5, we present our results for Vietnam industries. Section 6 concludes and discusses avenues for future research.

2. Background

The failure of Soviet-stylized economic system in Russia and East European economies in 1980s and early 1990s forced the Vietnam government to carry out the economic reform in mid-1980s and deepened the reform in early 1990s when the Soviet bloc massively collapsed. The economic reform or transition in Vietnam has led to great economic growth and economic structure changes. Vietnam has experienced impressively economic growth and poverty reduction over the last 20 years. The real GDP per capita has increased remarkably from US$98 in 1990 to more than US$1,000 in 2009 (IMF, 2010). Economic activities were untied thank to the transition; households and businesses have had more autonomy in economic activities. A great increase in number of firms is observed in the last decade from the first Enterprise Law introduction in 2000, from about 42,000 firms to more than 240,000 firms in 2009,[3] is a good example (GSO, 2010a; VEC, 2009). There is a significant shift of employment structure between industries during the last 10 years. In 2009, the agriculture, forestry and fishing sector makes up 52% of employment, a considerable decline from about 70% in 1999 (GSO, 2010b).

The sharp rise in number of firms over the last decade may be a good signal of competition in Vietnam, number of state owned enterprises (SOEs) declined markedly from about 5,760 in 2000 to 3,200 in 2009 (VEC, 2000 & 2009). This could reflect the shrinking government's direct intervention in economic activities and be good for competition. But in fact a relatively small number of SOEs accounts for almost number of large firms in the economy, and still accounts for a high proportion of total investment capital (more than 40%) (GSO, 2010a), controls important economic industries and keeps having privileges from the government. One may argue that the large SOE monopolies would continue to dominate markets and thus private sector would not be able to develop well (e.g. Hersch, Kemme & Bhandari *et al*, 1994).

[3] These figures do not include economic householders such as farmers, shopkeepers, fishermen, small unregistered businesses. etc.

Additionally, that the sharp growth of number of firms is dominated by private sector may not be as dynamic and competitive as the growing number of businesses suggests because the number of newly registered firms may be a misleading indicator of private sector expansion (Hakkala & Kokko, 2007) and competition intensity improvement. The fact that newly established private firms have mostly medium, small, and micro sizes (Hakkala & Kokko, 2007), as well as unwillingness and ambiguousness of the Communist Party to equitize and privatize the SOEs, implies the incomplete economic transition to a market economy and low competitiveness in Vietnam.

However, Vietnam is an open economy; foreign trade turnover is very high, 160% of GDP (Doan & Gibson, 2010) of which import turnover has been always higher than export since early 1990s. Therefore, import penetration would increase intensity of competition in Vietnam economy as observed in many other economies including transition economies (Bugamelli *et al*, 2009; Chen, Imbs & Scott, 2009; Konings *et al,* 2003; Raff & Wagner, 2010). Put all together, we expect an increasing trend of competition intensity during the economic transition due to economic openness and pro-competitive policy introductions in Vietnam.

Given the fact that many factors may affect competition intensity in different ways, the question remains whether competition intensity increases significantly in a transition economy of Vietnam over the last decade given the fact that there is a rapid increase in number of firms due to economic transition. If it is not the case, then an increasing number of firms over the transition may not be a good indicator of competition. A robust measure of competition is essential to uncover the evolution of competition in this sense.

3. Competition measures

3.1 Competition definition

Competition is a widely used concept in economics. In the 18th century, Adam Smith started using the concept and evaluated impacts of competition on economic efficiency. However, so far there is no a unique definition and complete understanding about competition. Many tried to visit and revisit the meaning of competition in economics, for instance, Lerner (1934), Stigler (1957), McNulty (1968), and Boone (2000, 2008). Although there is no unique definition of competition, firm's market power or extent of monopoly is widely used as an indicator of competition. Monopoly means a firm has market power to profitably raise price over marginal cost. On the contrary, competition results in decline in profits of all firms if

they have the same marginal costs. Competition may also lead to reallocation effect, more efficient firms will expand market shares on the cost of less efficient firms as they can use their cost advantage more aggressively and then force the least efficient firms to exit the market. These two opposing effects imply selection effect (Boone, 2000). The easiness of market entry makes the market is more competitive. Therefore, competition is associated with the decrease in firm's market concentration and profits or total industry profits, but Boone (2000) states that these properties are not always the case because many firms would increase profits in fiercer competition environment due to reallocation effect.

3.2 Competition measures[4]

Competition is often measured by concentration rate, rents, price-cost margin (PCM) (also called mark-up or Lerner index), import penetration, and profit elasticity (PE) (see Domowitz *et al*, 1986; Blundell *et al*, 1999; Nickell, 1996; Boone, 2000 & 2008). Early studies of competition employed measures such as Concentration index (CI) or the Herfindahl Index (H). More completive market has a lower CI or H. The idea behind these indices is that the structure of the market is the determinant of competition. More concentrated markets are less competitive as some leading firms control large market shares and have market power. The problem of this measure is that the structure of the market, in terms of the number of firms and their market shares, are themselves the outcomes of a competition process. For example, an increase in competition may reallocate market shares to more efficient firms with higher mark-ups, thus the Herfindahl index actually *increases* rather than decreases as expected effect of competition on the index. In other words, the H index is not monotonically decreasing as competition intensity increases.

Similarly, rents, PCM and import penetration are also not strictly monotonic (Boone, 2000, 2008). For example, Amir (2003), Rosenthal (1980) and Stiglitz (1989) show that in some cases PCM still raises even competition increases. Likewise, a rise in import penetration will increase competition when import barriers are removed, but it is not always the case if domestic producers are more efficient than importers, the reallocation and selection effects still occur. In other case where there is collusion between domestic firms and foreign firms (or importers), such an increase in import penetration in these cases will not increase competition. In summary, the first four measures are not robust. However, in this paper we still employ the conventional PCM method as it is a popular empirical measure and well known as Lerner Index in economics. In addition, if results from PCM measure support the PE measure, it

[4] This subsection is drawn from Devine, Doan, Mok, Kris and Stevens (2011).

would help to corroborate our findings. We now turn out to discuss the PCM measure and then pay more attention to the profit elasticity (PE) which is believed to be theoretically robust (Boone, 2000).

3.2.1 Price Cost Margin

Economists classify markets according to firms' ability to influence markets through market power. Lerner Index or Price-Cost Margin (PCM) is widely used to measure the market power. The difference between price (p_i) and marginal cost (c_i) gauges levels of competition in a market. If the difference or margin is nil, that is $p_i = c_i$, the market is perfectly competitive whereas PCM is greater than zero, firms are able to pose prices over their marginal cost. If the margin approaches to one (theoretically) the market is purely monopolistic. This has led to the PCM being empirically used as one of measures of competition (Nickel, 1996; Schiersch & Ehmcke, 2010) and become a very popular measure of competition in economics. The PCM for firm *i* can be written as follows:

$$PCM_i = \sum_i \left(\frac{p_i - c_i}{p_i} \right) \tag{1}$$

where p_i and c_i are the unit price and marginal cost of firm *i*.

To evaluate competition intensity in industries, we need to aggregate firm's PCM up to industrial levels by taking weighted mean of firm level PCMs. The firm' market share s_i is used as weight to capture the market power of big firms. The PCM measure of competition in a market or industry *j* is estimated as follows:

$$PCM_j = \sum_{i \in j} \left(\frac{p_i - c_i}{p_i} \times s_i \right) \tag{2}$$

PCM measure can be interpreted as when competition increases PCM decreases. PCM measure has two main drawbacks. First, it is not a robust competition measure (Boone, 2000) because an increase in competition, e.g. the increasing number of firms in a market or an increase in competition among firms in recessions, does not always lead to lower PCM (Amir, 2003; Stiglitz, 1989). Second, PCM measure ignores the reallocation effect. In a fiercer competition, more efficient firms expand their market shares while the less efficient firms' market shares shrink. Consequently, the weighted average PCM may increase if the rise of more efficient firms' market share (s_i) is greater than the decrease in respective individual

firm PCM. Thus, PCM indicator in this case may be misleading (Boone, 2000; Schiersch & Ehmcke, 2010).

3.2.2 Relative profits and profit elasticity

Consider a market where there is heterogeneity in PCMs due to differences in efficiency. An increase in competition is likely to have two effects: a *reallocation* and a *selection* effect. Profits will be reallocated from less efficient firms to more efficient firms. Competition adversely affects the profits of inefficient firms harder than those of more efficient firms. Inefficiency is more severely punished in a more competitive market (Boone, 2000 & 2008; Devine *et al*, 2011). The *selection effect* operates through firm exit; where the least efficient firms suffer losses and are forced to cease and exit the market, the exited firms leave behind their market shares and profits for more efficient firms, the survived firms then obtain higher PCMs. The weighted average PCM for an industry or market may increase or decrease depending on the difference between decrease in individual firm PCM and reallocating output (increase in market shares) to firms with higher PCMs.

Boone (2000) proposed a measure of competition and later in (2004, 2008) developed into a new measure of competition called Relative Profits Differences (RPD). The spirit of this measure is that competition rewards efficiency. A market maps marginal cost differentials between firms into profit differentials. An increase in competition may lead to a decrease in the output of firms, but the decrease will be higher for less efficient firms. Therefore, the market share for less efficient firms shrinks while that of more efficient firms increases.

Let consider the case where there are two firms in a market with profits defined as $\pi(\eta)$ with the firms having different levels of efficiency (η) where $\eta'' > \eta'$. The RPD can be calculated as the ratio of the profits of the more efficient firm to the less efficient firm:

$$RPD(\eta) = \frac{\pi(\eta'')}{\pi(\eta')} \tag{3}$$

The RPD can measure the impact of competition via its impact on the relative profits of the two firms. If competition increases due to more firms entering the market for example, leads to higher the RPD. This is because as firms respond to the increase in competition will reduce the profits of the more efficient firm by less than inefficient firm. Thus, profits will be reallocated from the less efficient firm (η') to the more efficient firm (η'').

Griffith *et al*. (2005) slightly modified the RPD to a more general case for many firms in a market that can be used to measure industry-wide measure of competition, Profit Elasticity (PE). The PE measures the response of profits to changes in marginal cost. When competition increases, inefficient firms take a greater decrease to profits than do more efficient firms. The advantages of this measure are that, under certain assumptions, it is monotonic with competition intensity and requires no further data as the other methods. These assumptions include firms being completely symmetric except for their marginal cost levels. Boone (2000, 2008) also assumes that firms choose their strategic variables simultaneously and independently.

The PE measure is calculated by running an OLS regression of firms' profits (π) on their marginal cost. However, the marginal cost is often not available so average variable cost (*avc*) is used instead.

$$\ln(\pi_{ij}) = \alpha + \beta_j \ln(avc_{ij}) + \varepsilon_{ij} \tag{4}$$

where profit equals sales (y_i) of firm i minus total variable cost (tvc_i) (labour cost and intermediate costs), and average variable cost equals to total variable cost (tvc_i) divided by sales. That is:

$$\ln(\pi_{ij}) = \alpha + \beta_j \ln\left(\frac{tvc_{ij}}{y_{ij}}\right) + \varepsilon_{ij} \tag{5}$$

PE measures how much is change in profits of firms in industry j caused by a unit change in average cost. In other words, the β coefficient measures the elasticity of profits with respect to changes in average cost. The coefficient β is expected to be negative, indicating that as firm average cost increases, profits of the firm will decrease. In a more competitive market, β will be more negative as profits are more sensitive to similar changes in average cost.

The PE is robust to the ambiguity of the reallocation effect (Boone, 2000 & 2008). This feature is theoretically superior over other competition measures because PE is monotonic with changes in competition intensity whereas other measures such as the PCM are not monotonic as PCM can increase even in fiercer competition conditions due to reallocation effect.

However, there are a few assumptions underlying the PE measure that can make it biased (Creusen *et al*, 2006a & 2006b; Schiersch & Schmidt-Ehmcke, 2010). First, given that the indicator measures competition based on efficiency, it assumes that one is able to rank firms

based on their efficiency (assuming a direct relationship between efficiency and cost). Second, the indicator assumes symmetry in the market meaning that firms respond in the same way to changes in competition given their relative efficiency, 'firm *i*'s profits are the same as firm *j*'s profits would be if firm *j* was in firm *i*'s situation' (Athey & Schmutzler 2001). This is to ensure that the results are due to changes in competition, and not due to changes to the industry structure. Third, the PE uses average cost instead of marginal cost because of data un-availability. Other problems are unobserved unlevel playing field (that tends to be in favour of the most efficient firm in a certain industry) and problems with defining irrelevant market for firms thus affecting estimated coefficient (Boone, 2000). As these reasons, Boone noted that comparing competition between industries using PE measure may be nonsense, but changes in the measured competition intensity over time within an industry can tell the trend of competition in that industry. This paper focusing on examining evolution of competition during the economic transition matches well this measure.

4. Data and methods

The data used in this paper comes from the Vietnam Enterprise Census (VEC). The census was conducted annually since 2000 by the Vietnam Statistical Office (GSO). The VEC provides comprehensive information about firms and their activities in the first decade of the twenty first century. The survey offers information on demographic data of firms, firm ownership, business activities, employment, income of employment, assets, capital, business performance, revenue, profit, detailed information for each production sector such as manufacturing, transport, communication, restaurant, accommodation, education, agriculture, whole sales, retail etc.

Industries or markets have been defined in this paper by the Vietnam Standard Industrial Classification (VSIC) 4-digit industry level codes. This is standard for defining possibly narrowest markets. If the definition of market is too broad, the estimated competition may overestimate or underestimate the true intensity of competition depending on relative cost and profit ratios of the added firms. However, the 4-digit level market definition may not be complete. Industries in this paper are defined according to firms' main economic activities, but markets can be also defined according to firm products, so one should bear in mind when interpreting the results.

Our analysis is restricted by usable data. We removed firms without tax code for some reasons such as missing data or infant firms since we use the tax code as firm identifiers to

merge and append data. Some 4-digit industries have very few firms that do not allow us to estimate competition intensity using regressions such as PE, we drop those industries. However, one should bear in mind when considering issues of competition, these industries where there are a small number of players could be also of interest. The focus of this paper is the degree of competition in the Vietnam one-digit level industries, not to study specific markets.

In addition, we exclude some industries those we believe either the current data do not support or the government still not yet treated or allowed them to operate in a market mechanism because of the Communist Party's political doctrine. These industries are 'Agriculture, hunting, forestry and related services', 'Fishing and aquaculture', 'Personal and community services', 'Electricity and water supply', 'Recreational, cultural and sports', 'Healthcare & social work', 'Education and training'. The number of registered firms in the first three industries does not include millions of economic householders who are also producers and competitors like small farmers, fishermen, café owners, shopkeepers and barbers in the markets.[5] The current number of registered firms in these industries does not reflect sufficiently number of firms in the playing field and competition intensity. For 'Electricity and water supply' is simply state monopolistic as few state-owned enterprises has been so far operating in this industries. The last three industries have not been fully treated yet as profit making and financial self-sufficient ones in market mechanism by the government and current laws. Therefore, study on competition for these industries would be partial.

Two measures of competition for industry level, the conventional measure of weighted price-cost-margin (PCM) and the recently developed measure of profit elasticity (PE) are employed to examine levels and evolution of competition in Vietnam.

The price cost-margin is computed as follows:

$$PCM_{jt} = \sum \left(\frac{p_{it} - c_{it}}{p_{it}} \times s_{it} \right)$$

where p_i is the price of firm i's output, c_i its marginal cost and s_i the firm's market share in industry j in year t.

[5] There were about 44 million people, out of population of 86 million (GSO, 2010b), in working ages in 2009. However, only about 8.3 million working for firms (GSO, 2010a), the remaining of labour force are small economic householders such as farmers, fishermen, other unregistered micro self-employed households.

The problem one faces with implementing this measure, however, is that marginal costs and prices in many cases are seldom observed in practice. Thus, in order to calculate PCM we use gross output (sales) and average variable costs instead:

$$PCM_{jt} = \sum_{i \in j}\left(\frac{p_{it} - c_{it}}{p_{it}} \times s_{it}\right) \approx \sum_{i \in j}\left(\frac{y_{it} - ic_{it} - w_{it}}{y_{it}} \times s_{it}\right)$$

where y_{it} is gross output (sales) of firm i at time t, ic_{it} is intermediate costs, w_{it} is labour cost, s_{it} is the firm's market share in industry j in year t.

The estimates of the profit elasticity (PE) come from a set of industry-year OLS regressions as follows:

$$\ln(\pi_{ij}) = \alpha + \beta_j \ln\left(\frac{tvc_{ij}}{y_{ij}}\right) + \varepsilon_{ij}$$

where total variables costs (tvc_i) are the sum of intermediate costs and labour costs.[6]

5. Empirical results

In this section we look at competition in Vietnam industries, both how they compare across broad industries and how they have changed over time.

Table 1 and Figure 1 show the aggregated 1-digit industry PCMs. In early 2000s, the least competitive sectors from the perspective of the PCM are the 'Mining and quarrying', 'Property business, R&D and consultancy services', 'Transport, storage, travel services, post and telecommunications' and 'Manufacturing'. On the contrary, the mark-ups of the 'Retail trade and individual and household appliance repairs', 'Whole sales', 'Sales and maintenance, repairs of motor vehicles and machinery and related services' and 'Construction' are lowest suggesting that these industries have highest competition intensity.

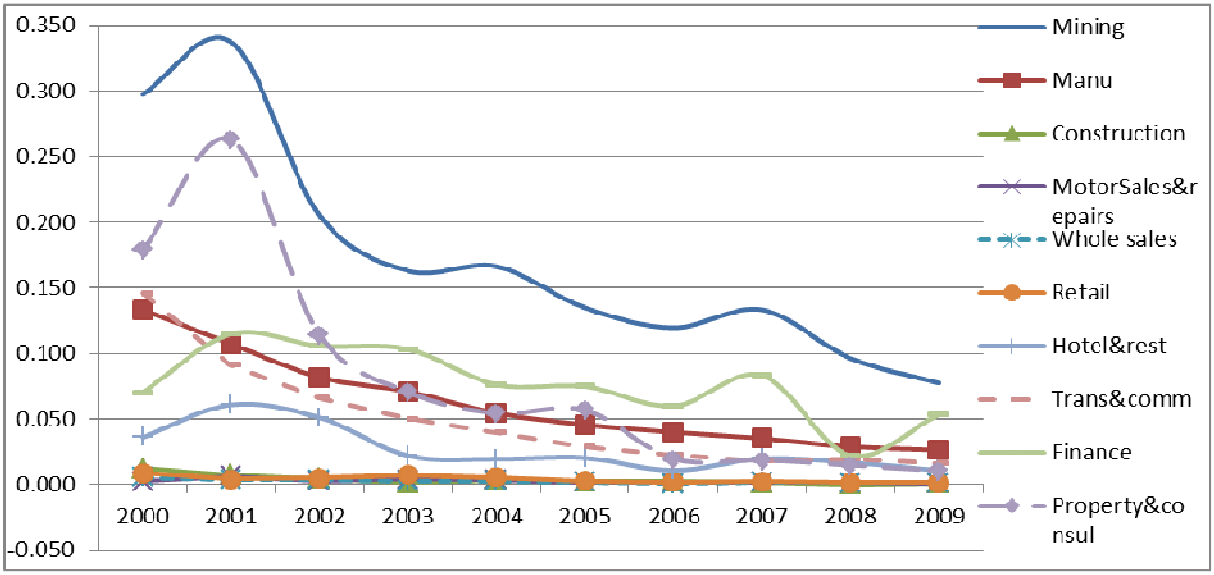
[6] For more detail of the variables and their definitions, see Data Appendix.

Table 1: PCM by one-digit industry level over the period 2000-2009

PCM by ind1	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	Change
Mining	0.298	0.338	0.205	0.163	0.166	0.135	0.120	0.133	0.096	0.077	-0.220
Manu	0.133	0.107	0.082	0.071	0.054	0.046	0.040	0.035	0.029	0.027	-0.107
Construction	0.012	0.007	0.005	0.001	0.004	0.002	0.002	0.002	0.000	0.001	-0.012
Motorsales&repair	0.002	0.006	0.003	0.004	0.004	0.002	0.001	0.002	0.001	0.001	-0.001
Whole sales	0.006	0.004	0.003	0.003	0.003	0.002	0.001	0.002	0.001	0.001	-0.004
Retail	0.009	0.004	0.005	0.007	0.005	0.003	0.002	0.002	0.001	0.001	-0.007
Hotel&rest	0.036	0.061	0.051	0.022	0.020	0.020	0.011	0.020	0.017	0.011	-0.025
Trans&comm	0.146	0.091	0.066	0.050	0.040	0.029	0.023	0.018	0.020	0.016	-0.129
Finance	0.070	0.115	0.106	0.103	0.076	0.075	0.060	0.083	0.022	0.053	-0.017
Property&consul	0.179	0.263	0.114	0.071	0.054	0.057	0.020	0.019	0.015	0.011	-0.168

The PCMs declined in all studied industries over the study period (Figure 1), except in 2000-2001 where we observed the PCM increase in some industries such as mining and quarrying; property business, R&D and consultancy services; finance and hotel and restaurants. This exception would be due to the effect of the first Enterprise Law in 2000; a large number of firms were established including the formalization of unregistered household enterprises (Hakkala & Kokko, 2007). The formalization may make up the mark-ups immediately, but the effect of the law and massive entry of new firms in subsequent years has led to an increase in competition and lowering PCM. One interesting finding is that competition increased faster over the period in the least competitive industries in the beginning of study period (the 'Change' column of Table 1). This is perceivable as the lift of business barriers would be conducted in the industries where there were significant business restrictions. For example, mining, telecommunications, transports, and business consultancy services were treated as (politically) sensitive industries in Vietnam; they were state monopolistic and had higher PCMs until late 1990s. Then the strict barriers of entry in these industries have been gradually removed in 2000s. However, the PCMs of mining and quarrying, finance (banking) and telecommunications industries are still higher than in other industries there still exist some certain entry barriers such as entry licencing and high start-up capital at the end of the study period.

Figure 1: Vietnam industry average PCM (2000-2009)



We now turn out to apply profit elasticity (PE) to measure competition intensity in the selected industries. It is worth noting that PE reflects how sensitivity of profits with respect to a unit change in average cost. In theory, the more competitive is the industry the higher (more negative) is the PE. However, as discussed previously, Boone noted that comparing competition between industries using PE may be nonsense, but changes in the measured competition intensity over time within an industry can tell the trend of competition in that industry. Therefore, we pay more attention to the evolution of competition in the industries over time than comparing competition across industries.

There is an improvement in competition level of all considered industries in Vietnam (the 'Change' column of Table 2). The biggest absolute improvement is observed in 'Finance', 'Sales and maintenance, repairs of motor vehicles and machinery and related services', and in 'Manufacturing. But the highest relative rise is in 'Property business, R&D and consultancy services', 'Hotel and restaurants', and 'Manufacturing industries. In contrast, the least improvements both in terms of absolute and relative are found in 'Mining and quarrying' and 'Transport, storage, travel services, post & telecommunications', though competition in these industries have steadily risen over the period (Figure 2).

In 2009, industries such as mining & quarrying, construction, hotels and restaurants, and transport, storage and communications are less responsive to cost changes than other industries such as finance, manufacturing and whole sales.

Figure 2: Vietnam industry average PE (2000-2009)

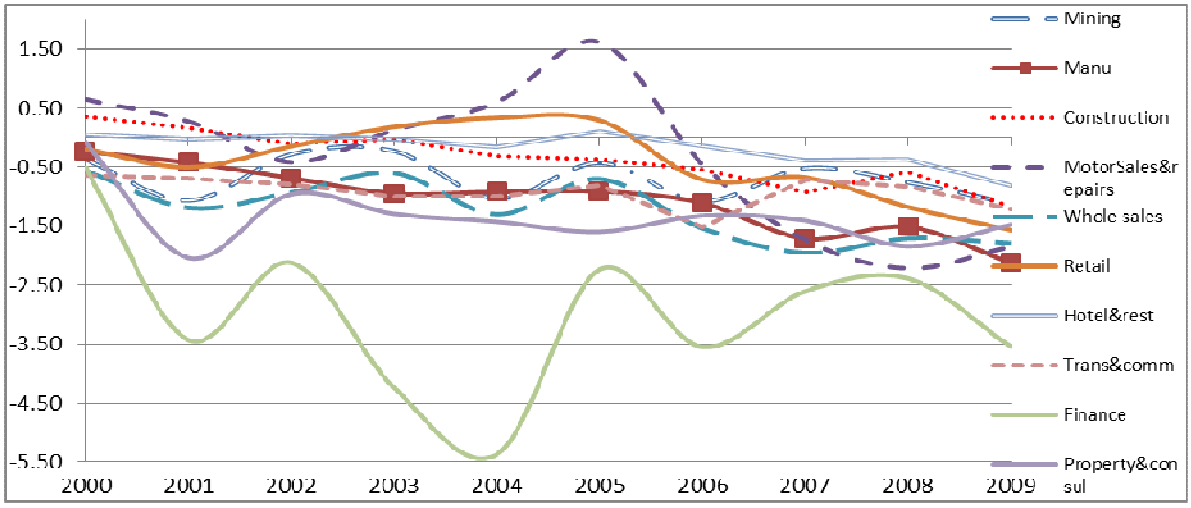


Table 2: PE by one-digit industry level over the period 2000-2009

1-digt industry	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	Change
Mining	-0.37	-1.07	-0.28	-0.23	-1.03	-0.43	-1.08	-0.52	-0.76	-1.12	-0.75
Manu	-0.24	-0.43	-0.68	-0.95	-0.92	-0.91	-1.11	-1.71	-1.51	-2.12	-1.88
Construction	0.35	0.17	-0.11	-0.02	-0.31	-0.38	-0.55	-0.92	-0.58	-1.17	-1.53
Motorsales&repairs	0.65	0.28	-0.41	0.13	0.60	1.62	-0.45	-1.73	-2.21	-1.85	-2.49
Whole sales	-0.56	-1.19	-0.93	-0.60	-1.30	-0.70	-1.54	-1.95	-1.71	-1.79	-1.23
Retail	-0.19	-0.50	-0.15	0.18	0.33	0.29	-0.71	-0.68	-1.17	-1.57	-1.38
Hotel&rest	0.05	-0.03	0.04	-0.02	-0.16	0.10	-0.14	-0.39	-0.37	-0.82	-0.87
Trans&comm	-0.64	-0.69	-0.79	-0.99	-1.00	-0.81	-1.52	-0.72	-0.82	-1.21	-0.58
Finance	-0.51	-3.42	-2.12	-4.23	-5.37	-2.23	-3.55	-2.60	-2.38	-3.54	-3.03
Property&consul	-0.08	-2.04	-0.96	-1.29	-1.42	-1.60	-1.32	-1.41	-1.84	-1.48	-1.40

Figure 2 also indicates that the introductions of the first Enterprise Law in 2000, Unified Enterprise Law in 2005, and the Competition Law in 2005 have pro-competitive effects. In both years 2000 and 2005 the competition became fiercer. All the curves except finance sector curve became steeper after 2005. Additionally, effect of the economic downturn started in 2008 would be a potential underlying reason for a sharp decline (more negative) in PE in a period 2008-2009. The fast increase in competition in finance sector until 2004 would be due to entry of many new banks in the period until 2004 and loosen monetary policy particularly interest rate cuts over period 2001-2005 in Vietnam to stimulate economic growth. The tighten monetary policy to fight inflation and harder regulations on establishing new banks e.g. raised level of legal required capital since 2005 explain lower level of competition in this industry. It is worth noting that when the State Bank of Vietnam raises the base interest rate,[7] commercial banks are able to lend at maximum 150% of the base rate, their competition is

[7] When there is inflation and credit demand pressure.

restrained by this regulation, on the other hand banks are able to compete with others by lowering the lending rates when there is no credit demand pressure in the capital market.

To consolidate our finding on the improved level of competition, we further look at competition measures at 4-digit industry level since one potential shortcoming of aggregated one-digit level PE measure is that the competition intensity of some 4-digit industries may not be improved even worsen but cancelled out by overwhelming intensity of other industries. Our implicit assumption that the changes in the level of competition in 1-digit industries reflect the changes in the component 4-digit industries may be undermined. Furthermore, fiercer competition in the 1-digit industry may be due to the fact that the component industries are becoming more competitive, or may be due to the more competitive industries are growing i.e. economic structure change. For this reason, we now look at changes in competition intensity in the component industries.

Figures 3 and 4 show how competition has changed across 4-digit industries in Vietnam over 2000-2009. To get more smoothed changes in PCM and PE over the study period 2000-2009 and minimize missing values, we estimate means of PCM and PE for two periods 2000-2001 and 2008-2009.[8] As competition increases firms' ability to mark-up decreases, but the sensitivity of profits to average costs increases. Therefore that a decline in PCM indicates an increase in competition whereas more negative PE indicates an increase in competition is expected.

Both measures suggest that there is a larger group, about two thirds, of industries that appear to have an improvement in competition. This group of industries is dominant when considering PCM; but it is worth noting that there exists a significant group of industries in 'Retail trade, individual and household appliance repairs', 'Whole sales', and 'Construction' sectors, about that of increased PCM group, have little changes in PCM as these industries had low PCMs already in the beginning of the study period. Therefore, it would be argued that that low mark-ups in the industries may not provide enough sufficient incentives for entry of new firms thus competition pressure has not increased much in the low PCM industries.

[8] Some industries those have no data on either of the two periods are removed, and to compare PCM and PE, we remove industries whose PEs are missing due to insufficient observations when estimating PE.

Figure 3: Change in PCM by 4-digit level industry over 2000-2009

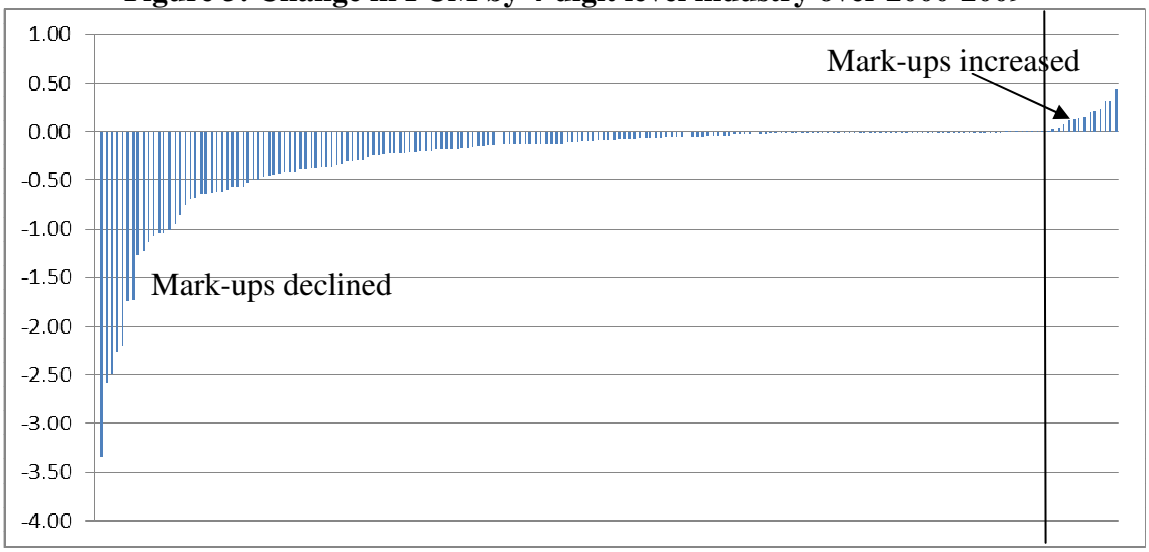
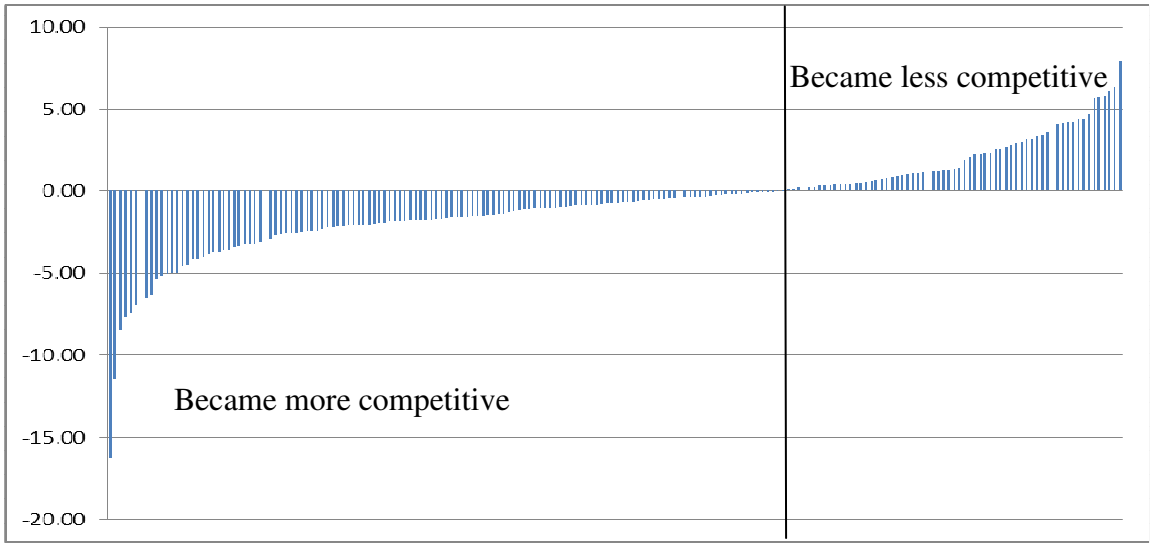


Figure 4: Change in PE by 4-digit level industry over 2000-2009

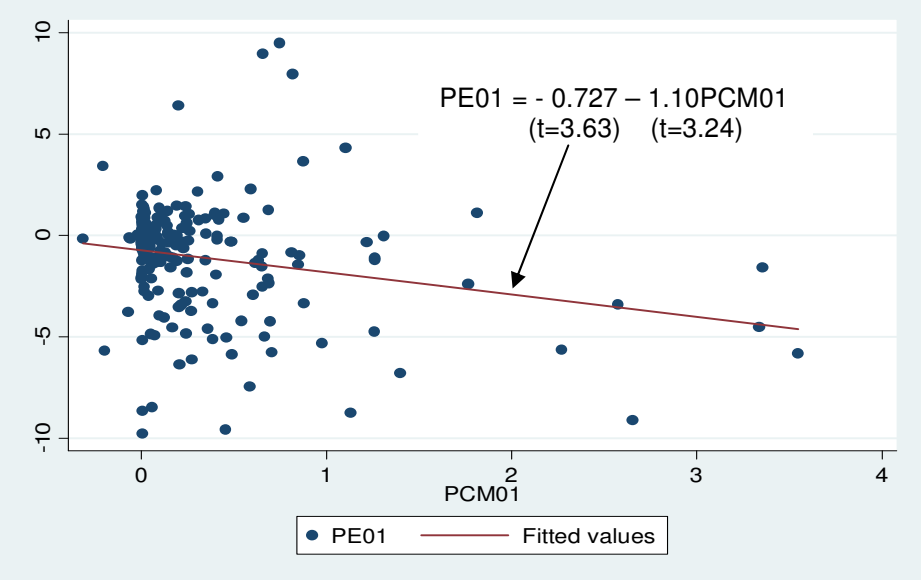


The predominant increasing trend of competitiveness over the period is also collaborated by the profit elasticity measure. This finding accords well with other studies on transition economies where pro-competitive policy such as economic restructure, privatization, increase in number of firms, economic openness are associated with levels of competition (Carlin, Fries, Schaffer & Seabright, 2001; Hersch *et al*, 1994; Vagliasindi, 2001), but different from developed economies such as New Zealand, the Netherlands where there are ambiguous trends in competition evolution in the last decade as the markets are believed to be more mature (e.g. Creusen *et al*, 2006b; Devine *et al*, 2011).

The two measures of competition roughly tell us a consistent story at an aggregated level. However, in some industries PE and PCM are not consistent in representing the competition intensity, they do not consist one another. In theory, one industry that a higher price-cost

margin often has lower (in terms of magnitude) profit elasticity. Thus, PCM and PE would often be negatively related to one another. In other words, as competition increases firms' ability to mark-ups decreases, but the sensitivity of profits to average cost increases. Figures 5 and 6 show a negative relationship between PCM and PE. In Figure 5 we use pooled data of two years 2000 and 2001 to estimate PCM and PE, and we name these PCM01 and PE01. This significantly negative relationship implies that these two measures of competition are complimentary in case of Vietnam industries in early stage of economic transition when the competition was still restrained.

Figure 5: Relationship between PCM01 and PE01

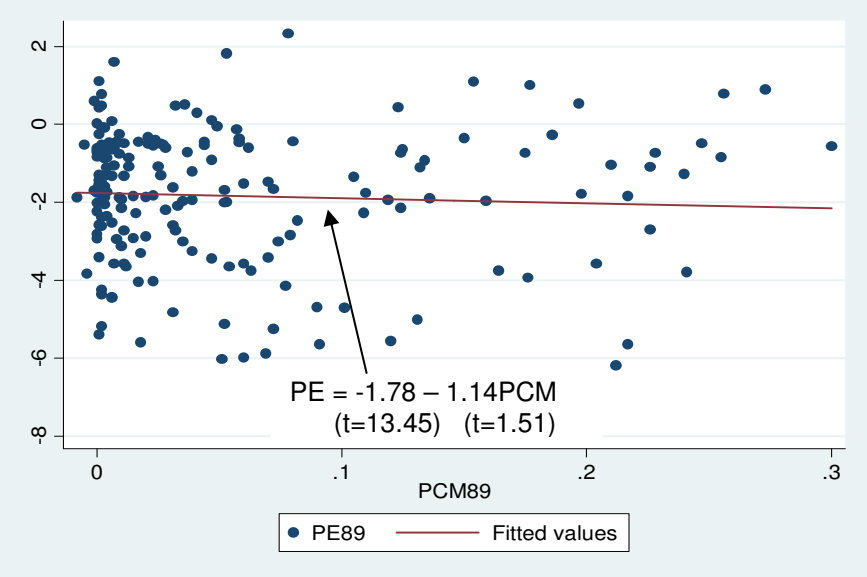


This correlation is consolidated when we look at the relationship between change in PCM and change in PE over 2000-2009. A simple regression coefficient of change in PCM on change in PE is negative 1.18 with a robust t-statistic of 3.25 suggesting that industries experienced a higher change in mark-ups were more responsive to average cost.

However, by the end of the study period (2008-2009) the relationship between PCM and PE turns out to be ambiguous (Figure 6) as mark-ups of almost 1-digit industries in Vietnam have declined markedly and fell to low levels (see Figure 1 and Table 1). That means for many 4-digit industries these two measures contradict one another in reflecting competition intensity. The difference between these two measures reflects the fact that in some industries the reallocation effect dominates. The potential explanation would be that fiercer competition in later stage of economic transition had led to considerable reallocation of market shares amongst firms within these industries. Fiercer competition may result in market share reallocation from inefficient firms to more efficient firms. That is, PCM still raises even

competition increases. If the reallocation effect is considerable, PCM no longer correctly represents the intensity of competition. This observation was well discussed and/or evidenced in Amir (2003), Boone (2000, 2008), Creusen *et al.* (2006a &2006b), Devine *et al.* (2011), and Stiglitz (1989).

Figure 6: Relationship between PCM89 and PE89



Note: Three extreme outliers of PCM are removed.

Unlike PCM, PE is monotonic to competition regardless of the reallocation effect of market share as discussed in Boone (2000 & 2008*).* We expect reallocation effect to dominate in highly competitive industries or where there is greater dispersion in efficiency. The inconsistency of these competition measures has been discussed in Creusen *et al.* (2006a), they proposed that higher dispersion in efficiency levels across firms within an industry creates a greater increase in the reallocation effect. Higher levels of product substitutability also increase the reallocation effects. Higher rate of entry into the market during the economic transition may also lead to an increase in competition, however, incorrectly identifies levels of competition by PCM.

6. Concluding remarks

This paper has considered the measurement of competition intensity and its evolution over the first decade of the twenty first century when some key important pro-competitive policies were implemented in Vietnam. We have employed two measures of competition – the Price-Cost Margin and Profit Elasticity. The latter is claimed to be robust to the effects of reallocation and selection that afflict more conventional measures used in the empirical

analysis of competition. We calculate these two measures for a range of selected industries in Vietnam using ten Vietnam Enterprise Censuses initiated from 2000 by the General Statistical Office.

The two measures of competition examined in this paper show that competition in Vietnam has increased significantly between 2000 and 2009. Generally, competition appears to have improved, particularly after introductions of the first Enterprise Law in 2000 and Unified Enterprise Law and Competition Law in 2005. The improvement in competition would be due to the massive rise in number of firms, from more than 42,000 in 2000 to more than 240,000 firms in 2009, and also due to external competition as Vietnam had deepened economic integrity in 2000s particularly accession to WTO in 2006. The recent economic downturn in late 2000s has affected and created a more competitive pressure on firms.

The two competition measures are consistent at 1-digit aggregated level but not really complement well each other in some 4-digit industry level particularly in recent years when we believe that markets in Vietnam become more competitive.[9] Market shares and outputs are reallocated within a market to more efficient firms. Thus, reallocation and selection effect may blur the relationship between PE and PCM. The transition from a command to market economy in Vietnam provides a good opportunity to examine how consistent between PCM and PE in measuring competition. In early economic transition the markets were less competitive, PCM and PE are consistent or they are complementary indicators; but as competitiveness improves and markets are more mature PCM becomes non-monotonic to competition levels.

Intuitively the increase in number of firms and economic integrity or import penetration can be potential explanations to competitive evolution, but other factors such as privatization, pro-competitive policies, and market entry barriers also have roles to play. However, this paper has not yet quantified contributions of these factors. Further work in this area should look at determinants of competition and dynamics of competition.

[9] In early stage of market development and economic transition there would be enough rooms both inputs and outputs for very firms so reallocation and selection effects may not be predominant.

References

Amir, R. (2003). *Market structure, scale economies and industry performance* (CORE Discussion Paper No. 2003/65).

Athey, S., & Schmutzler, A. (2001). Investment and market dominance. *RAND Journal of Economics, 32*(1), 1-26.

Blundell, R., Griffith, J., & van Reenen. (1999). Market share, market value and innovation in a panel of British manufacturing firms. *Review of Economic Studies, 66*(3), 529-554.

Boone, J. (2000). *Competition* (Centre for Economic Research Working Paper Series No. 2636).

Boone, J. (2004). *A new way to measure competition* (TILEC Discussion Paper DP 2004-004), Tilburg University.

Boone, J. (2008). A new way to measure competition. *The Economic Journal,* 118(August), 1245-1261.

Bugamelli, M., Fabiani, S., & Sette, E. (2009). *The pro-competitive effect of imports from China: An analysis on firm-level price data.* Unpublished paper, Bank of Italy, Economic Research Department.

Carlin, W., Fries, S., Schaffer, M., & Seabright, P. (2001). *Competition and enterprise performance in transition economies: Evidence from a cross-country survey* (William Davidson Institute Working Paper No. 376), the University of Michigan.

Chen, N., Imbs, J., & Scott, A. (2009). The dynamics of trade and competition. *Journal of International Economics, 77*(1), 50-62.

Creusen, H., Minne, B., & van der Wiel, H. (2006a). *Measuring competition in the Netherlands* (CPB Netherlands Bureau for Economic Policy Analysis, CPB Memorandum No. 163).

Creusen, H., Minne, B., & van der Wiel, H. (2006b). *Competition in the Netherlands: An analysis of the period 1993-2001* (CPB Netherlands Bureau for Economic Policy Analysis, No. 136).

Devine, H., Doan, T., Iyer, K., Mok. P., & Stevens, P. (2011). *Competition in New Zealand industries: Measurement and evidence*. Paper presented at the 2011 NZAE Annual Conference, Wellington.

Doan, T & Gibson, J. (2010). *Return to schooling in Vietnam during economic transition: Does the return reach its peak*? (Working Paper No. MPRA Paper No. 24984). Available at http://mpra.ub.uni-muenchen.de/24984/1/MPRA_paper_24984.pdf

Domowitz, I., & Hubbard, G., & Petersen, B. (1986). Business Cycles and the Relationship Between Concentration and Price-Cost Margins. *RAND Journal of Economics*, *17*(1).

Griffith, R., Boone, J., & Harrison, R. (2005). *Measuring Competition* (AIM Research Working Paper No. 022).

GSO. (2010a). *The enterprises in Vietnam 9 years at the beginning of century 21.* Statistical Publishing House, General Statistics Office. Hanoi, Vietnam.

GSO. (2010b). *Population and Housing Census, 1 April 2009* (Complete report and major findings, General Statistical Office). Hanoi, Vietnam.

Hakkala, K., & Kokko, A. (2007). *The state and the private sector in Vietnam* (Working Paper No. 236). Research Institute of Industrial Economics, Stockholm, Sweden.

Hersch, P., Kemme, D., & Bhandari, S. (1994). Competition in transition economies: determinants of price-cost margins in private sector manufacturing in Eastern Europe. *Southern Economic Journal, 61*(2), 356-366.

IMF. (2010). *World Economic Outlook Database*, International Monetary Fund, available at http://www.imf.org/external/pubs/ft/weo/2010/01/weodata/weoselser.aspx?a=&c=582&t=1

Konings, J., Cayseele, P., & Warzynski, F. (2003). *The effects of privatization and international competitive pressure on firms' price-cost margins: Micro evidence from emerging economies* (Working Paper No. 03-17). Department of Economics, Aarhus School of Business. Available at http://www.hha.dk/nat/wper/03-17_fw.pdf

Lerner, A. (1934). The concept of monopoly and the measurement of monopoly power. *Review of Economic Studies*, *1*(3), 157-175.

McNulty, P. (1968). Economic theory and the meaning of competition. *The Quarterly Journal of Economics*, *82*(4), 639-656.

Nickell, S. (1996). Competition and Corporate Performance. *Journal of Political Economy, 104*(4), 724-46.

Raff, H., & Wagner, J. (2010). Intra-industry adjustment to import competition: Theory and Application to the German clothing industry. *The World Economy*, *33*(8), 1006-1022.

Rosenthal, R. (1980). A model in which an increase in the number of sellers leads to a higher price. *Econometrica, 48*(6), 1575-1579.

Schiersch, A., & Schmidt-Ehmcke, J. (2010). *Empiricism meets theory: Is the Boone-indicator applicable?* DWI Berlin Discussion Papers No. 1030.

Stigler, G. (1957). Perfect competition, historically contemplated. *Journal of Political Economy*, 65, 1-17.

Stiglitz, J. (1989). *Imperfect information in the product market.* In Schmalensee, R., & Willig, R (eds), Handbook of Industrial Organization Vol. I. Amsterdam, the Netherlands.

Vagliasindi, M. (2001). *Competition across transition economies: an enterprise-level analysis of the main policy and structural determinants* (Working Paper No. 68). European Bank for Reconstruction and Development.

Data Appendix

Key variables used in this paper are defined as below.

Sales of goods and services (GO) include total sales of products and services, and other incomes excluding fixed asset sales. Profits are total before-tax profits. Employment is measured using an average over year beginning and ending employees and working proprietor counts. A working proprietor is assumed to be a person who (i) operates his or her own enterprise or engages independently in a profession or trade, and (ii) receives income from self-employment from which tax is deducted, but not from wages and salary.

Fixed assets are averaged over beginning and ending year values. Depreciation is the difference between year-ending and year-beginning accumulated depreciation. Variable costs include intermediate costs (IC) and labour costs. Labour cost includes wages, allowance, contribution of social and health insurance, and union fees by firms for employees. The intermediate costs include materials, tools, fuel, electricity, water bills, transport expenses, postage, and insurance. As IC is not explicitly collected in the census, thus the IC is estimated as the difference between total sales *minus* sum of labour cost, capital cost (or capital services) and before-tax profits. Capital service cost is estimated as follows:

$$\text{Capital cost} = \text{Depreciation} + \text{interest rate} * \text{fixed asset}$$

where interest rate is yearly average interest rate, equals 150% of the base rate of the State Bank of Vietnam (Central Bank of Vietnam).