Markups in South African Manufacturing - Are they high and what can they tell us?

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1. Introduction

This paper critically reviews recent contributions that aim to estimate the magnitude and impact of manufacturing markups in the South African economy, with a particular focus on an influential article by Aghion, Braun and Fedderke (2008) (henceforth ABF). ABF make three major claims about markups or price-cost margins (PCMs) in South Africa manufacturing. First, they claim that South African manufacturing PCMs have been – between the mid-1970's and the mid-2000's – higher than in the rest of the world (C1). Second, it is claimed that South African manufacturing PCMs have been 'non-reducing' over this period (C2). Third, ABF claim that there is a large negative correlation between higher PCMs and manufacturing productivity growth, and that higher PCMs cause lower manufacturing productivity growth (C3).

The influence of these claims has spread beyond the academic literature. The ABF paper has been cited in South African policy documents and in documents intended to influence policy, including those produced by international finance and multilateral institutions.

This paper critically assesses the three core claims set out above and queries the extent to which the approach followed by ABF adds to an understanding of manufacturing growth. Section two begins by locating ABF's paper in relation to debates about South African industrialisation. It then briefly outlines the ABF approach to estimating PCMs and to analysing the relationship between manufacturing PCMs and productivity growth.

Section Three deals in some detail with claims that South African manufacturing PCMs are high by international comparison (C1) and 'non-reducing' (C2). We replicate ABF's measure of PCMs using the same cross-country sectoral dataset that they used. We find that South African aggregate manufacturing PCMs have since 1993 been consistently lower than developing and

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transition economy averages and have generally been lower than advanced economy averages. We also identify serious methodological problems in ABF's use of cross-country data on listed firms. We then replicate ABF's key measure of PCMs using a South Africa sectoral dataset. We find aggregate manufacturing PCMs lower than in most other broad sectors of the economy since 1993 and also find that these PCMs have declined dramatically since 2004. There are also wide variations amongst manufacturing sectors. We find trends in sectoral profitability – as measured by the net operating surplus – to be consistent with our own estimates of sectoral trends. We conclude that – on its own terms – the application of ABFs method to three datasets cannot sustain the core claim C1: that South African PCMs have been higher than the rest of the world. In relation to core claim C2: that manufacturing PCMs have been 'non-reducing', our results show that aggregate manufacturing PCMs have been the lowest of all sectors since 1993 – apart from Gold mining – and have declined dramatically since 2004. If we had access to ABFs data it is possible that we could have understood the reasons for the discrepancies between their results and ours. However, repeated requests for access to their data went unanswered.

Section four deals with ABFs attempts to find a causal link between PCMs and manufacturing productivity growth and their claim C3: that there is a large and negative relationship between PCMs and manufacturing productivity growth. We find that their regressions suffer from significant problems. Most important is their inability to adequately control – using instrumental variables – for spurious correlation arising from potential endogeneity. In other words they are unable to reject the possibility that the relationship between PCMs and manufacturing productivity growth may run in the opposite direction: from higher PCMs to higher productivity growth.

Section Five briefly considers the policy conclusions arising from ABFs claims. It discusses a broader and richer literature which is more useful in shedding light on the evolution of South African industrialisation and leads to very different policy implications. It sketches ways in which

research on the relationship between dynamic competitive processes and South African industrialisation could more usefully develop.

Section Six concludes that ABFs three core claims are questionable. PCM estimations in isolation are likely to add little value to an understanding of the relationship between dynamic competitive processes and South African industrialisation. There is a broader and richer literature which provides a more satisfactory basis for future research in this area.

2. Locating the estimation and interpretation of manufacturing markups in South Africa's industrialisation debate

The evolution of corporate structure and conduct and its impact on South African economic performance is an important area of enquiry and was an important part of the debate leading up to South Africa's democratic transition in 1994. This debate was characterised by sharply differing views on the role of corporate structure and conduct in explaining the industrial stagnation of the late apartheid period – from the mid-1970's through to democracy in 1994. Differing views on the causes of stagnation necessarily gave rise to differing policy prescriptions. Notwithstanding these differences there was a broad consensus in the literature that the late-apartheid economy was dominated by a handful of very large and inter-linked conglomerates with extensive holdings across most sectors of the economy including much of manufacturing. Similarly, there was a broad consensus that a key weakness of the apartheid-era South African economy was its failure to develop a more dynamic and diversified manufacturing export base (Feinstein, 2005; Fine and Rustomjee, 1996; Hirsch, 2005; Joffe et al., 1995; McCarthy, 1999).

The slowdown and ultimate stagnation of apartheid-era manufacturing since the mid 1970's has been widely characterised as a failed import substituting industrialisation (ISI) strategy (Feinstein, 2005; Hirsch, 2005; Joffe et al., 1995; McCarthy, 1999) in which South Africa had exhausted import replacement opportunities in relatively 'easy' ISI sectors of light manufacturing but had fallen at the hurdle of 'hard' ISI sectors, such as capital goods. Amongst these researchers

product and factor market distortions featured prominently – albeit not with equal weight – as a major cause of the 'failure of ISI'.

ABF's analysis of South African manufacturing PCMs sits firmly within a neoclassical 'market distortions' framework. Within this framework economic rents – generated by pricing power in particular – lead to allocative inefficiencies which are detrimental to economic growth, with some limited exceptions. Policy implications of this body of work tend to emphasize further liberalization of trade, capital and labour markets.

Contrasting sharply with the 'market distortion' premise are Fine and Rustomjee (Fine and Rustomjee, 1996) and others (Freund, 2010; Mohamed and S Roberts, 2008) who view the modern South African economy as having emerged around a Mineral-Energy-Complex (MEC) both as a set of core sectors as well as an evolving system of capital accumulation. Much of South African manufacturing is closely linked to the mining and energy sectors, engaged in the capital-intensive processing of minerals into semi-processed intermediate inputs. As a system of accumulation the MEC involved a process of post-war conflict, compromise and ultimately increasing 'inter-penetration' of English and Afrikaner conglomerate capital structure. In this process the black majority of the population were excluded from any meaningful opportunities for capital accumulation (Innes, 2007). It is argued that post-apartheid economic restructuring has been heavily influenced by the evolution of the MEC in the context of the rapid ascendance of the financial sector both globally and domestically (Ashman and Fine, 2013; Mohamed and S Roberts, 2008). Investments by large private conglomerates and large state owned enterprises (often in the form of joint ventures) played the predominant role in shaping industrial structure. Scale-intensive resource processing industries rapidly scaled the technological learning curve but not lighter industries and capital goods. Tariff policy played a secondary role and was deployed more or less on-demand to protect smaller scale industries in the absence of any coherent overarching industrial strategy for their development. In broad-brush strokes, Fine and Rustomjee contend that the structure of MEC-based conglomerates represented both problem and opportunity to restructure the South African

economy upon attainment of democracy. These conglomerates needed to be re-oriented both to serve domestic basic needs and export markets, building on the resources, capabilities and economies of scale and scope that had been – however imperfectly and problematically – developed under apartheid[2].

To a large degree the 'market distortions' views found expression in post-apartheid economic policy. It was believed that the removal of product and factor market distortions would allocate capital more efficiently, and raise the level of investment and employment (Department of Finance, 1996). Wide-ranging trade and capital account liberalization was effected and competition policy was revamped. It was anticipated that these reforms would raise investment levels inter alia by opening up industrial sectors to greater foreign direct investment as well as to increasing small and medium enterprise participation.

Over the last decade, there have been several attempts to estimate the magnitude of South African manufacturing markups or price-cost margins (henceforth PCMs), and to establish a relationship between PCMs and broader measures of economic performance, such as productivity growth (Philippe Aghion et al., 2008; Edwards and van de Winkel, 2005; Johannes Fedderke et al., 2007; J. W. Fedderke, 2013; Gilbert and Du Plessis, 2013). These have drawn on theoretical developments in measuring pricing power pioneered in relation to advanced economies (Hall, 1988; Martins and Scarpetta, 1999; Roeger, 1995) (Hall, 1988; Martins and Scarpetta, 1999; Roeger, 1995) .

Here, we focus on the ABF paper. This is primarily because the paper has exerted considerable influence in South African policy circles. It originates from a working paper produced as part of the output of an International Panel on Growth commissioned by South Africa's National Treasury (P Aghion et al., 2006; Hausmann, 2008). It has been widely cited in South African policy documents and in documents intended to influence policy including those produced by international

[2] These of course were not the only views. For instance Bell (Bell, 1995) argued that opportunities for import replacement had not been exhausted and that there remained significant scope to pursue an import replacement strategy.

finance and multilateral institutions (e.g. International Monetary Fund, 2011; Klein, 2011; National Planning Commission, 2012; OECD, 2010; World Bank, 2011). Where relevant we comment on subsequent and related contributions that have a bearing on ABF's paper.

ABF adopt two techniques to estimate PCMs. The first – and more recent – "Roeger" technique estimates PCMs through a neoclassical growth model aimed at separating out the discrete contribution of imperfect competition embodied in the equation's residual (Hall, 1988). This Solow Residual or sum of what is unexplained about growth, is traditionally attributed to all manner of 'technological change', often in the form of total factor productivity (TFP): the portion of growth not attributable to capital and labour in the model (Solow, 1956). As Solow makes absolutely clear this model is predicated on assumptions that include perfect competition and full employment.

Roeger (1995) refined Hall's technique to bypass an inherent endogeneity problem: namely that markups are themselves likely to be correlated with the error term of the equation. The underlying intuition (or assumption) is that the difference between quantity (primal) and price based (dual) measures of the SR are a reflection of the level of imperfect competition, that is the extent to which prices exceed marginal cost or the PCM. The difference between the two – the Nominal Solow Residual (NSR) – cancels out the error term and thus side-steps the endogeneity problem.

The second technique is one or other variant of a proxy of the Lerner Index intended to represent the degree of monopoly power an industry (Lerner, 1934). While estimates based on the Roeger method feature strongly in ABF's representation of the level of pricing power, it is in fact proxies of the Lerner index which enter into the ABF regressions which seek to explain manufacturing productivity growth as a function of markups. The proxies adopted by ABF estimate the gap between price and average rather than marginal cost and do not include intermediate inputs.

The derivation of the NSR and its relation to the PCM is set out in some detail in e.g. Martins and Scarpetta (1999) and Edwards and van der Winkel (2005). The relevant equations are set out in Appendix A of this paper. All estimates of PCMs are extremely sensitive to key underlying assumptions. Martins and Scarpetta highlight that PCM estimates will be biased

upwards if intermediate inputs are not taken into consideration (1999, p. 7). Intermediate inputs – costs which are necessarily incurred in any real-world production environment – are not included in ABF's estimation. They also indicate that "there is no good measure of the rental rate of capital" and propose a method to arrive at what they consider a reasonable estimation of this rate (1999, p. 7 and 15).

ABF draw on three datasets to produce estimates of PCMs and related measures of markups and profitability: a UNIDO International Industry Statistics Indstat2 (henceforth Indstat2) country and sector data set, a Worldscope country and firm database of listed companies and a TIPS/SASID[3] (henceforth SASID) South Africa-specific sector dataset. They seek to account for manufacturing productivity growth taking PCMs as the major explanatory variable and using two alternative measures of productivity: value added per worker and total factor productivity (TFP). Various instrumental variables are introduced to attempt to deal with the potential endogeneity problems, specifically that the PCM is itself likely to be correlated with the error term of the regression.

ABF make three major claims in relation to markups or price-cost margins (PCMs) in South Africa manufacturing. First, that margins in South African manufacturing – between the mid-1970s and the mid-2000s – have been higher than the rest of the world (C1). Second, that South African PCMs have been 'non-reducing' over this period (C2). Third, that there is an unambiguous and large negative correlation between higher PCMs and manufacturing productivity growth (C3)

3. South African and international manufacturing markups

SA and international PCMs using the UNIDO Indstat dataset

The UNIDO Indstat2 dataset comprises series that include value-added, output and wages for aggregate manufacturing and 22 manufacturing sectors classified according to International Standard Industrial Classification (ISIC) codes and covering over 100 countries since 1963. It

[3] Trade and Industrial Policy Strategies / South African Standardised Industry Database.

covers the period up to 2010. Citing lack of reliable capital stock data in Indstat2 ABF do not estimate PCMs based on the Roeger methodology. They compute a proxy of the Lerner index using equation (A4) below which is an estimate of divergence between price and average rather than marginal cost. As shown in Figure 1 below ABF present five-year averages of South African manufacturing PCMs side by side with labour productivity growth measured by value added per worker. They argue that Figure 1 represents evidence of "a falling level of competitive pressure" over 1976-2000 (2008, p. 752) with the associated inference of a causal relationship with slowing labour productivity growth over the same period.

Remarkably however, ABF make no direct mention or comparison of South African manufacturing PCMs – computed using equation (A4) – with the PCMs of other countries. They provide no comparison of South Africa PCMs with the world mean or median values or indeed the PCM value for any other country or group of countries[4]. This is all the more extraordinary given that their paper is littered with claims that all three datasets demonstrate that South African markups are higher than elsewhere in the world.

> "[M]ark-ups are significantly higher in South African manufacturing than they are in corresponding industries worldwide … Our results are robust to three different data sources, two alternative measures of productivity growth, and three distinct measures of the mark-up" (2008, p. 741).

> "Consistently over the three datasets, mark-ups are significantly higher in South African industries than they are in corresponding industries worldwide" (2008, p. 742).

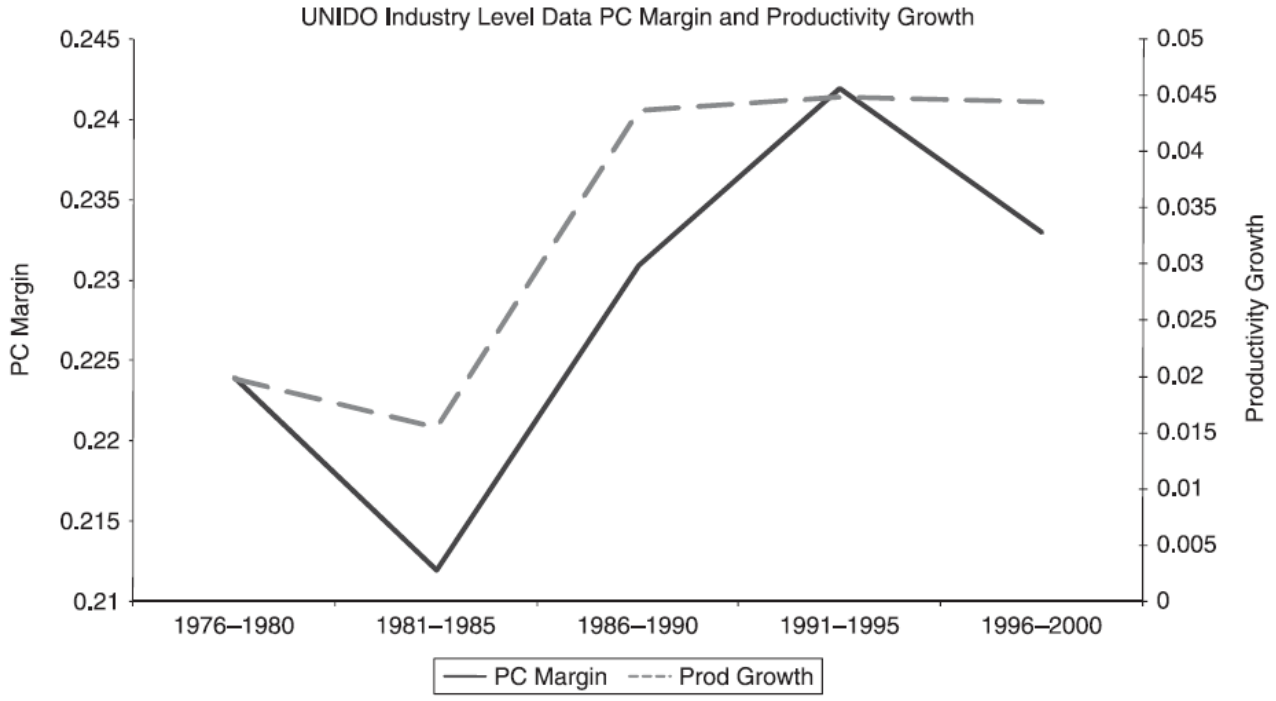
> We find consistent evidence of pricing power in South African industry that is greater than international comparators, and which is non-declining over time. Results

[4] The only reference to a world average we can detect is indirect: in presenting the *ratio* of listed firm PCMs to "all firm" PCMs which obscures the underlying world average computed . (Philippe Aghion et al., 2008, pp. 744–5).

prove to be robust across three distinct datasets, covering both industry-level data as well as firm-level evidence, two alternative measures of pricing power, alternative measures of firm profitability, and hence for alternative levels of aggregation (2008, p. 746).

"Consistently across the three datasets, we found that: (i) mark-ups remain significantly higher in South African industries than in corresponding industries worldwide …" (2008, p. 764).

Figure 1. ABF price–cost margin levels and labour productivity growth for South African manufacturing, rolling half-decade sub-periods: 1976–2000



Source: (Philippe Aghion et al., 2008, fig. 2)

In order to calculate and compare PCMs and draw meaningful and robust conclusions across multiple countries and sectors, considerations of data quality and integrity are paramount. ABF do

raise some specific concerns in relation to data reliability and availability[5]. However, they neglect far more fundamental problems with the Indstat2 dataset.

Values for manufacturing variables are missing for South Africa and many other countries for a number of years. Observations are missing both at the level of aggregate manufacturing and to a greater extent at the level of specific two digit ISIC sectors. The problem is particularly acute for the 1990s which is a critical period for any assessment of PCMs. This era was characterized by fundamental changes in economic policy and industrial structure, including extensive trade and capital account liberalization and far-reaching corporate restructuring. There are a number of years during the 1990's for which the data required to calculate PCMs is either missing or registers implausibly large swings and cannot be considered accurate[6], as is evident in Figure 2 below. This casts doubt on the meaning of the five-year averages presented by ABF for the critical 1991-1995 and 1996-2000 periods.

To establish what can be gleaned from the Indstat2 dataset we replicate ABF's proxy of the Lerner index as set out in equation (A4), across all countries and years for which this is possible. Given the extensive data problems already discussed – missing and unreliable data at the aggregate manufacturing level which is even more pronounced at the sub-sectoral level – we restrict this exercise to aggregate manufacturing. But before dealing with the results of this exercise we provide some more detail on how the Indstat2 dataset is compiled.

Industat2 is compiled in the first instance from data provided by national statistical authorities (NSAs). In the South African case this is Statistics South Africa (StatsSA). UNIDO state

[5] For instance they raise concerns in relation to:
- Non-availabilty and quality of capital stock data in the UNIDO and Worldscope datasets (747)
- The quality of the TIPS data since 1996 based on an assumption that the 2001 large sample manufacturing survey was not incorporated into its sectoral disaggregation and that this is the cause of consequent large standard deviations in the Solow Residual (750)
- Unspecified concerns about outliers and truncation of the Worldscope firm level data (748, 752)
- A timing mismatch between variables used for their instrumentation strategy in relation to estimating the relationship between PCMs and productivity growth (749).

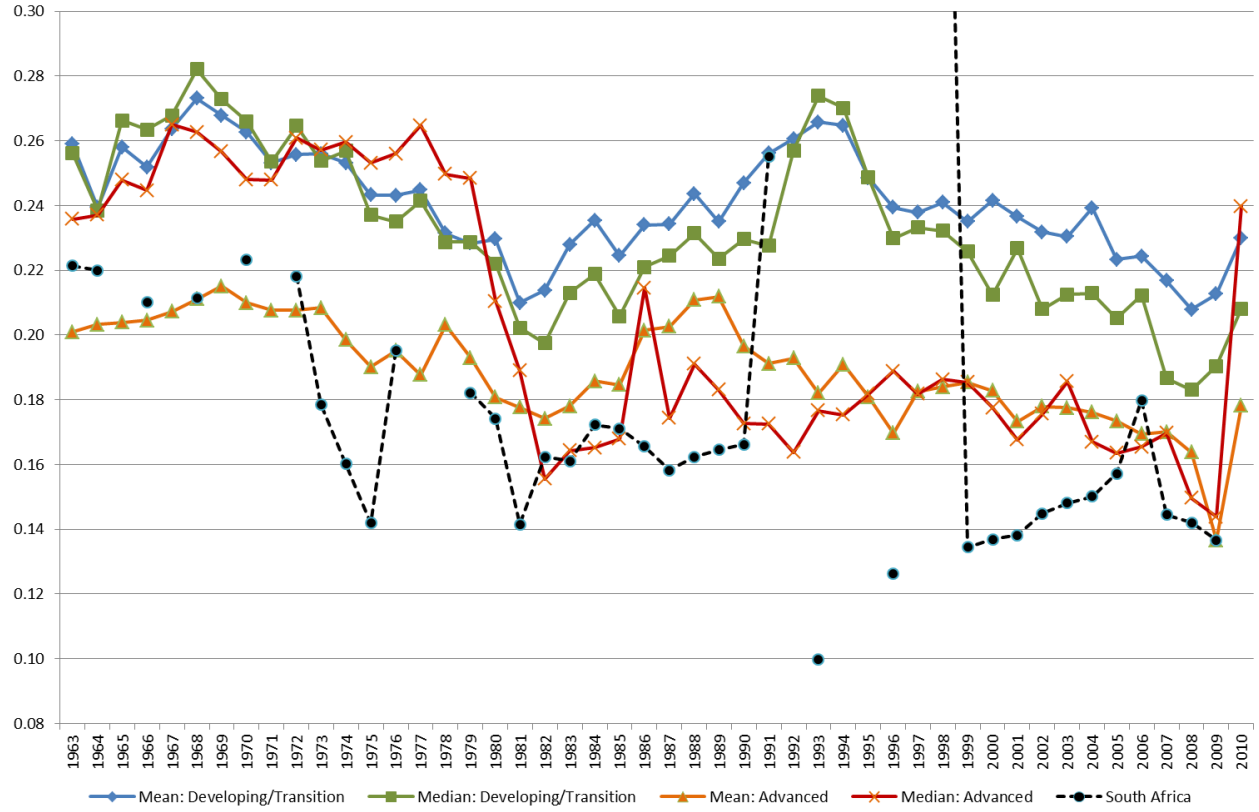
[6] Missing data makes it impossible to calculate PCMs for aggregate manufacturing for 1992, 1994, 1995 and 1997. The 1998 PCM displays an implausibly large increase which on closer examination is driven by a massive and clearly erroneous 'collapse' of manufacturing output in the UNIDO data which is not reflected in corresponding StatsSA data.

that they do not make changes to the data supplied by NSAs except to aggregate total manufacturing values from sectoral values and to convert sector data into the ISIC classification where necessary[7]. Missing data is hence a function of non-reporting by NSAs and it is clear that StatsSA has not consistently provided data to UNIDO over the years. Communication with StatsSA also highlights the significant change in their data collection methodology from 1993 onwards as they made efforts to conform with the international System of National Accounts (SNA) (Statistics South Africa, 1999). StatsSA therefore caution on the direct comparability of data prior to 1993 with data thereafter[8]. We therefore focus our comments on the period from 1993 onwards.

Figure 2 shows annual South African PCMs in relation to mean and median averages for Advanced and Developing/Transition country groupings between 1963 and 2010, for all the years for which data is available. In addition to illustrating the volatility of the data, Indstat2 clearly shows that South African PCMs have been below Developing/Transition economy averages since 1993 and, in general, have also been below Advanced economy averages.

[7] Email communication with UNIDO Statistics Unit.
[8] Email communication with Statistics South Africa.

Figure 2: Price-cost margin estimates for South African Manufacturing, Advanced and Developing / Transition economies, 1963-2010



Sources: UNIDO, Statistics South Africa

Note: Value for South Africa for 1998 is 0.46 and has been truncated

Thus using the same dataset and methodology as ABF our results do not support their core claim C1: that mark-ups are significantly higher in South African manufacturing than worldwide. Access to ABFs data may have shed light on the reasons why their findings differ so markedly from ours.

SA and international PCMs – Worldscope dataset

Since ABF did not respond to our request for access to their data we were not able to directly interrogate the Worldscope dataset of listed companies. However, we highlight some fundamental methodological problems in relation to their findings when using this dataset.

ABF effectively use two sets of measures to represent markups in relation to the Worldscope dataset. The first is a calculation of the PCM based on equation (4). The difference

between the average PCM computed for South African listed firms: 0.12 is nominally larger than that arrived at for an average of 56 countries: 0.11 (2008, p. 758). However, ABF give far greater prominence to selected financial ratios in their exposition and in presenting cross-country comparisons in graphical format, as reproduced in Figure 3. Relying on Net Income/Sales as their primary financial ratio they state that South African listed firms "exhibit 50 percent higher profitability when this is measured with Net Income : Sales, Net Income : Assets, and Net Income : Equity ratios" (2008, p. 752). These ratios feature in graph form while subordinated to a footnote is the statement that "we note that the Gross-Margins, Market : Book Ratios, and Price : Earnings Ratios of South African firms are lower than their international counterparts" (2008, p. 752). In a subsequent contribution Fedderke (2013) highlights the return on assets of listed firms (the net income to asset ratio), arguing that this represents evidence that South African markups are more than double the world average.

Figure 3: ABFs firm profitability over time: South Africa and average of 60 countries, Worldscope database, 1980–2004

Source: (Philippe Aghion et al., 2008, fig. 4)

ABF contend that they find no significant differences in profitability between 'large' and 'small' listed firms although they provide no definition of firm size or the threshold that separates large from small. Listed firms differ in obvious ways from their unlisted counterparts. They are likely to be larger and a priori one would expect them to command greater market power on average than unlisted firms. There is therefore a problem with the implicit assumption adopted by ABF that trends in the PCMs and profitability of listed firms are representative of the broader population of predominantly unlisted manufacturing firms. This problem re-emerges in Fedderke (2013). Fedderke estimates PCMs of Chinese and Indian firms from firm level databases. However, the Indian dataset is of listed firms while the Chinese dataset is of a broader sample of manufacturing firms. A great deal of caution should therefore be adopted before drawing conclusions from the

comparison of results arising from these two datasets. Furthermore, and as Fedderke concedes, the extensive role of the State and presence of State Owned Enterprises in China plays a substantial role in reducing cost structures in manufacturing, particularly in relation to intermediate inputs delivered to the Chinese manufacturing sector.

There is a major methodological problem in defining the subset of listed firms and of the activities of these firms that should be included as part of the manufacturing sector. For instance, if firms are classified as manufacturing because they form part of one or more of a stock exchange's major indices such as "Industrials", "Consumer Goods" and "Health Care" this would result – in the South African case – in the inclusion of many firms that either are not manufacturers or for which manufacturing only constitutes a small part of turnover and profit. For instance there are a number of listed firms within the Johannesburg Stock Exchange (JSE) Industrials index whose profit is driven entirely or predominantly by importation and distribution of industrial products. Although we do not have access to the list of firms ABF include, the number of South African listed firms in their sample – between 92 and 96 – in their regression testing the relationship between PCMs and growth (2008, p. 757) is much greater than the number of listed firms that are (or have been, in the case of delisted firms) solely or predominantly manufacturers (see Appendix B). Many listed South African firms have operations outside of South Africa, requiring the separation of domestic estimations of margins and profitability from listed operations. Furthermore, over recent years there has been a widespread increase in the acquisition by non-financial corporations (NFCs) of various forms of financial assets (Crotty, 2006), which also need to be stripped out before it is possible to make a meaningful assessment of the margins and profitability of domestic listed manufacturing operations. Robust cross-country comparison would require a dataset corrected for these factors – not just for South Africa but for all countries in the dataset.

As pointed out by Gilbert and Du Plessis (2013) comparisons of the financial metrics of listed companies are subject to survivorship bias. Survivorship bias arises when a sample is drawn only from firms that are currently listed and does not include firms that were previously listed but

have fallen off the index due to events such as bankruptcy, de-listing or merger. Correcting for survivorship bias, Gilbert and Du Plessis contest ABF's finding that the profitability of South African listed firms are higher than those in the rest of world, using the USA as a proxy. In Fedderke (2013) there is neither a recognition of Gilbert and Du Plessis' critique nor correction for survivorship bias. However, Gilbert and Du Plessis also neglect the firm and activity classification problem. They do not distinguish between manufacturing and non-manufacturing firms in their comparison or correct for other distorting factors including manufacturing versus non-manufacturing operations, domestic versus international and financial versus non-financial activities. Gilbert and Du Plessis list of 98 "South African Industrial Firms" (reproduced in Appendix B) includes many that are clearly not manufacturers such as firms engaged primarily in importing; logistics and distribution; information technology; telecommunications; retail; construction; television; and media.

An assessment of margins, profitability and economic performance of listed firms should take account of the specific structural features of the South African economy. As discussed below South Africa's post-apartheid political settlement ushered in a series of changes to economic policy that have resulted in widespread economic restructuring. It would be difficult to interpret cross-country comparisons and time-series of listed firm data without understanding this context of restructuring and correcting the data for mis-categorisation of sectors and economic activities.

Use of South African data: the South African Standardised Industry Database

In addition to the cross-country dataset discussed above ABF use a South Africa specific SASID datset to estimate markups, using both the Roeger methodology as in equation (A1) and a proxy of the Lerner index as in equation (A5).

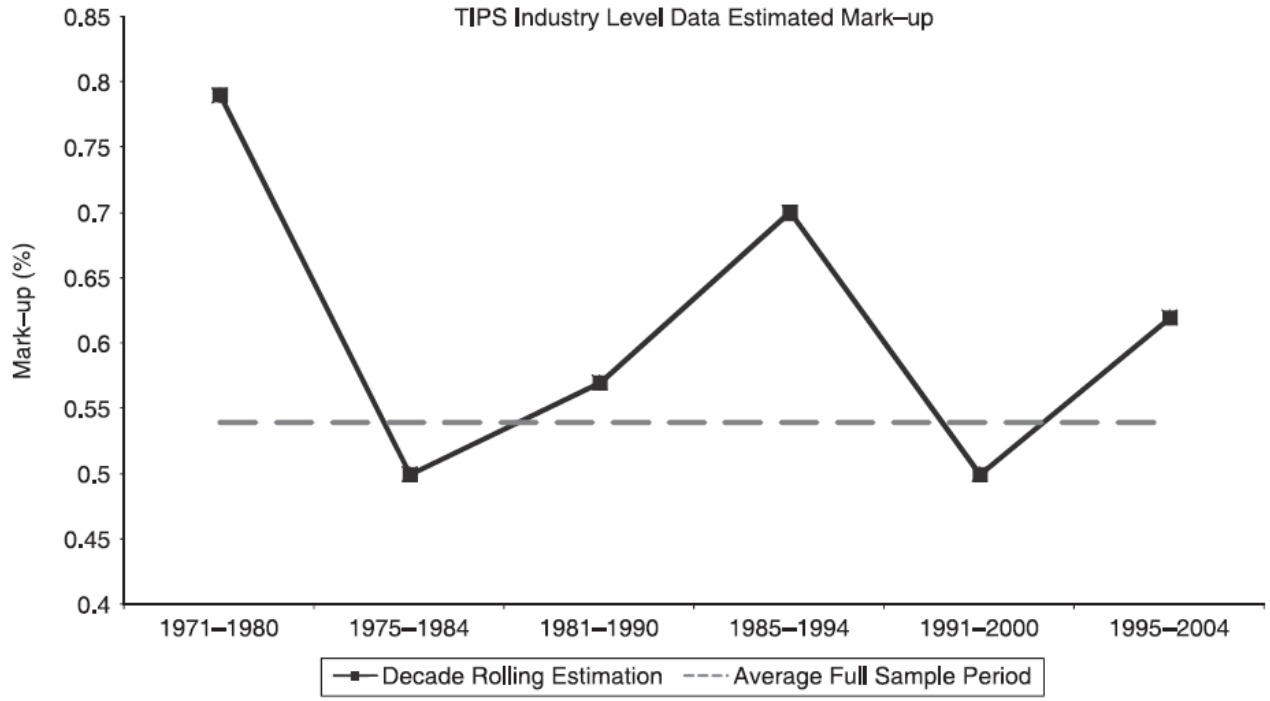
ABF make extensive use of a Pooled Mean Group Estimation (PMGE) technique for deriving period averages of PCMs, on the grounds of "controlling for both industry effects and dynamic adjustment to equilibrium over time" (2008, p. 750). This involves an assumption that all

South African manufacturing sectors PCMs display a homogenous long run mark-up across all sectors with only short term variations around this trend between 1970 and 2004. This seems a particularly inappropriate assumption given the extensive restructuring of the South African economy over such a long period that has included major structural economic and political breaks.

Figure 4 below shows the ABF estimate of a 54% aggregate average manufacturing PCM for the entire 1971-2004 period and "rolling decade" or overlapping 10-year averages, derived from the Roeger method. Based on these estimates ABF argue that there is "no robust evidence of a declining trend in the level of the mark-up … for South African manufacturing" and that for "individual three-digit manufacturing sectors the evidence is again of consistently significant mark-ups" (2008, p. 750) as presented in an appendix.

It is important to note that the Roeger method is very sensitive to underlying assumptions such as the treatment of intermediate inputs and returns to scale. Exclusion of intermediates and the assumption of constant returns in the production function both lead to increases in PCM estimates (Martins and Scarpetta, 1999, p. 7). ABF do not include intermediate inputs in their estimation. In previous papers both Edwards and van der Winkel (2005) and Fedderke (2007) find that inclusion of intermediate inputs result in a dramatic reduction in their estimates of PCMs.

Figure 4: ABF's estimated average mark-up for South African manufacturing, rolling decade sub-periods



Source: (Philippe Aghion et al., 2008, fig. 1)

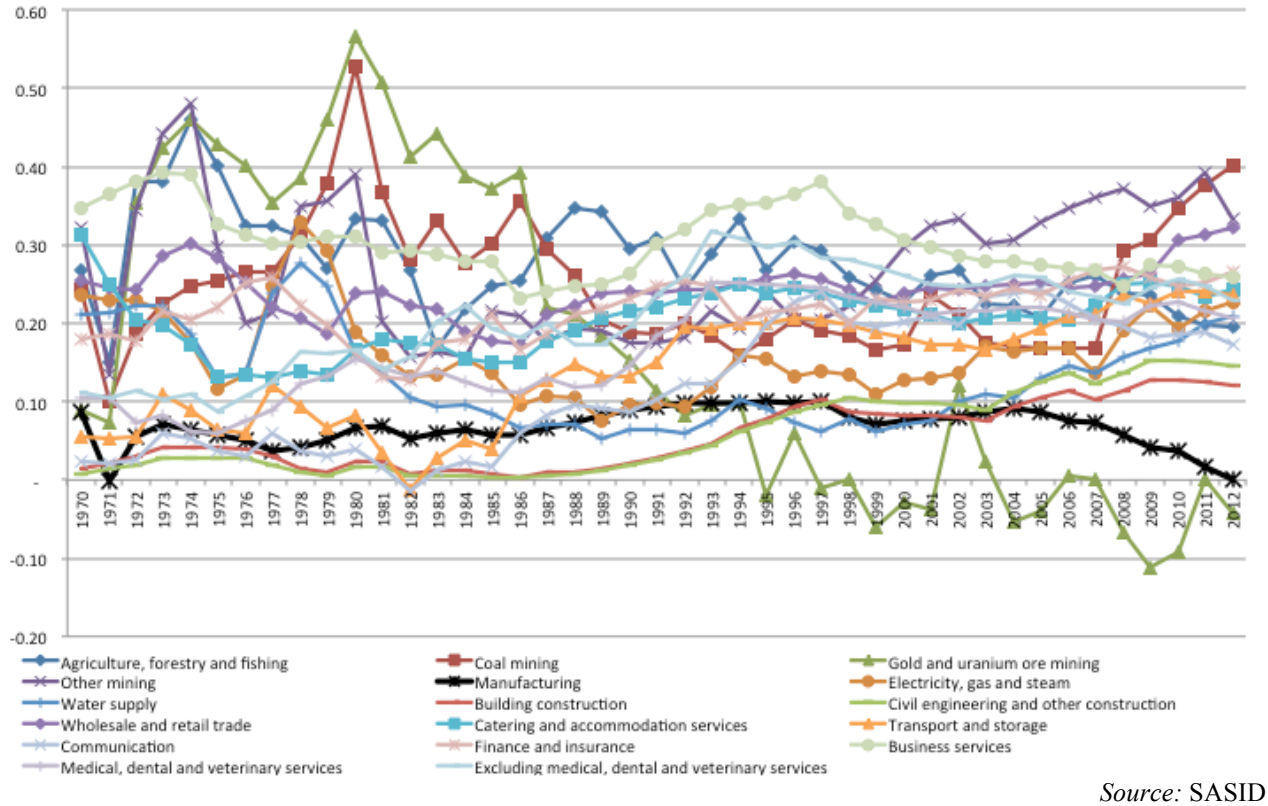
However, it is the proxy of the Lerner index derived from computation of equation (A5) and not the "Roeger" results which are used in ABF's regression of the relationship between productivity and markups. They compute the Lerner index proxy using equation (A5) as "a consistency check of our results, given the potential for high volatility in the SR [Solow Residual]" of their Roeger-based results[9]. Unlike the Roeger-based estimates of PCMs they do not present the Lerner proxy results explicitly but state that they are "[c]onsistent with the remainder of the results reported thus far" and in a footnote that "[f]ull results [are] available from the authors upon request".

Using the SASID dataset we therefore calculate ABFs alternate measure of the Lerner index using equation (A5) from 1970 through to 2012. Two main trends are apparent. First, Figure 5 illustrates that since 1993 aggregate South African manufacturing PCMs are consistently lower than

[9] ABF raise concerns about the volatility of the SR in their estimations from 1996 onwards using the Roeger method and attribute this to data quality problems, particularly that variables may have been derived using a dated input-output table

all other broad sectors of the South African economy, with the exception of gold and uranium mining. Second, since 1993 manufacturing PCMs have never exceeded a maximum of 10% and have declined dramatically since 2004. In fact by 2012 manufacturing approaches an aggregate 0% markup. In contrast, the sectors with PCMs between 30 and 40% in 2012 were: Coal mining, Other mining, and Wholesale and retail; between 20 and 30%: Business services, Finance and Insurance, Catering and Accommodation, Services excluding Medical and Dental, Transport and Storage, Electricity, Gas and Steam, Medical, Dental and Veterinary services, and Water supply; between 10 and 20%: Agriculture, forestry and fishing, Communication, Civil engineering and other construction, and Building construction.

Figure 5: South African PCMs by broad sector, 1976-2012



Source: SASID

Table C1 (appendix) shows that, within manufacturing itself there is considerable variation in PCMs. There is clear general trend of declining PCMs both at the aggregate manufacturing level as

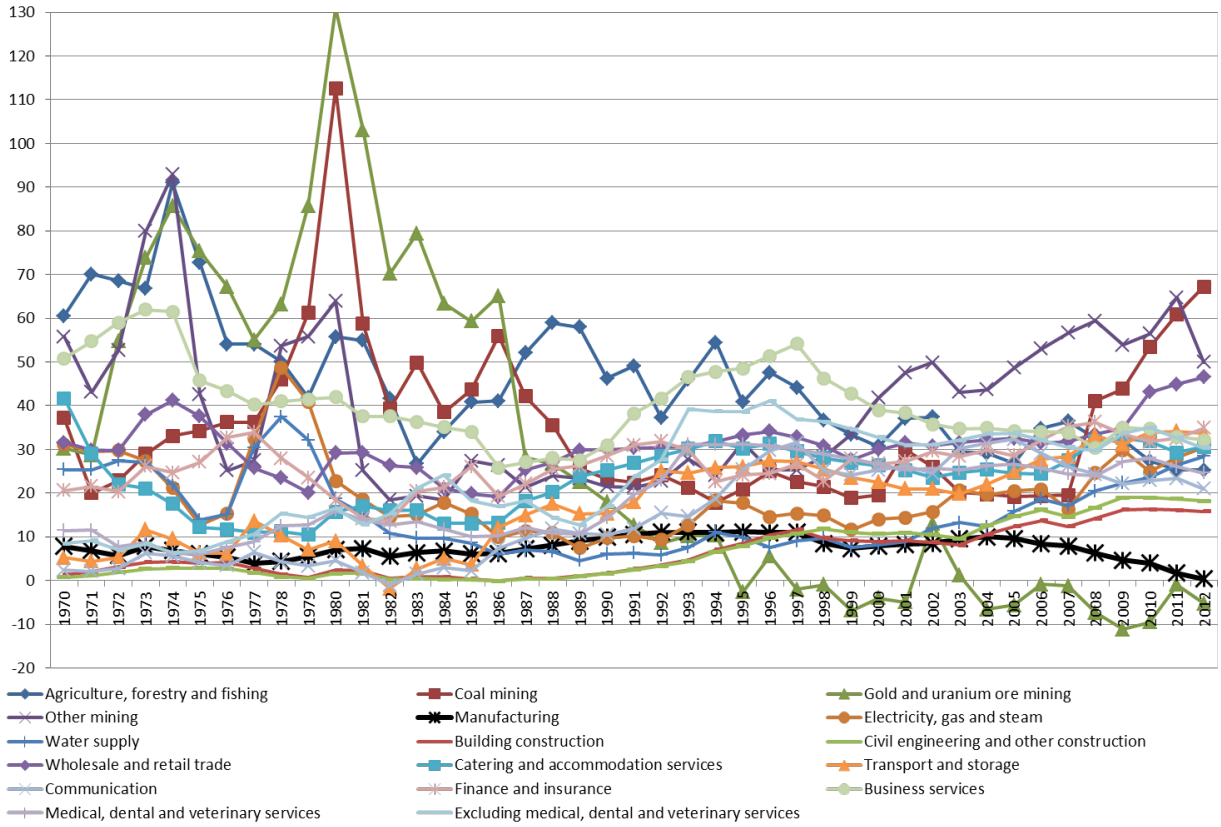
well as across the bulk of manufacturing sectors from the 1993-1997 period as compared with the 2003-2007 period and a much sharper decline in the 2008-2012 period.

Thus far from confirming ostensibly "high" and "non-reducing" markups as presented in Figure 4 (and Table A2 of ABF (2008, p. 767)) there is in fact a wide divergence between the results derived by ABF from calculating PCMs using the Roeger methodology and our estimations replicating their proxy of the Lerner index.

Furthermore, any attempt to account for the significant differences between these results also has to confront the reality-check of a very close correspondence between PCMs calculated according to equation (5) and measures of aggregate sector profitability such as the net markup or net operating surplus (NOS)[10]. The disparity between ostensibly "non-reducing" manufacturing markups in a context of declining sector profitability has been raised by Rodrik (2008). Rodrik notes the declining *relative* profitability of manufacturing in relation to the 'FIRE' (Finance, Insurance and Real Estate) sectors of the South African economy. Figures 6 and Table C2 demonstrate very similar trends with respect to sector profitability to the trends we find for PCMs. This indicates that aggregate manufacturing and various individual manufacturing sectors of the South African economy have been subject to declining relative profitability since 1993 and that most have seen absolute declines in profitability. However, it is critical to emphasise that an aggregated picture of margins or profitability of manufacturing as a whole or a specific individual manufacturing sector should not detract from an appreciation of heterogeneity within each sector.

[10] As defined by Quantec – the compilers of the SASID database the NOS is the net operating surplus of an industry as a percentage of total intermediate inputs plus labour remuneration plus consumption of capital for that industry. It excludes all net indirect taxes. ("EasyData," n.d.)

Figure 6: South African Net operating surplus by broad sector, 1976-2012



Source: SASID

4. The relationship between price-cost margins and productivity

ABF seek to explain sector productivity growth as a function of their PCM estimates of markups. They use labour productivity and Total Factor Productivity (TFP) as the dependent variable for their cross-country estimations and for the South Africa-specific estimates, respectively. Both sets of regressions use proxies of the Lerner index as measures of PCMs.

ABF acknowledge that their regression results are subject to potential endogeneity or spurious regression problems. That is PCMs may be correlated with the error term of their regression if higher productivity drives higher markups and not the other way around. They therefore seek to control for this problem by using instrumental variables. Instruments must be correlated with the explanatory variable (PCMs) but not with the error term of the regression.

In relation to their regressions using PCMs based on the cross-country Indstat2 sector and Worldscope listed firm datasets they introduce various measures of import penetration: total

imports over output; "the opening of the economy to trade", industry tradability; and tariff levels (2008, p. 758). They concede that:

> Our attempt to control for endogeneity was thus mostly unsuccessful. This means that the OLS evidence above should be interpreted cautiously for, even if we used lagged margins, the lack of good instruments did not allow us to rule out that the relation goes from productivity to margins and not the other way round.
>
> (2008, p. 758)

It is particularly striking – given the prominence ABF afford to the claim that SA listed firms display higher PCMs than worldwide – that ABF find no statistically significant relationship between South African productivity growth and PCMs of listed firms (2008, p. 759). Again it should be emphasised that this does not imply that some SA listed firms do not enjoy high margins and profit levels.

In relation to their regression on the South Africa specific SASID dataset ABF adopt a wide range of instrumental variables: computed effective rates of protection, scheduled tariff rates, export taxes and an estimate of anti-export bias (2008, p. 761). However, problems arise with their efforts at instrumentation:

> In terms of the quality of our instruments, while all instruments report a low correlation with our measure of productivity growth, only scheduled tariff rates and export taxes show statistically significant partial correlations with the Lerner index measure, and the absolute magnitude of the correlation of all of the trade protection measures with the price-cost margin measure is low. (2008, p. 761).

Thus the basis for establishing a causal relationship between price-cost margins and productivity growth is at best ambiguous. Indeed one are of research identified is "to push further on the search for good instruments for product market competition" (2008, p. 764). Aghion et al. (2013) seek to address the instrumentation problem indirectly within a model which tests the relationship between

trade liberalisation and productivity growth within a General Method of Moments modelling framework "[c]ontrolling for the impact of product market competition" (2013, p. 444). However, this also runs into problems. In addition to the issues already raised in relation to the measurement of PCMs, Aghion et al.'s measure of PCM gains statistical significance only at the expense of one of their selected measures of trade liberalisation losing its statistical significance, raising questions about the underlying framework. Thus the definitiveness with which ABF reach the conclusion "that a reduction in mark-ups … should have large positive effects on productivity in South Africa" (2008, p. 764) goes far beyond the evidence actually presented.

5. South African political economy and economic restructuring: industrial structure, conduct and performance

We therefore argue that understanding the complex interrelationship between industrial structure, conduct and economic performance requires drawing on a broader base of literature and evidence to inform future research.

Economic development is a process of fundamental structural change in which the labour force in developing countries moves from lower to higher productivity activities and in which industrialisation plays a fundamental part. The major source of productivity growth at the initial and intermediate stages is the mastery of existing technologies (Amsden, 1992; Lall, 1992). This process requires both resources and incentives to undertake the learning processes involved (M. Khan, 2010; M. H. Khan and Jomo, 2000). It also requires co-ordination mechanisms across private and public investments to identify and realise new industrial opportunities (Hirschman, 1988). Large firms and business groups have played a central role as agents of rapid technology acquisition and diversification (Amsden, 2003; Chandler et al., 1999; Studwell, 2013). Competition and rivalry are important parts of rapid technology acquisition and industrial diversification, but the required competition bears little resemblance to textbook perfectly competitive markets (Amsden, 1997). Some measure of domestic market dominance combined with strong domestic rivalry and

pressures to export give rise to a powerful set of incentives that both provide resources (effectively rents) to invest in capability acquisition as well as pressures to ensure these rents are deployed to do so rather than being dissipated (Amsden, 2003; M. Khan, 2010; M. H. Khan and Jomo, 2000). The scope and shape of industrial restructuring is fundamentally shaped not simply by pre-existing 'endowments' and industrial structure but by the detailed specifics of a country's political economy and the shifting balance of economic and political forces. Modern theorists have described the impact the balance of these forces has on favouring certain economic activities in relation to others variously in terms of 'systems of accumulation' (Ashman and Fine, 2013), 'political settlements' (M. H. Khan and Jomo, 2000) or 'elite bargains' (Di John and Putzel, 2009).

Economic reforms intended to raise private investment levels by removing various product and factor market distortions have not succeeded in this objective, but have certainly resulted in widespread corporate and industrial restructuring since 1994. However, there has unfortunately been a parallel decline in academic research focussed on the detail of sectoral and corporate structure relative to the research output during the apartheid period and early years of democracy (Chabane, 2006, p. 550).

Nevertheless some key structural changes can be identified which have a bearing on industrial structure, conduct and performance. Capital account liberalisation since 1994 has contributed to a fundamental shift in relative prices in the South African economy. Long-term capital – much of it embodied in the large conglomerates which became able to shift their primary stock market listing offshore – has left South Africa to be replaced by a much stronger reliance on volatile short-term capital inflows. These inflows have induced long periods of currency overvaluation which have turned the exchange rate against tradable sectors such as manufacturing. They have also provided some of the funding for households to purchase increasing volume of imported consumer goods – as commercial banks matched short term inflows to similarly short term credit extension to households (Zalk, 2013).

This external "Dutch Disease"-type effect has been combined with an internal "Dutch Disease"-type effect with the relative profitability of non-tradable activities and the financial sector in particular increasing relative to manufacturing profitability (Rodrik, 2008; Zalk, 2013).

The rise of the "shareholder value" movement both internationally and in South Africa has placed pressure on conglomerate groups to focus on their "core" business lines and divest "non-core" assets. This led to a process 'unbundling' of cross-sector holdings by conglomerates but also to 'rebundling' within a number of sectors which have either retained or further entrenched the market power of the largest incumbents. A key question is the impact this process has had on the capabilities of the industrial subsidiaries that were disposed of during this process.

Trade liberalisation has had a differential impact on industrial capabilities and performance. Many capital intensive resource-processing industries that were close to the global technological frontier have not been impeded by a liberalised trade environment. These are effectively the apartheid infant industries which have grown up in sectors such as petro-chemicals and steel. Privatisation of these state-nurtured natural monopolies into unregulated markets has allowed them to exert pricing power at the expense of downstream industries. Competition policy – itself the outcome of a deeply contested process with dominant firms – has powers to deal with conduct but not pre-existing market structure. Multiple tiers of legal appeal have resulted in the 'gaming' of the competition system (Makhaya and Simon Roberts, 2013). Simultaneously, the more vulnerable downstream value-adding and labour-intensive sectors have suffered as a result of trade liberalisation from intensive margin squeezes on their sales – due to import competition – and from the monopolistic pricing of their inputs.

In short, South Africa's post-apartheid economic reforms – ostensibly to remove market distortions and thereby raise levels of firm entry, competition and growth – have had some extremely negative consequences. Capital account liberalisation has shifted relative prices against manufacturing. Trade liberalisation has allowed certain firms to "protect their positions and the supra-competitive returns they earn from them" (Makhaya and Simon Roberts, 2013, p. 557) while

many value-adding and labour-intensive sub-sectors and firms have been subject to price and cost margin squeezes with attendant firm closures, job losses and precariousness of many existing firms.

6. Conclusions

This paper leads to a number of conclusions. There is no credible evidence marshalled by ABF that South African manufacturing markups are particularly high, either by international standards or in relation to other sectors of the South African economy. A narrow focus on sectoral PCMs detract on the one hand from significant heterogeneity within sectors and on the other from broader structural patterns within the South African economy which influence the trajectory of the manufacturing sector. Evidence of any clear relationship between markups and productivity growth is at best tenuous. There is thus a sharp contrast between the tentativeness of the evidence base and the definitiveness of the conclusions drawn by ABF.

There are a number of fruitful ways in which research on the complex interactions between industrial structure, conduct and performance can be taken forward. In particular there is a need for detailed sectoral research which explores rather than assumes how various forms of economic rents are accrued in particular sectors and the uses to which they are deployed and relates these processes to the specifics of South Africa's political economy.

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Appendix A – Equations

The PCM (μ-1) can be estimated using equation (1):

$$NSR = (\mu - 1) \cdot \alpha \cdot [\Delta(w + l) - \Delta(r + k)] \quad (1)$$

where: parameters are in natural logs; NSR is the nominal Solow residual; μ = P/MC (P=price, MC=marginal cost and μ = 1 denotes perfect competition); α is the labour share in value-added; Δ is the difference operator; Δ(w + l) is the log change in the wage bill and Δ(r + k) is the rental price of capital, which is estimated separately:

$$R = ((i - \pi) + \delta) \cdot P_K \quad (2)$$

where: i is the yield on 10 year government bonds, π is the expected rate of inflation, δ is the rate of depreciation and

By rearranging the penultimate equation through which (1) is derived it can also be directly computed:

$$\mu - 1 = \left[\frac{\Delta(p + q) - \alpha \cdot \Delta(w + l) - (1 - \alpha) \cdot \Delta(r + k)}{\alpha \cdot [\Delta(w + l) - \Delta(r + k)]}\right] \quad (3)$$

where: Δ(p + q) is the log change in real value-added and (1-α) is capital's share in value-added.

Estimation using the Roeger method requires reliable data on each of these variables. Citing lack of reliable capital stock data in both the UNIDO and Worldscope datasets, ABF set out two

alternative measures of the PCM in the form of proxies of the Lerner index (Lerner, 1934). These are:

$$\text{PCM1} = \frac{\text{value added} - \text{total wages}}{\text{sales}} \tag{4}$$

and

$$\text{PCM2} = \frac{\text{pY} - \text{W} - \text{rK}}{\text{pS}} \tag{5}$$

where: pY is nominal sector manufacturing value added (MVA); W is the sectoral wage bill (average wage rate x no. of workers); r is the real interest rate plus the sector depreciation rate; K is the nominal sector capital stock; pS is nominal sector output or sales.

Appendix B – Gilbert and Du Plessis survivorship-bias corrected list of "South African Industrial Companies"

1 Abercom Group Limited
2 Adcock Ingram Limited
3 AECI Limited
4 African Cables Limited
5 African Oxygen Limited
6 Allied Electronics Corporation Limited
7 Allied Technologies Limited
8 Alpha Limited
9 Amalgamated Beverage Industries Limited
10 Anglo American Industrial Corporation Limited
11 Anglo American Properties Limited
12 Anglovaal Industries Limited
13 Aspen Pharmacare Holdings Limited
14 Barloworld Limited
15 Beverage & Consumer Industry Holdings Limited
16 Bidvest Group
17 Blue Circle Limited
18 C G Smith Foods Limited
19 C G Smith Limited
20 Cadbury Schweppes (South Africa) Limited
21 Charter - Sterling
22 Comparex Holdings Limited
23 Consol Limited
24 Cornick Group Limited
25 Darling And Hodgson Limited
26 Datatec Limited
27 Dimension Data Holdings Plc
28 Dorbyl Limited
29 Dunlop Africa Limited
30 Edgars Consolidated Stores Limited
31 Energy Africa Limited
32 Engen Limited
33 Everite Group Limited
34 Federale Volksbeleggings Beperk
35 Foodcorp Limited
36 Foschini Limited
37 Genbel South Africa Limited
38 Haggie Limited
39 Highveld Steel & Vanadium Corporation Limited
40 Hunt Leuchars & Hepburn Holdings Limited
41 Ics Holdings Limited
42 Imperial Holdings Limited
43 Iprop Holdings Limited
44 Jd Group Limited
45 Johannesburg Consolidated Invest Corp
46 Johnnic Holdings Limited
47 Kanhym Investments Limited
48 Kohler Limited
49 Malbak Limited
50 Massmart Holdings Limited
51 Messina Limited (Old)
52 Metkor Group Limited
53 MIH Holdings Limited
54 Mittal Steel S.A Ltd
55 MTN Group Limited
56 Murray & Roberts Holdings Limited
57 M-Web Holdings Ltd (Ex Mih/M-Web)
58 Nampak Limited
59 Naspers Limited -N
60 Network Healthcare Holdings Limited
61 New Africa Investment Limited
62 New Clicks Holdings Limited
63 Northern Engineering Industries Africa Limited
64 Ok Bazaars (1929) Limited
65 Pep Limited
66 Pepkor Limited
67 Pick `N Pay Stores Limited
68 Plate Glass & Shatterprufe Industries Limited
69 Polifin Limited
70 Premier Group Limited Old
71 Pretoria Portland Cement Company Limited
72 Primedia Limited
73 Profurn Limited
74 Rembrandt Group
75 Remgro Limited
76 Reunert Limited
77 Richemont Securities AG
78 Romatex Limited
79 Rothmans International - Sterling
80 SABmiller Plc
81 Safmarine & Rennies Holdings
82 Sappi Limited
83 Sasol Limited
84 Sentrachem Limited
85 Shoprite Holdings Limited
86 Southern Sun Hotel Holdings Limited
87 Steinhoff International Holdings Limited
88 Sun International (South Africa)
89 Sun International Limited
90 Super Group Limited
91 Technology Systems International Limited
92 Telkom SA Limited
93 Tiger Brands Limited
94 Tigon Limited
95 Toyota South Africa Limited
96 Trencor Limited
97 Truworths International Limited
98 Woolworths Holdings Limited

Source: Gilbert and Du Plessis (2013)

Appendix C - Data

Table C1: South African Manufacturing PCMs, 5 year annual averages and inter-period changes, 1993-2012

	1993-1997	1998-2002	2003-2007	2008-2012	Change 93-97 to 03-07	Change 93-07 to 08-12
Other manufacturing	0.40	0.35	0.30	0.24	-0.10	-0.16
Basic non-ferrous metals	0.15	0.17	0.20	0.14	0.05	-0.01
Beverages	0.21	0.18	0.20	0.14	-0.01	-0.07
Tobacco	0.13	0.14	0.13	0.10	0.01	-0.03
Non-metallic minerals	0.09	0.12	0.15	0.08	0.06	-0.01
Coke and refined petroleum products	0.13	0.12	0.14	0.03	0.02	-0.09
Professional and scientific equipment	0.12	0.08	0.13	0.08	0.01	-0.04
Footwear	0.05	0.10	0.12	0.04	0.07	-0.01
Food	0.07	0.05	0.07	0.07	0.00	0.00
Other chemicals and man-made fibers	0.08	0.07	0.08	0.03	-0.01	-0.05
Wood and wood products	0.13	0.05	0.09	0.00	-0.04	-0.13
Basic iron and steel	0.03	0.02	0.07	0.01	0.04	-0.02
Manufacturing	**0.10**	**0.08**	**0.08**	**0.03**	**-0.02**	**-0.07**
Basic chemicals	0.10	0.09	0.07	-0.01	-0.03	-0.11
Television, radio and communication equipment	0.07	0.06	0.08	0.03	0.02	-0.04
Metal products excluding machinery	0.07	0.04	0.04	-0.01	-0.03	-0.07
Plastic products	0.10	0.03	0.05	-0.01	-0.05	-0.11
Machinery and equipment	0.07	0.04	0.05	0.02	-0.03	-0.05
Electrical machinery and apparatus	0.09	0.09	0.07	-0.00	-0.03	-0.10
Rubber products	0.06	0.03	0.03	0.01	-0.03	-0.05
Leather and leather products	0.06	0.05	0.08	-0.01	0.02	-0.07
Furniture	0.07	0.05	0.05	-0.02	-0.03	-0.10
Wearing apparel	0.06	0.02	0.04	-0.03	-0.01	-0.09
Other transport equipment	0.04	-0.05	0.02	-0.04	-0.02	-0.08
Motor vehicles, parts and accessories	0.04	0.04	0.02	-0.02	-0.02	-0.06
Paper and paper products	0.07	0.05	0.04	-0.04	-0.03	-0.12
Textiles	0.03	-0.00	0.02	-0.01	-0.00	-0.04
Printing, publishing and recorded media	0.10	0.03	-0.01	-0.08	-0.10	-0.17
Glass and glass products	0.07	-0.00	0.06	-0.15	-0.02	-0.22

Source: SASID

Table C2: South African Manufacturing Net Operating Surplus, 5 year annual averages and inter-period changes, 1993-2012

	1993-1997	1998-2002	2003-2007	2008-2012	Change 93-97 to 03-07	Change 93-07 to 08-12
Other manufacturing	66.86	53.73	42.11	31.84	-24.74	-35.02
Basic non-ferrous metals	17.71	20.38	26.13	17.70	8.42	-0.02
Beverages	25.18	21.41	23.63	15.00	-1.55	-10.18
Non-metallic minerals	10.22	13.32	18.16	9.11	7.95	-1.11
Coke and refined petroleum products	14.50	13.40	17.00	3.34	2.50	-11.16
Tobacco	14.05	15.65	16.00	12.41	1.94	-1.64
Professional and scientific equipment	13.61	7.79	15.15	8.74	1.54	-4.87
Footwear	5.74	11.00	13.03	4.19	7.28	-1.55
Television, radio and communication equipment	7.24	6.05	9.38	3.24	2.13	-4.01
Wood and wood products	14.16	4.98	9.15	-0.05	-5.01	-14.21
Manufacturing	**11.03**	**8.10**	**9.07**	**3.38**	**-1.96**	**-7.64**
Leather and leather products	6.56	5.11	8.72	-0.93	2.17	-7.49
Basic chemicals	10.69	9.46	8.41	1.21	-2.28	-9.48
Other chemicals and man-made fibers	9.28	7.65	8.05	3.23	-1.24	-6.05
Food	6.82	4.78	7.31	7.39	0.50	0.58
Basic iron and steel	3.17	1.44	7.07	0.84	3.89	-2.34
Electrical machinery and apparatus	10.09	9.70	7.01	-0.58	-3.08	-10.67
Glass and glass products	8.19	-0.47	5.84	-12.80	-2.35	-20.99
Plastic products	11.99	2.64	5.56	-0.53	-6.44	-12.52
Machinery and equipment	7.58	3.78	5.28	3.39	-2.31	-4.20
Furniture	7.82	4.47	4.79	-2.03	-3.03	-9.85
Paper and paper products	7.76	5.40	4.54	-4.11	-3.22	-11.87
Metal products excluding machinery	7.38	4.25	4.49	-0.36	-2.89	-7.74
Wearing apparel	6.56	1.76	4.32	-3.42	-2.24	-9.98
Rubber products	8.06	3.40	3.34	1.68	-4.72	-6.38
Motor vehicles, parts and accessories	5.08	3.91	2.47	-1.35	-2.61	-6.43
Textiles	3.60	-0.40	2.38	-1.26	-1.22	-4.86
Other transport equipment	4.76	-4.78	2.17	-3.98	-2.59	-8.73
Printing, publishing and recorded media	10.29	2.28	-1.27	-7.56	-11.57	-17.85

Source: SASID