The determinants of concentration in the South African manufacturing industry

Anmar Pretorius

Ewert Kleynhans

Reghard van Niekerk

School of Economics, NWU

Introduction

- High levels of concentration in the SA economy highlighted by the IMF (2014) and President Zuma (2017 SONA address)
- Academic literature:
  - high levels of industry concentration noted by, amongst aothers, Du Plessis (1981), Fourie and Smit (1989), Leach (1992), Fourie and Smith (1993), and Fedderke and Szalontai (2009)
  - main focus on trends and levels
  - adverse effects on price margins, competitiveness and exports also noted
  - raises the real relative unit labour costs and reduces productivity (Fedderke and Szalontai 2005)
  - main causes of industry concentration in SA manufacturing not addressed (Fedderke and Simbanegavi 2008)
- Paper aims to estimate the determinants of concentration in the South African manufacturing industry

Literature review: Theory

- Industrial Organisation theory identifies the following as determinants of seller concentration (Lipzynski, Wilson and Goddard 2005; Caves & Porter, 1977; Sutton 1991&1998; Pindyck & Rubinfeld 2009; Stigler 1951; Geroski 1982)
  - economies of scale
  - entry and exit barriers
  - regulation
  - sunk cost (advertising, R&D)
  - industry life cycle
  - distinctive capabilities
  - core competencies
  - export intensity

Literature review: Empirical studies

- Pickford (1983) manufacturing New Zealand; main determinants
  - size of the market (-), growth of the market (+), **economies of scale (+)**, multi-plant ownership (+), merger activity (+) and product differentiation (**advertising/sales ratio**, barrier to entry (+))
- Ratnayake (1999) industry concentration in New Zealand declining trend; 1986 trade policy changes
  - protectionism of industries/ no room for international competition to take place [export intensity and import penetration];
  - merger activity; size of the domestic market (required firm size to obtain advantages from economies of scale; no antitrust legislation
- Australian manufacturing sectors high degree of industry concentration (Bhattacharya & Bloch, 2000).
  - **economies of scale (MES)**; capital intensity (K/S); **product-differentiation dummy;** import-intensity

Literature review: Empirical studies

- French manufacturing sector Jenny and Weber (1978)
  - Initial concentration; entry barriers (**economies of scale**, product differentiation and **absolute capital cost requirements**); industry growth
- Extensive literature on role of advertising (Bain 1956; Hamm and Mueller 1974; Mueller and Rogers 1980; Porter 1976), etc
  - Causality
  - Barrier to entry, product differentiation, different for search goods and experience goods
  - Uri (1987) an optimal level is reached; misspecification if not included
  - Greer (1971) three classes included **standard products** (relatively cheap products that can be compared easily), **expensive products** (mostly luxury goods), and unique goods
  - Durable vs non-durable goods

CRs for 10 divisions

	CR5			CR10			CR20		
	2008	2011	2014	2008	2011	2014	2008	2011	2014
30: Food products and beverages	30	29	25.8	40	41	36.1	56	55	49.8
31: Textiles, clothing, leather and footwear	17	13	14.2	23	18	21.8	31	26	30.6
32: Wood, wood products, paper, publishing and printing	30	26	29.5	41	35	40.4	52	44	48.4
33: Coke, petroleum, chemical products, rubber and plastic	50	47	47.4	69	62	64.9	76	70	73.7
34: Glass and other non-metallic mineral products	38	46	43.7	50	57	56.4	60	65	64.8
35: Metals, metal products, machinery and equipment	27	23	21.8	36	31	30.0	46	39	38.6
36: Electrical machinery and apparatus	29	30	38.4	43	43	52.2	56	58	65.7
37: Telecommunication, medical and optical equipment and watches and clocks	33	27	35.0	42	38	49.4	55	52	66.4
38: Transport equipment	53	52	56.7	66	66	72.0	76	76	80.3
39: Furniture, other manufacturing and recycling	23	21	39.2	26	25	47.1	31	29	57.3
Source: StatsSA									

Data and method

- No time series available; StatsSA now as part of Manufacturing Industry Financial reports; previously as part of manufacturing census
- 10 different divisions, and 80 sub-divisions at 4-digit Standard Industrial Classification level
- Reports for 2005, 2008, 2011, 2014; not compatible. Most similarities between 2008 and 2011; include only them
- OLS cross section on 2008 and 2011 data, also change in levels between 2008 and 2011
- CR5 as dependent variable (also experiment with CR10 and CR20)
- Explanatory variables:
  - Advertising/income ratio (+)
  - Export intensity (exports/output ratio) (+ or -)
  - Import penetration (imports/ sales ratio) (+ or -)
  - Value added per worker (industry growth, market size, productivity) (+)
  - Other proxies for economies of scale (highly correlated with value added per worker): Capital expenditure per worker, carry assets per worker, productive assets per worker, total sales per worker

Cross section results 2008

Dependent variable CR52008					
Independent variables	*Model 1*	*Model 2*	*Model 3*	*Model 4*	*Model 5*
Advertising-income ratio	**3.84	*2.57	**3.45	**4.36	**4.03
Export intensity	**0.39	**0.39	**0.40	**0.44	***0.47
Import penetration	*0.26	*0.23	*0.23	*0.26	*0.25
Value-added per worker					***0.29
Economies of scale proxy variables					
Capital expenditure per worker	***1.50				
Carry assets per worker		***25.59			
Productive assets per worker			***28.22		
Total sales per worker				***4.32	
R^2	0.264	0.296	0.297	0.256	0.277
F-statistic	6.551	7.665	7.715	6.290	6.994

Cross section results 2011

Dependent variable CR52011					
Independent variables	*Model 1*	*Model 2*	*Model 3*	*Model 4*	*Model 5*
Advertising-income ratio	**2.49	**2.16	***3.18	***3.47	**2.25
Export intensity	**0.33	*0.26	*0.24	**0.31	**0.32
Import penetration	***0.44	***0.46	***0.47	***0.41	**0.33
Value-added per worker					***0.24
Economies of scale proxy variables					
Capital expenditure per worker	***0.61				
Carry assets per worker		***18.16			
Productive assets per worker			***37.90		
Total sales per worker				***4.13	
R^2	0.221	0.311	0.277	0.253	0.279
F-statistic	5.304	8.461	7.199	6.358	7.269

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Additional regressions

- Change in CR5 between 2011 and 2008:
  - Change in adv/income and valad/worker significant at 2%
- Advertising income ratio squared CR5:
  - Causality
  - + then - ; significant for 2008, not 2011
  - Median for 2008 higher than for 2011
- Basic regression for CR10 and CR20:
  - 2008: IMPPEN not sig, other three are
  - 2011: CR10 adv/income not sign, others at 5%; CR20 only export and valad/worker significant
- Change in 2011 and 2008:
  - CR10: valad/worker at 2%, adv/income at 7% significant
  - CR20: only valad/worker sig at 2%

Discussion of results

- CR5 Industry concentration in SA manufacturing determined by advertising/income ratio (product differentiation) and value added per worker (productivity; economies of scale). To lesser degree also export and imports.
- Potential quadratic relationship with advertising
- CR10 and CR20 more influenced by economies of scale and not product differentiation
- Classification of industries according to kind of product not significant results
- Did not consider impact of mergers and acquisitions
- Further studies: expand empirical to 2005 and 2014 – with loss of sub-sectors