



# **Competition, Industrial Structure and Economic Growth**

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# Competition, industrial structure and economic growth

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## Abstract

This paper takes as its starting point established findings on industrial conduct as measured by pricing power in South African industry. The South African findings are contrasted with recent results derived from firm-level data from China and India. A stark contrast emerges between China, with low mark-ups of price over marginal cost of production, and South Africa and India with high mark-ups. Given the impact of pricing power on productivity growth, we show that lack of competitive pressure in the manufacturing sector, contributes one important explanation of why China has a relatively large, while South Africa and India have a relatively small manufacturing sector. We also provide an estimate of foregone employment opportunities due to the presence of pricing power has carried for South Africa. We provide a framework in terms of which the impact of success of potential policy intervention in the labour market can be assessed, given the findings on industrial structure. Returning to Chinese firm level data, we also examine whether there is a case to be made for differential policy treatment of established, new entrant, and struggling firms - and find that there is little evidence to support such a claim. For China we find that state intervention in the manufacturing sector has primarily served to suppress pricing power. We conclude with reflections on competitive pressures in other sectors of the economy, as well as final inferences on desirable policy interventions designed to stimulate growth and employment creation.

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# 1 Introduction: South African Exceptionalism

The fundamental concern of this paper is the growth performance of the South African economy.

Reason for this focus is that South Africa has not been successful in addressing poverty. As Figure 1 demonstrates, according to World Bank data in terms of either the \$1 a day or the \$2 a day poverty head count measures, the proportion of the South African population falling below the poverty lines has not declined significantly from the 1990s through the 2000s. Indeed, if anything the proportion has risen. By contrast, China over the same period has been able to halve the proportion of its population falling under the two poverty measures - though it started from a much higher incidence of poverty than did South Africa.

What is more, this differential ability to reduce poverty between the two economies did not arise from closer Chinese focus on welfare policies targeted on the poor. As Figure 2 shows, South African welfare policy allocated a proportion of GDP to welfare policy seven times as high as that maintained by China during the 2000s. Instead, the dramatic difference between China and South Africa is that the former maintained growth rates in GDP close to 10% per annum over the past two decades - while that for South Africa has averaged between 2 and 3% per annum. It is difficult to avoid the conclusion that better growth performance in the South African economy is at least part of the answer to any attempt to address, let alone eliminate poverty.

Which raises the question of how higher growth for South Africa might be achieved.

Previous work on growth constraints on South Africa raises three broad areas in which higher growth might be constrained. The first is the quantity and quality of human capital in the economy. The second concerns the nature of the labour market, and the rigidities to which it is subject. The third concerns the level of competitive pressure, and the levels of efficiency realized in South Africa's output markets, which can be linked both to the nature of physical capital accumulation in the economy, as well as employment creation.

While all three are important, in the present paper it is competitive pressure, and the impact it has on industrial structure and performance that will be the focus of analysis. An immediate means of illustrating that South Africa has peculiarities in terms of industrial performance and structure, is to consider the distribution of output across its principal aggregate sectors - as reported in Table 1. What is evident is that

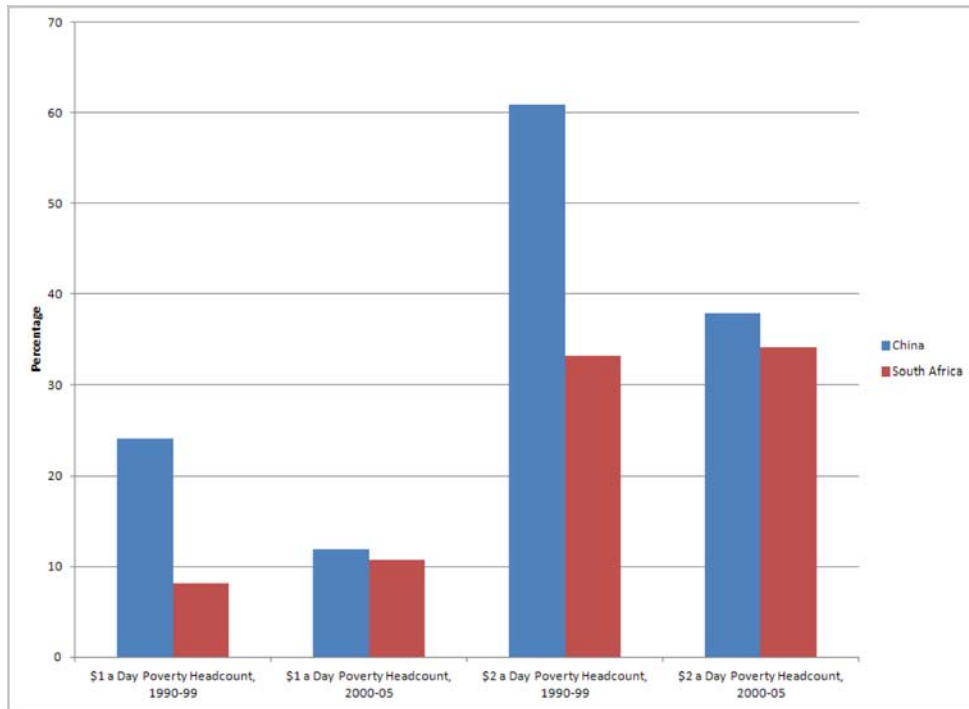


Figure 1: Poverty Headcounts: China and South Africa. Source: World Development Indicators.

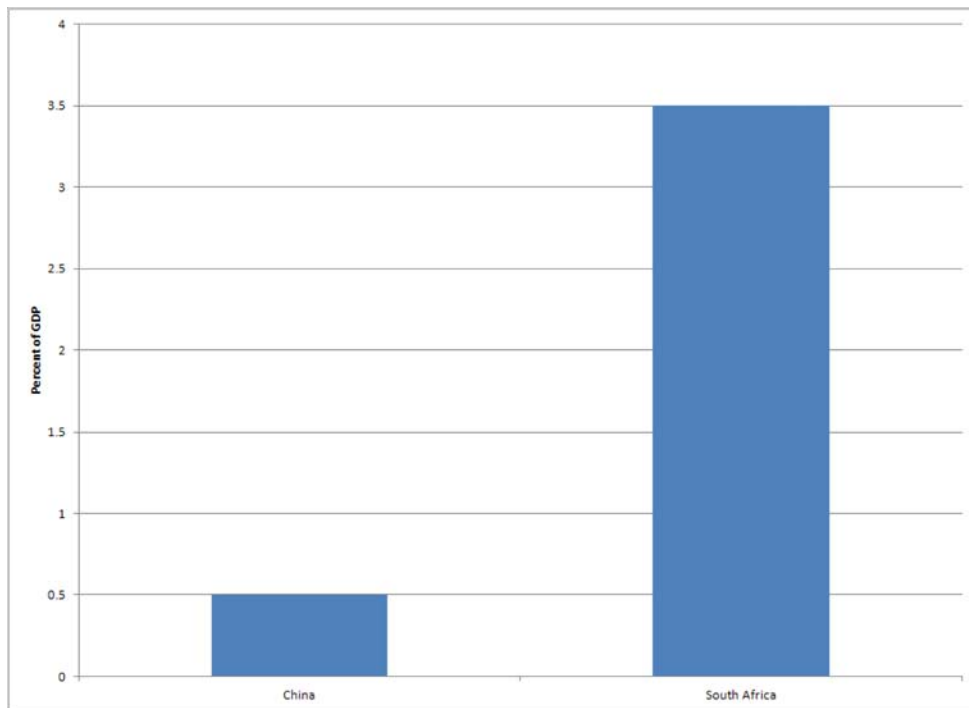


Figure 2: Percentage of GDP Spent on Welfare: China and South Africa.

	Primary	Manufac.	EGWC	PvtServ.	CSocServ.	GenGov
1970-74	16.41	15.53	5.62	29.07	20.65	12.73
1975-79	13.47	16.36	5.48	29.83	21.41	13.44
1980-84	11.79	17.38	5.18	30.50	21.63	13.52
1985-89	11.18	16.49	4.68	30.39	22.99	14.28
1990-94	10.43	15.42	4.60	30.38	24.12	15.04
1995-99	9.40	15.25	4.52	32.78	23.84	14.22
2000-04	8.53	15.35	4.31	36.99	22.40	12.42
2005-09	7.42	14.73	4.91	39.86	21.46	11.62

Table 1: Sectoral Share of GDP; Primary denotes Agriculture, Forestry, Fishing and Mining; EDWC denotes Electricity, Gas, Water and Construction; PvtServ denotes private service sectors; CSocServ denotes Community and Social Services; GenGov denotes General Government

	Mining	Manufac.	Construction	Trade	Financial	Public Sector
1970-74	0.18	0.33	0.11	0.05	0.03	0.30
1975-79	0.17	0.33	0.09	0.05	0.03	0.34
1980-84	0.17	0.33	0.09	0.04	0.03	0.34
1985-89	0.17	0.32	0.08	0.04	0.03	0.36
1990-94	0.14	0.32	0.08	0.04	0.04	0.38
1995-99	0.12	0.32	0.07	0.05	0.05	0.40
2000-04	0.09	0.28	0.06	0.06	0.15	0.35
2005-09	0.08	0.21	0.07	0.07	0.29	0.28

Table 2: Sectoral Share of Employment

over the last four decades, the relative contribution of primary sectors as well as manufacturing in South Africa has steadily declined. Instead, it is the services sector that has come to contribute more than 50% of GDP. In effect, South Africa’s industrial structure has come to resemble that of developed economies, despite the fact that it remains a developing country in the upper middle income classification.

In the case of the distribution of employment, the evidence is equally unusual. Table 2 also shows that the relative contribution of primary and manufacturing sectors to total employment has declined - and that financial and business services in particular have been the area of strongest growth.

The concern of this paper is to provide an account of why this unusual industrial structure might have emerged, by considering evidence on industrial conduct in South Africa. The paper starts by considering accumulated evidence on the level of pricing power in the South African economy, and by placing this in the context of similar evidence from China and India. This allows for a counterfactual analysis of how South Africa’s industrial structure might have differed, under lower levels of pricing power, and the associated higher growth rates in output and employment that might have been realized. We demonstrate that under plausible assumptions, industrial structure might have been closer to that of China, than that actually

reported in Tables 1 and 2.

Some policy inferences are then drawn with respect to firms that are new entrants into industry, the impact of mark-ups on international competitiveness, and finally whether there is evidence to suggest that there is a role for the state in influencing the level of the mark-up.

## 2 Some Core Findings on Industrial Conduct

We begin our exposition by noting a number of fundamental results that relate to industrial conduct in South Africa, before turning our attention to the implications of this conduct for economic growth.

A number of papers have examined the evidence on the strength of the mark-up over marginal cost of production for South Africa.

In all instances, the strength of the mark-up was found to be substantial. In Fedderke et al (2007) the average mark-up of price over the marginal cost of production for South African manufacturing sectors, for the 1970-97 period, was found to be between 77% and 79% - a mark-up approximately twice as high as that reported for the United States.<sup>1</sup> Aghion et al (2008), repeating the exercise for the 1971-2004 period reported an average of 54% for South African manufacturing over the full sample period, without evidence of a downward trend over sample sub-periods. Figure 3 summarizes the findings.

These findings of a high mark-up are not just an artefact of a few sectors with exceptionally high mark-ups biasing the average mark-up for the manufacturing sector upward. To illustrate this, Figure 4 reports the average estimated mark-up by three digit manufacturing sector, over the 1971-2004 period, as reported by the Aghion et al (2008) study. More than half the sectors have a mark-up in excess of 50%, and approximately a third of the sectors have a mark-up in excess of 77%. What is more, for the majority of manufacturing sub-sectors (eighteen), the magnitude of the mark-up *rose* from the 1971-1990 to the 1985-2004 period, in some instances dramatically so - see the evidence of Figure 5.

The level of the mark-up of price over marginal cost of production in South African manufacturing is thus high relative the USA, and appears to be rising over time. But is the level of the mark-up high relative

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<sup>1</sup>See Roeger (1995) and Oliviera Martins and Scarpetta (1999). While the mark-up was found to be considerably lower once intermediate inputs in production were controlled for, the findings nonetheless confirm a mark-up considerably higher than for the USA.

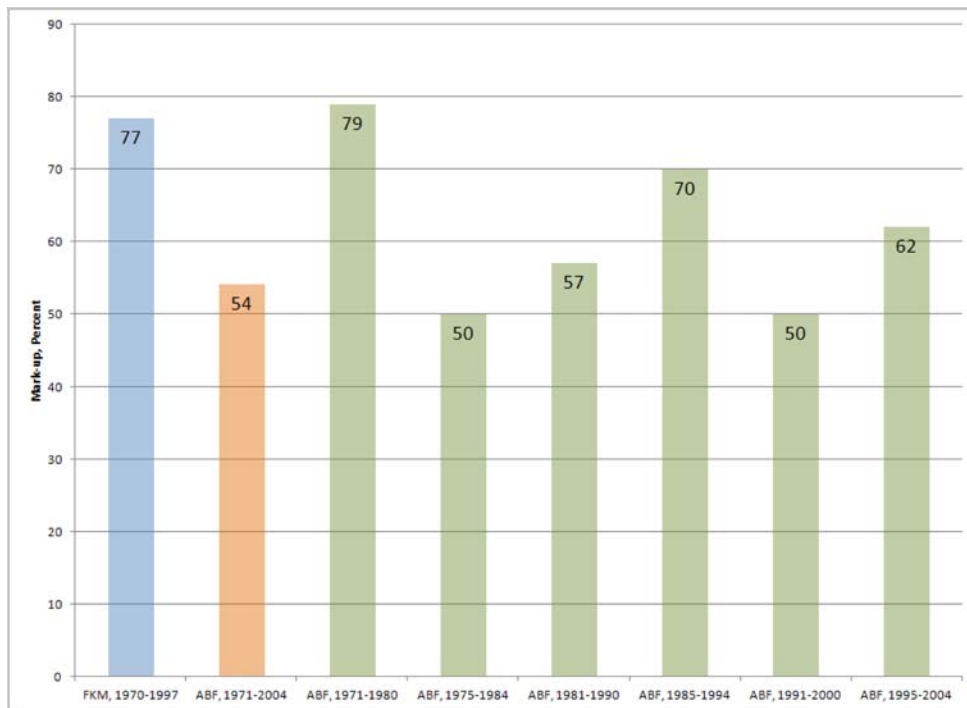


Figure 3: Estimated Mark-ups of Price over Marginal Cost of Production in South Africa. FKM denotes the Fedderke et al (2007) and ABF the Aghion et al (2008) study. Dates indicate sample periods.

to a more general set of comparators than the USA? In short, how does the South African mark-up compare with the rest of the world? Arguably the level of the South African mark-up may simply be a reflection of the rate of return that is standard for manufacturing sectors internationally, and thus lack exceptionalism.

To explore this question, we consider firm level data both for South Africa and a sample of 56 countries drawn from the Worldscope database. We then compare the ratio of Net Income to Assets of South African listed firms, to that reported on average in the remaining 55 countries in the data base. The data covers the 1980-2004 period. Figure 5 reports the ratio of the Net Income to Assets ratio for listed South African companies to the same ratio for listed companies across the world, for a range of sectoral classifications, including but not restricted to the manufacturing sectors.<sup>2</sup> What is striking is that across all sectors of the South African economy, the return on assets is considerably higher than in the rest of the world. For no sector is the ratio lower than 1.42 as high as elsewhere in the world, and in the majority of sectors the return

<sup>2</sup>While we report only the Net Income to Asset ratio results, note that Aghion et al (2008) establish that symmetrical results follow for Net Income to Sales, Net Income to Equity, the Gross Margin, the Market Value to Book Asset ratio, and the Price Earnings ratios.

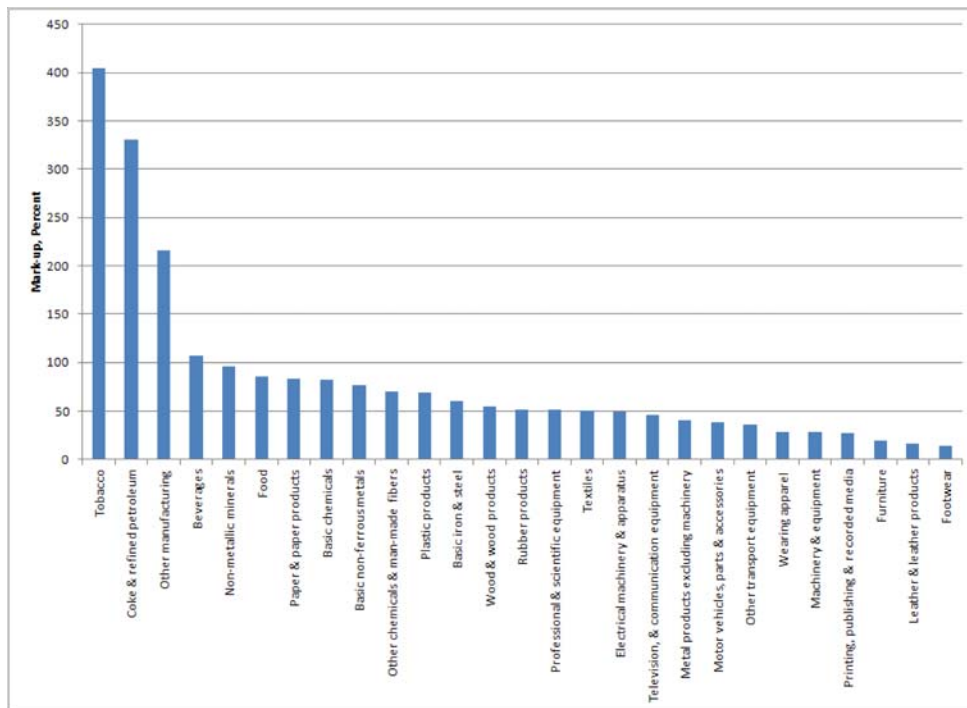


Figure 4: Estimated Mark-ups of Price over Marginal Cost of Production by Three-Digit Manufacturing Sector, 1971-2004. Source: Aghion et al (2008).

on assets in South Africa is twice as high as elsewhere in the world. What is more, for a number of sectors returns on assets are three times as high as elsewhere in the world, and in one instance 4.5 times as high. To the extent that mark-ups are related to the net return on assets therefore, the inference is thus not only that mark-ups are high in South Africa, but that they are high in comparison with other countries.

What is more, the high rates of return on assets are not restricted solely to the manufacturing sectors. Note that the Transport and Financial sectors return the second and fourth highest rate of return on assets relative to the rest of the world (a return on assets approximately three times as high as elsewhere), while the Retail, Construction and Recreational service sectors all show rates of return on assets approximately twice that observed on average elsewhere in the world. Once again therefore, not only are South African mark-ups high, but the manufacturing sector does not appear to be exceptional relative to other sectors in the economy.

It is also worth noting that over time, the structure of returns on assets (and by inference the mark-up) in South Africa has changed from favouring small firms, to dramatically favouring large producers. Consider



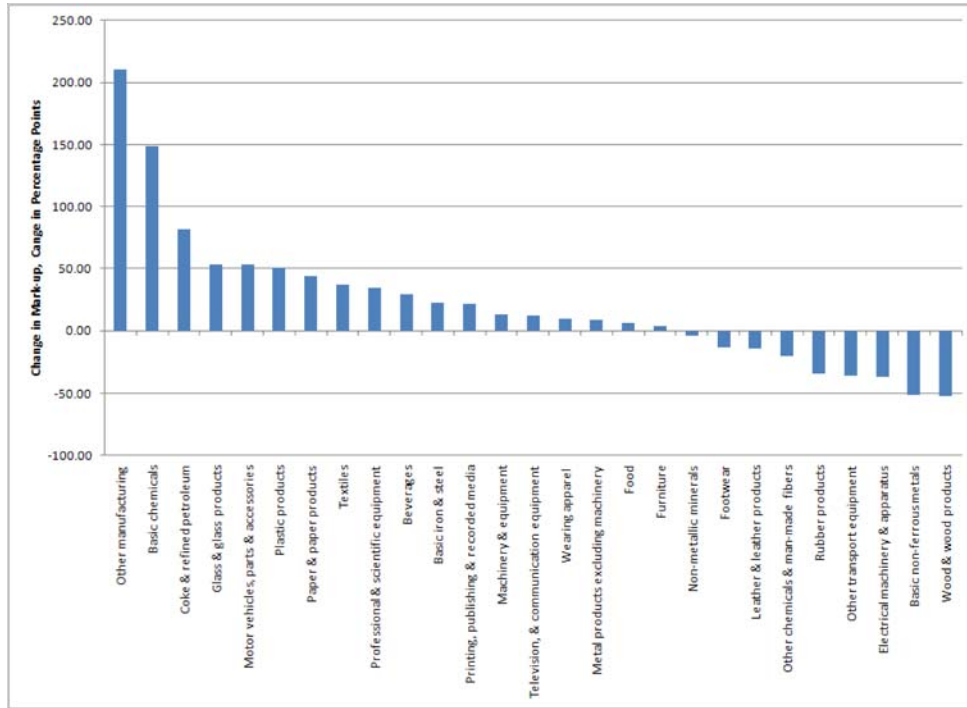


Figure 5: Estimated Change in Mark-ups of Price over Marginal Cost of Production, by Three-digit Manufacturing Sector, between the 1971-1990 and the 1985-2004 sample subperiods. Source: Aghion et al (2008).

by way of evidence the ratio of Net Income to Sales. In Figure 7 we report the ratio of the Net Income to Sales of large to small South African listed firms. While for most of the sample period the Net Income to Sales ratio was lower for large than for small firms in South Africa, with the ratio of ratios consistently below 1 for the 1980-94 period. However, during the 1990s the pattern began to reverse. By the 2000's, the rate of return for large relative to small firms in South Africa began to rise dramatically, with Net Income to Sales ratios between two and six times as high for large as for small firms. What is more, this pattern is not simply a reflection of international trends. Figure 7 also reports the large to small firm ratio of Net Income to Sales, between South Africa and the rest of the world in our firm level data set. What emerges is that while the Net Income to Sales ratio of large to small firms rose on average across the world, the increase in South Africa was considerably stronger - with the result that the differential rate of return between large and small firms was three times as great in South Africa relative to the rest of the world by the mid 2000s.

In summary then, the evidence on South African industrial conduct suggests that the mark-up of price over the marginal cost of production is high. Moreover, the mark-up is high not only in absolute terms,

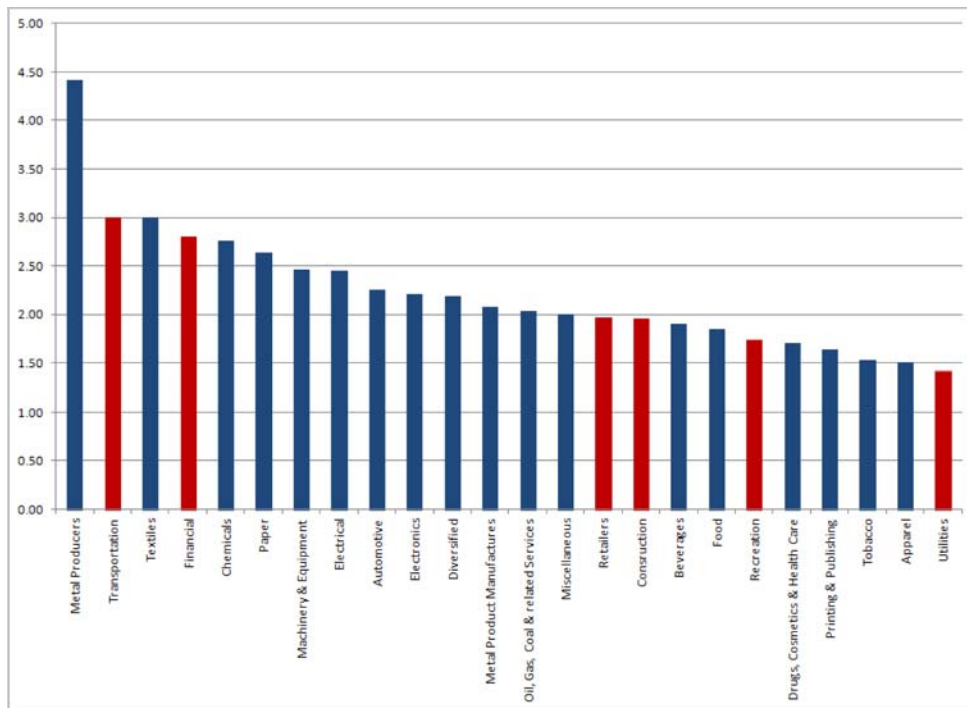


Figure 6: Ratio of South African Net Income to Asset Ratio to World Net Income to Asset Ratio. Source: Aghion et al (2008). Blue bars denote manufacturing sectors. Red bars denote sectors other than manufacturing.

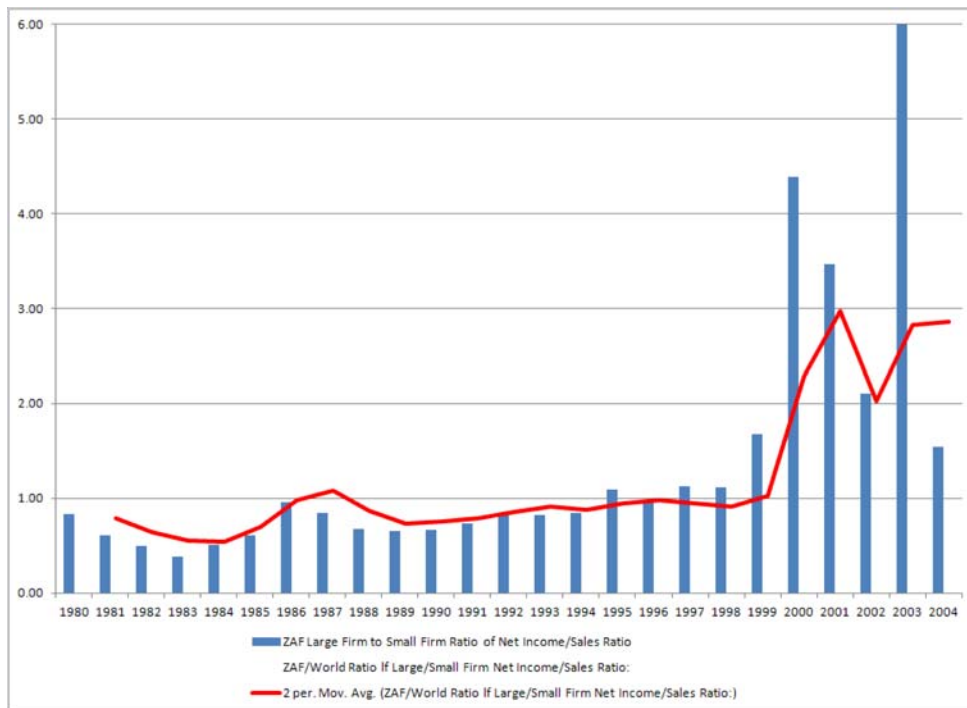


Figure 7: Ratio of Large Firm to Small Firm Net Income to Sales Ratios. Source: Aghion et al (2008).

but it is high relative to mark-ups elsewhere in the world - not solely relative to the USA. Over time, the structure of mark-ups between large and small firms also appears to have changed, from favouring small firms, to favouring large firms. While there is some evidence to suggest that the move to higher rates of return for large firms is an international phenomenon, the rate of increase for South African large firms has considerably outpaced that of large firms internationally.

### 3 Why Does Industrial Conduct Matter for Growth?

Why does the evidence on industrial conduct matter - particularly in the context of economic policy formulation?

To address this question, in this section of the paper we consider three separate pieces of evidence.

In the first, we note the impact of differential mark-ups of price over the marginal cost of production, on the long-term industrial structure of an economy. We do so on the basis of concrete evidence from China and India.

Second, we consider evidence on the productivity-growth impact of mark-ups in South Africa, in order to undertake a set of simulation exercises on some counterfactual scenarios, that consider how South African industrial structure might have been different under lower mark-ups in the manufacturing sector.

Finally, we consider the implications of lower mark-ups on conditions in South African labour markets, and consider how the structure of the market might have differed under the alternative industrial conduct assumption.

### 3.1 An International Comparison - China and India

To consider the impact of the size of mark-ups on the long term industrial structure of an economy, we estimated the size of the mark-up in the Chinese and Indian manufacturing sectors, and considered the differential patterns of industrial structure between China and India. To do so we employ firm-level data sourced from Chinese and Indian official statistical sources.<sup>3</sup>

#### 3.1.1 The Methodology

We employ the same methodology as employed for the South African studies reported above, and that have been applied to the USA also. Since the method is established, we provide only a brief exposition.

Under constant returns to scale, the primal of the Solow residual ( $SR$ , or growth in Total Factor Productivity,  $TFP$ ), is related to the mark-up of prices over marginal cost. Hall (1990) demonstrates that:

$$\begin{aligned} TFP &= SR = \Delta q - \alpha \cdot \Delta l - (1 - \alpha) \cdot \Delta k \\ &= (\mu - 1) \cdot \alpha \cdot (\Delta l - \Delta k) + \theta \end{aligned} \tag{1}$$

where  $\mu = P/MC$ , with  $P$  denoting price, and  $MC$  denoting marginal cost. Under perfect competition  $\mu = 1$ , while imperfectly competitive markets allow  $\mu > 1$ .  $\Delta$  denotes the first difference, lower case denotes the natural log transform,  $q$ ,  $l$ , and  $k$  denote real value-added, labour, and capital inputs,  $\alpha$  is the labour share in value-added, and  $\theta = \dot{A}/A$  denotes exogenous (Hicks-neutral) technological progress, where  $A$  is the technology parameter.

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<sup>3</sup>Comparative results on China and India were produced jointly with Chandana Kularatne of the World Bank.

Estimation of equation (1) faces the difficulty that the explanatory variables  $(\Delta l - \Delta k)$  will be correlated with the productivity shocks  $\theta$ , with resultant bias and inconsistency in the estimates of  $\mu$ . The standard instrumentation solution leads to implausibly high  $\mu$ -estimates.<sup>4</sup> An alternative approach proposed by Roeger (1995), notes that the dual of the Solow residual ( $DSR$ ), provides a symmetrical relation of the price-based productivity measure to the mark-up:

$$\begin{aligned} DSR &= \alpha \cdot \Delta w - (1 - \alpha) \cdot \Delta r - \Delta p \\ &= (\mu - 1) \cdot \alpha \cdot (\Delta w - \Delta r) + \theta \end{aligned} \quad (2)$$

with  $w, r$  denoting the natural logs of the wage rate and rental price of capital respectively. While equation (2) is of course subject to the same endogeneity problems as equation (1), subtraction of equation (2) from equation (1) gives the *nominal* Solow residual ( $NSR$ ):

$$\begin{aligned} NSR &= \Delta(p + q) - \alpha \cdot \Delta(w + l) - (1 - \alpha) \cdot \Delta(r + k) \\ &= (\mu - 1) \cdot \alpha \cdot [\Delta(w + l) - \Delta(r + k)] \end{aligned} \quad (3)$$

in which the productivity shocks ( $\theta$ ) have cancelled out, removing the endogeneity problem, and hence the need for instrumentation. The mark-up is now accessible either to simple estimation or computation directly from equation (3).<sup>5</sup>

### 3.1.2 The Data

For China the data is obtained from the Chinese National Bureau of Statistics. The Statistical Bureau conducts an annual survey of industrial plants, which includes manufacturing firms as well as firms that

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<sup>4</sup>See for instance the discussion in Oliveira Martins and Scarpetta (1999).

<sup>5</sup>Trivially,  $\mu - 1 = \frac{\Delta(p+q) - \alpha \cdot \Delta(w+l) - (1-\alpha) \cdot \Delta(r+k)}{\alpha \cdot [\Delta(w+l) - \Delta(r+k)]}$ . While problems of endogeneity are addressed by equation (3), there is an additional difficulty arising from the assumption of constant returns to scale, and the use of value-added measures of output. Oliveira Martins and Scarpetta (1999) demonstrate that where the assumption of constant returns to scale is dropped, equation (3) is actually:

$$NSR = \left(\frac{\mu}{\lambda} - 1\right) \cdot \alpha \cdot [\Delta(w + l) - \Delta(r + k)] \quad (4)$$

where  $\lambda > 1$  denotes increasing returns to scale. Thus any estimate of mark-up that follows from Solow residuals should be interpreted as *lower-bound* values if increasing returns to scale are present.

produce and supply electricity, gas, and water. It is firm-level based, including all state-owned enterprises (SOEs), regardless of size, and non-state-owned firms (non-SOEs) with annual sales of more than 5 million yuan. We use a ten-year unbalanced panel data set, from 1998 to 2007. The number of firms per year varies from a low of 162,033 in 1999 to a high of 336,768 in 2007. The sampling strategy is the same throughout the sample period (all firms that are state-owned or have sales of more than 5 million yuan are selected into the sample).

Note that the data set allows for firm entry and exit. As a consequence, while the maximum number of firms observed in any one period is 336,768, we in fact observe a total of 373,558 firms over the full sample period. In what follows, we exploit the data on entry and exit explicitly - see sections 4.1 and 4.3. In the context of China, the role of state is of particular importance, and its influence is deemed to be pervasive. For this reason, in what follows we pay particular attention to the distinction between SOEs and non-SOEs, while recognizing that this might not fully capture to full extent of state influence - see the discussion of section 4.3.

For India the data is drawn from the Prowess Database which is constructed by the Centre for Monitoring of the Indian Economy (CMIE). The data has advantages over the Annual Survey of Industries since the ASI is constructed from a repeated cross section of firms whereas the Prowess data set includes a panel of firms. The database contains information on income statements and balance sheets of publicly listed (relatively large firms as in the China data set). Only manufacturing firms are included in the analysis. The data provides a panel of 6242 publicly listed firms, over the sample period 1991-2011. The panel is constructed over the 1991 to 2010 period, since 1991 defines the implementation of the liberalizing reforms in India.

### 3.1.3 The Empirical Findings

The empirical specification we estimate is given by:

$$NSR_{it} = \gamma_{0i} + \gamma_1 RGR_{it} + \varepsilon_{it} \quad (5)$$

$$\text{where } RGR_{it} = \alpha_{it} \cdot [\Delta(w + l) - \Delta(r + k)]$$

with  $\alpha_{it}$  denoting the share of labour in value-added of sector  $i$ ,  $\Delta(w + l)_{it}$  the log change in nominal labour cost for sector  $i$ ,  $\Delta(r + k)_{it}$  the log change in total capital stock for firm  $i$ , in period  $t$ .  $\gamma_1$  now estimates  $(\mu - 1)$  directly  $\mu = P/MC$  is the mark-up.

What emerges is a stark difference between China and India in terms of the magnitude of the mark-up - see the illustrated mark-ups for the two countries in Figure 8, which contrasts the estimated mark-ups with those found for the South African manufacturing sector. While for China the mark-up is approximately 35% (about half that estimated for South Africa),<sup>6</sup> for India the mark-up in manufacturing is approximately 98% (even higher than in South Africa).<sup>7</sup>

This difference has had a profound impact on the industrial structure of the two countries. The empirical observation that the growth performance of China is strongly linked to the manufacturing sector, while that of India is linked to the service sector, is well established in the literature.<sup>8</sup> As Figure 9 illustrates, China has experienced strong labor productivity growth in manufacturing, while for India productivity growth in manufacturing is effectively zero, over the 1991-2005 period. The net result of these differential growth patterns in productivity are revealed in the industrial structure of the two countries.

Figure 10 shows that over the 1990 - 2005 period China's manufacturing and industrial sectors have either maintained a constant share of GDP, or arguably have even gained as a proportion of total GDP (primarily at the expense of Agriculture). By contrast, in India the share of GDP that grown most dramatically has been that of the Service sector - with Services coming to contribute more than 50% of GDP by the mid-2000s.

### 3.2 A Direct Consideration of the Growth Impact of Industrial Conduct

The implication of the evidence on Chinese and Indian manufacturing sectors, is that differences in industry mark-ups, can come to carry long-term implications for industrial structure. Specifically, the suggestion is that lower mark-ups in Chinese manufacturing supported productivity growth in its manufacturing sector that explain the much larger manufacturing base of China relative to India.

In this section we consider more direct evidence on this linkage, and do so directly on South African

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<sup>6</sup>Note that the mark-up reported is that estimated under fixed, but not time effects. Once time effects are controlled for, the China mark-up is even more moderate, at 14%.

<sup>7</sup>Full estimation results including diagnostics are available from the author.

<sup>8</sup>See for instance Chaudhuri and Ravallion (2006), Rajan (2006), Pack (2008), and Bosworth and Maertens (2010). See also Kochhar et al (2006) and the discussion of some of the reasons for the relative strength of the Indian service sector.

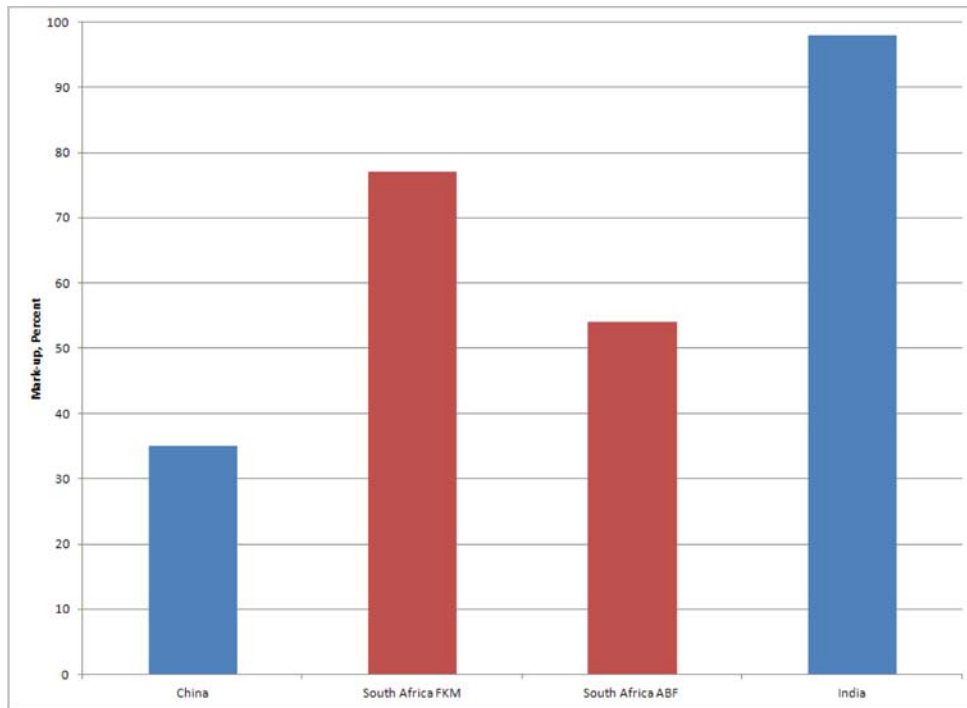


Figure 8: Mark-ups in China and India. Estimation is on firm-level data, correcting for fixed effects. Estimation for China is on 373,558 firms and 1,178,670 observations. Estimation for India is on 6,242 firms, and 38,291 observations. Source: own estimations, FKM refers to Fedderke et al (2007) study, ABF to Aghion et al (2008) study.

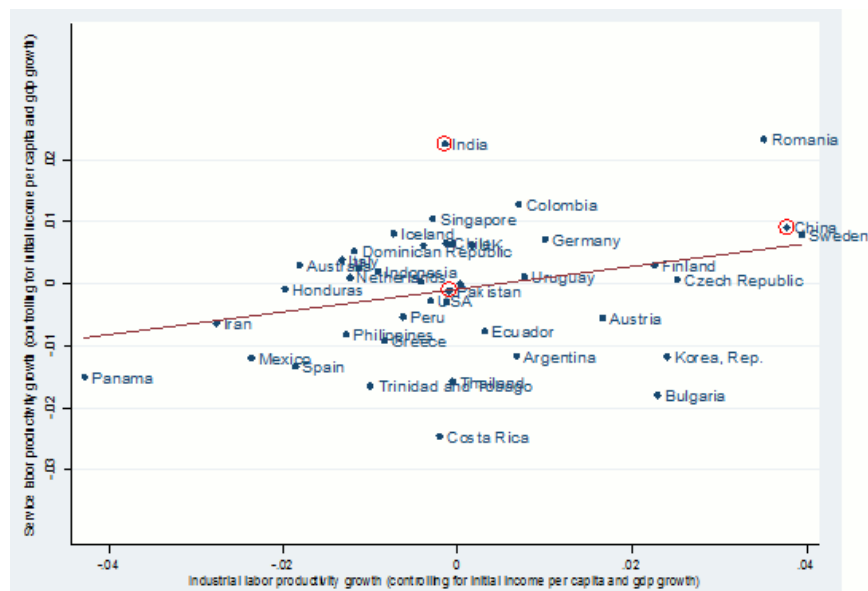


Figure 9: Service and Manufacturing Labor Productiivty Growth, 1991-2005. Source: Ghani (2011).



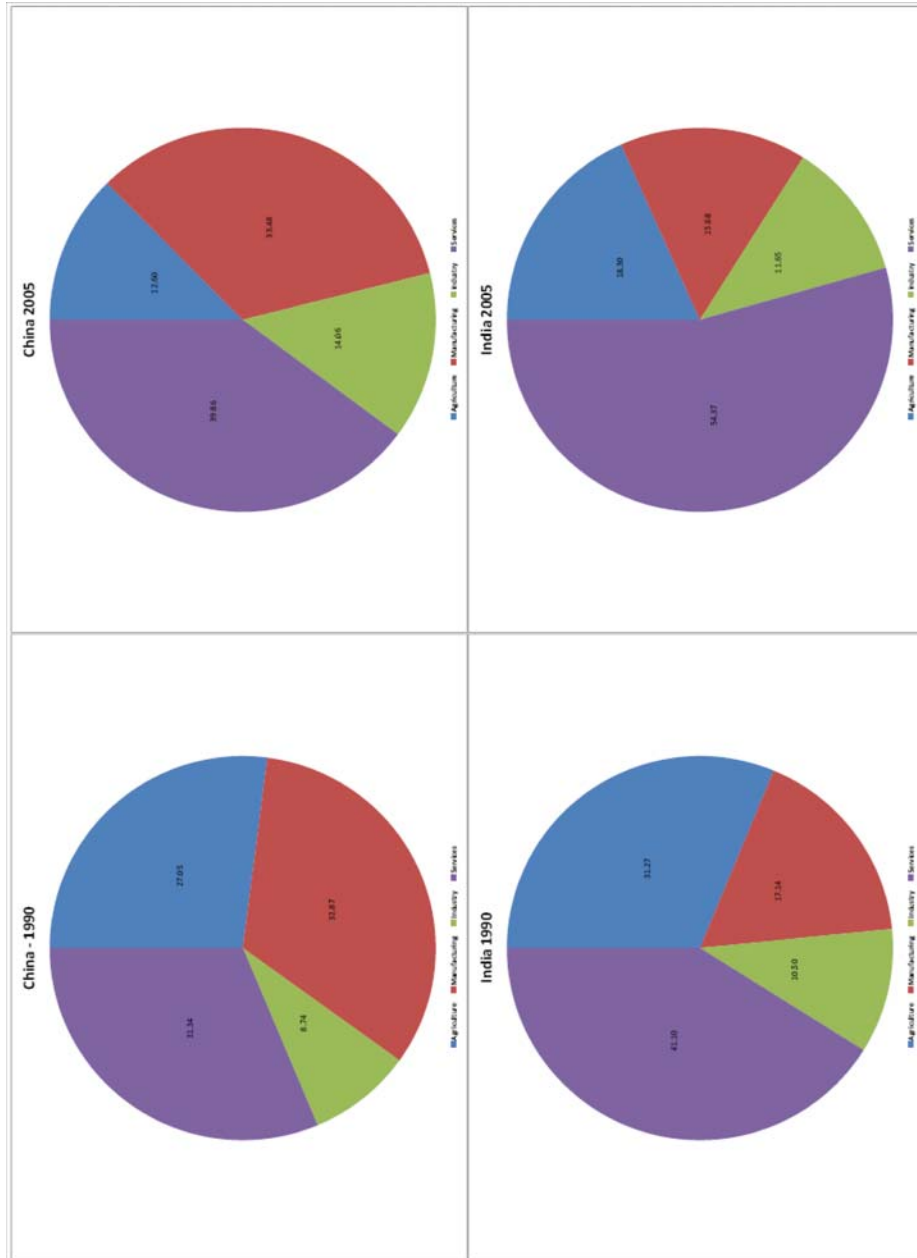


Figure 10: China and India: Industry Composition, 1990 - 2005. Source: World Development Indicators.

evidence. On the basis of the evidence a symmetrical point to that made for China and India can be made for the South African case.

Two separate studies have explored the impact of the mark-up on productivity growth for the South African manufacturing sector. Both have found the impact to have been not only statistically significant, but substantively large.

In Aghion et al (2008), the focus of the study was directly whether the size of the mark-up, computed annually on a three-digit manufacturing sector basis has an impact on productivity growth (as measured by TFP growth). The study finds that it does, with coefficients ranging from -0.12 for the full 1970-2004 sample period, to -0.2 for the 1988-2004 sub-sample, and with the finding robust to controlling for possible endogeneity of the mark-up to productivity growth.

One concern with the results of the Aghion et al (2008) study was that it did not control explicitly for trade liberalization (though it included fixed and time effects), while estimating the impact of the mark-up on productivity growth over a period in which South Africa liberalized its trade dispensation, such that the growth impact derived in the study may be overstated.<sup>9</sup> Aghion et al (2012) therefore controls for both direct and indirect impacts of the level of trade protection (measured by effective as well as nominal protection rates), and tests whether the growth impact of pricing power (the mark-up) is in any way affected. The findings of the study are that the coefficient on the mark-up ranges between -0.18 and -0.2, once a comprehensive set of direct and indirect impacts of trade protection are controlled for in estimation.

The inference is that the growth impact is certainly no lower, and potentially is up to twice as large in estimations that control for trade liberalization, relative to those that do not. Specifically, the inference is that an increase in the mark-up of 10 percentage points, would result in an annual productivity growth loss of between 1 and 2 percentage points.

The implied long-term impact on the South African economy is dramatic.

To illustrate the point, consider how South Africa's industrial structure might have differed if over the 1970-2004 period it had successfully lowered the level of the mark-up in its manufacturing industries. We

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<sup>9</sup>This concern was expressed particularly by Rodrik (2008), who noted falling relative manufacturing prices in the South African economy. While falling relative manufacturing prices are not inconsistent with constant mark-ups of price over cost of production, it raised the question of the robustness of the findings.

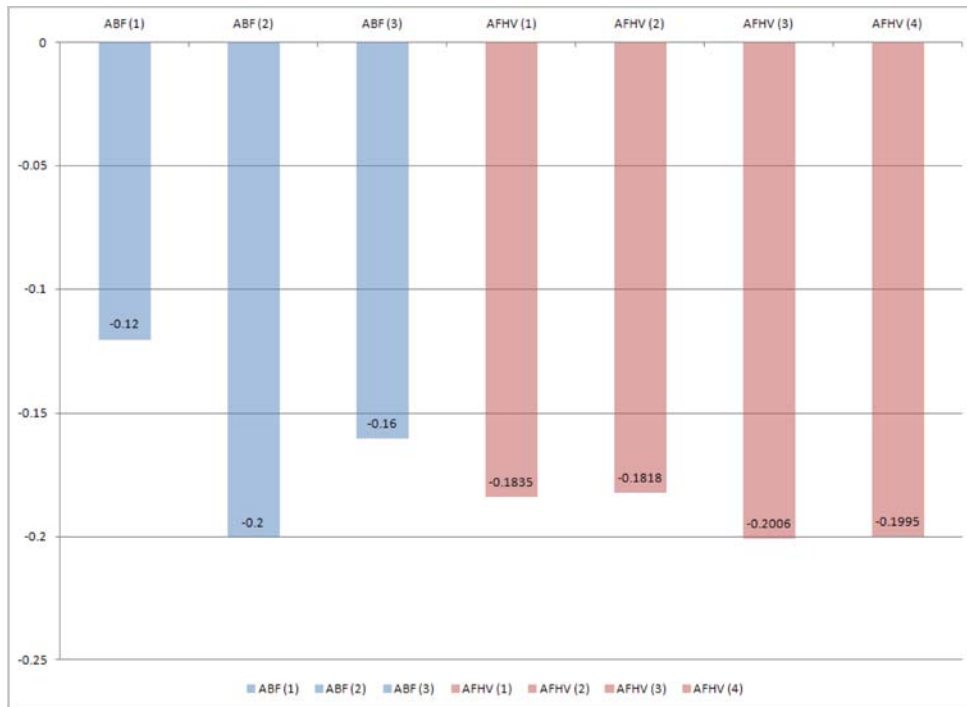


Figure 11: Estimated Impact of Mark-up on Productivity Growth. ABF denotes Aghion et al (2008). AFHV denotes Aghion et al (2012). ABF (1) and ABF (2) are for the 1970-2004 and 1988-2004 sample periods respectively; ABF (3) for the 1988 - 2004 sample period under IV estimation. The AFHV (1) coefficient is obtained while controlling for the level of trade protection and distance from the international technological frontier, while AFHV (2) allows for interaction between the mark-up and protection. AFHV (3) and (4) are symmetrical, while also controlling for industry scale effects.

noted at the outset of this paper that South Africa’s industrial structure was unusual for a developing country - with primary and manufacturing industries contributing considerably smaller proportions of GDP than did services, and with declining trends over time - recall Table 1. By the end of the 2000s the proportion of GDP contributed by manufacturing had declined to approximately 15%. In effect, South Africa’s industrial structure looks more like that we observe for India, than that we noted for China in Figure 10.

Now consider the impact of the lower-bound estimate of the productivity growth impact of the mark-up (the 1% impact of a 10 percentage point lowering of the mark-up), under two alternative scenarios. In the first, we allow the mark-up to be consistently 10 percentage points lower than the average 54% mark-up reported in the Aghion et al (2008) study over the 1970-2009 period, thereby generating a growth rate that is consistently one percentage point higher for the manufacturing sector.<sup>10</sup> This can be thought of as lowering the magnitude of the manufacturing sector mark-up in South Africa roughly half-way from the level found by Aghion et al (2008) for South Africa to that we reported above for the Chinese manufacturing sector (of approximately 30%). The implied impact on South African industrial structure is noted in Table 3.<sup>11</sup>

Second, we allow the mark-up to be consistently 20 percentage points lower than the Aghion et al (2008) 54% level over the 1970-2009 period, thereby generating a consistent two percentage point gain in productivity growth for the manufacturing sector. This can be thought of as lowering the magnitude of the manufacturing sector mark-up in South Africa from the level found by Aghion et al (2008) for South Africa approximately to that we reported above for the Chinese manufacturing sector (30%). The implied impact on South African industrial structure is also noted in Table 3.

Under either scenario, the structure of the South African economy would have been markedly different from that we actually observe. Under scenario 1, with a 10 percentage point lowering of the mark-up, the share of manufacturing sector in total South African GDP by the close of the 2000s approximates 30% - see

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<sup>10</sup>Note that we do *not* simply project a cumulative growth rate from the starting period. Instead, we consistently allow growth to be 1% higher than actually observed, with a cumulative component on the previous period’s additional growth. Thus:

$$y_t^{sim} = y_t + \gamma y_{t-1} + \gamma y_{t-2} (1 + \gamma)$$

where  $y_t^{sim}$  is the simulated value of manufacturing sector GDP in period t,  $y_t$  denotes actual GDP, and  $\gamma$  denotes the additional growth due the lower pricing power in the manufacturing sector. As such, simulated output remains tied to actual output levels more closely than under a pure cumulative growth rate from initial starting values, thereby remaining tied to the underlying structural conditions for the sector.

<sup>11</sup>Readers should note that since the simulation models the impact of the higher growth rate on manufacturing without taking into consideration the full set of forward and backward linkages between manufacturing and the rest of the economy, the simulation will likely *overstate* the impact on industrial structure, but *understate* the growth impact.

1% Growth Scenario Simulation							
	Primary	<b>Manufac.-Sim</b>	EGWC	PvtServ.	CSocServ.	GenGov	<i>Manufac.-Actual</i>
1970-74	0.16	<b>0.17</b>	0.06	0.29	0.20	0.13	<i>15.53</i>
1975-79	0.13	<b>0.20</b>	0.05	0.29	0.21	0.13	<i>16.36</i>
1980-84	0.11	<b>0.22</b>	0.05	0.29	0.20	0.13	<i>17.38</i>
1985-89	0.10	<b>0.26</b>	0.04	0.27	0.20	0.13	<i>16.49</i>
1990-94	0.09	<b>0.29</b>	0.04	0.26	0.20	0.13	<i>15.42</i>
1995-99	0.08	<b>0.30</b>	0.04	0.27	0.20	0.12	<i>15.25</i>
2000-04	0.07	<b>0.30</b>	0.04	0.30	0.18	0.10	<i>15.35</i>
2005-09	0.06	<b>0.29</b>	0.04	0.33	0.18	0.10	<i>14.73</i>
2% Growth Scenario Simulation							
	Primary	<b>Manufac.-Sim</b>	EGWC	PvtServ.	CSocServ.	GenGov	<i>Manufac.-Actual</i>
1970-74	0.16	<b>0.19</b>	0.05	0.28	0.20	0.12	<i>15.53</i>
1975-79	0.12	<b>0.25</b>	0.05	0.27	0.19	0.12	<i>16.36</i>
1980-84	0.10	<b>0.31</b>	0.04	0.25	0.18	0.11	<i>17.38</i>
1985-89	0.09	<b>0.37</b>	0.04	0.23	0.17	0.11	<i>16.49</i>
1990-94	0.07	<b>0.41</b>	0.03	0.21	0.17	0.10	<i>15.42</i>
1995-99	0.06	<b>0.43</b>	0.03	0.22	0.16	0.10	<i>15.25</i>
2000-04	0.06	<b>0.44</b>	0.03	0.24	0.15	0.08	<i>15.35</i>
2005-09	0.05	<b>0.43</b>	0.03	0.26	0.14	0.08	<i>14.73</i>

Table 3: Sectoral Share of GDP under Growth Simulation; Primary denotes Agriculture, Forestry, Fishing and Mining; EDWC denotes Electricity, Gas, Water and Construction; PvtServ denotes private service sectors; CSocServ denotes Community and Social Services; GenGov denotes General Government

	<b>1% Growth Scenario</b>	<b>2% Growth Scenario</b>
Actual GDP (R Millions)	314814	314814
Simulated GDP (R Millions)	381695	476443
% Simulated GDP Higher	21	51

Table 4: Growth Impact of Lower Manufacturing Sector Mark-ups

the share of manufacturing under Manufac-Sim in Table 3. Under the more aggressive scenario in which mark-ups are lowered by 20 percentage points, manufacturing's share in GDP approximates 40%. In effect, South Africa's industrial structure would be more akin to the Chinese, than to the Indian case.

What is more, the implied growth impact on the economy is substantial. In Table 4 we note the difference between actual South African GDP and that implied by the two alternative growth scenarios under a lower mark-up structure in manufacturing. Under either scenario the impact over the past 40 years is substantial - even under the moderate mark-up reduction scenario, aggregate GDP is found to be 21 % higher, while under a reduction of mark-ups to Chinese levels, the implication is that GDP would have been 50% higher.

The implication of these findings is thus that the structure of mark-ups of prices over the cost of production carries with it direct implications for productivity growth. Using the established findings of the magnitude of this growth impact, and simulating the counterfactual scenario of higher productivity growth in South

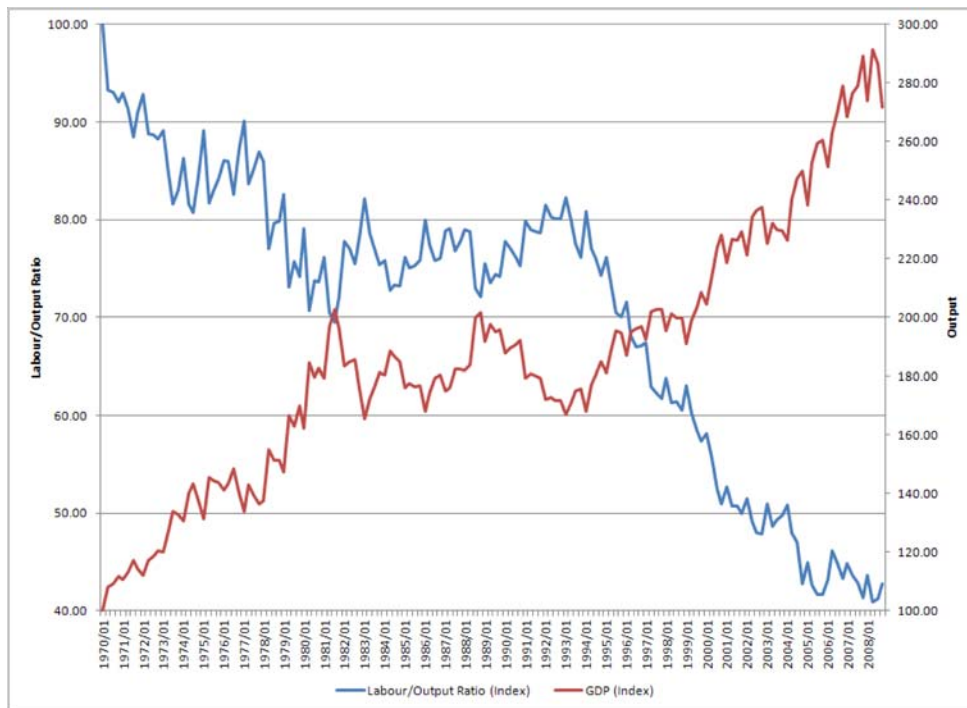


Figure 12: South African Manufacturing Sector Output and Labour:Output Ratio Index Series. Source: SARB data.

Africa’s manufacturing sector over the 1970-2009 period, demonstrates that one possible reason for the unusual industrial structure in South Africa that we noted in the introduction, may well be due to the high levels of pricing power found in the South African manufacturing sector.

### 3.3 The Labour Market Impact

To mirror the output market simulations, we also consider the possible impact of lower levels of pricing power in the manufacturing sector on employment. We consider only the impact of the lower-bound growth stimulus from lower pricing power (the 1% estimate). Production in the South African manufacturing sector has been significantly labour saving, particularly since 1990. Figure 12 illustrates. For this reason, we adjust the higher output growth implied by lower pricing power in the manufacturing sector, for the underlying growth in the labour-output ratio.

The resultant employment series for the manufacturing sector is reported in Table 5. While employment under the simulation falls below actual manufacturing sector employment during the 1970s, during the second

	Actual	Add. 1% Growth less L/Y Adj	Percent Dev. of Sim. from Act.	Sectoral Composition (Sim)					
				Mining	Manufac.	Constr.	Trade	Financial	Public Sector
1970-74	1178091	1080670	-8	0.19	0.31	0.11	0.05	0.03	0.31
1975-79	1327987	1221690	-8	0.17	0.31	0.10	0.05	0.03	0.35
1980-84	1503747	1359980	-10	0.17	0.30	0.09	0.04	0.03	0.35
1985-89	1536281	1666681	8	0.16	0.33	0.08	0.04	0.03	0.35
1990-94	1535957	2068919	35	0.13	0.39	0.07	0.04	0.04	0.34
1995-99	1406340	2200818	56	0.10	0.43	0.06	0.04	0.04	0.34
2000-04	1262142	2308307	83	0.08	0.42	0.05	0.05	0.12	0.29
2005-09	1275508	2564279	101	0.07	0.35	0.06	0.06	0.24	0.23

Table 5: Actual and Simulated Manufacturing Sector Employment

half of the sample period through the end of the 2000s this is reversed. Even taking into account the falling labour to output ratio, the higher growth rate associated with lower pricing power in manufacturing, implies a level of employment that is twice that actually observed by 2009. As Table 5 also clarifies, under the projected additional employment creation in manufacturing due to higher output growth under lower mark-ups, the distribution of employment across sectors of the economy would also have deviated substantially from that actually observed. Instead of manufacturing employment declining to approximately 20% of total employment by 2005-09 (see Table 2), under the higher growth scenario the projections suggest that more than 30% of employment would have remained in manufacturing.

We also considered the implications for the unemployment rate in South Africa, and note the results in Table 6. Using the actual unemployment rates reported in Banerjee et al (2008) over the 1995-2005 period, we considered what the additional manufacturing sector employment that emerges under our additional 1% growth simulation scenario, would have implied for the aggregate unemployment rate in South Africa, under the assumption that the additional employment would have left employment in other sectors unaffected. The net result is that the narrow unemployment rate would have peaked at approximately 13% in 2000 and would have declined to 10.5% (simulated) rather than the observed value of 26.7% by 2005. The broad unemployment rate would still have been substantial, peaking at 29%, but nonetheless by 2005 it would have stood at 28% (simulated) rather than the 41% actually observed. In short, while unemployment would have continued to be a substantial concern for the economy, its implied magnitude is considerably lower under the projected additional output growth due to lower pricing power in manufacturing.

The labour market impact of pricing power in the manufacturing sector does not end here, however. In

	Actual		Simulated	
	Narrow	Broad	Narrow	Broad
1995	15.6	28.2	3.1	17.6
1997	22.1	38	8.6	27.3
1999	24.85	39.9	7.6	26.1
2001	30.3	42.5	12.9	28.1
2003	28.6	42.5	12.1	29.2
2005	26.7	41.1	10.5	28.1

Table 6: Actual and Simulated Unemployment Rates

Fedderke and Hill (2011) we demonstrated that the size of the mark-up and labour market flexibility are linked by means of:

$$\frac{1}{1-\alpha} \left( \frac{\Delta \log \mu - ((\Delta q + \Delta p) - \Delta w)}{\bar{\mu}} - \alpha \Delta l \right) = \left( \frac{1}{\sigma} - 1 \right) \Delta k - \frac{1}{\sigma} \frac{L}{L-\bar{L}} \Delta l$$

where  $\sigma$  denotes the elasticity of substitution between capital and labour,  $Q$ ,  $L$ , and  $K$  denote real value-added, labour, and capital inputs,  $\alpha$  is the labour share in value-added,  $\mu = P/MC$ , with  $P$  denoting price, and  $MC$  denoting marginal cost,  $\bar{\mu}$  the steady-state mark-up, and  $W$  denotes the wage rate. Lower case notation denotes log transforms, and  $\Delta$  the first difference operator.  $L/(L-\bar{L})$ , is the ratio of total labour employed ( $L$ ) to the employed labour that is not associated with rigidities in the labour market ( $L-\bar{L}$ ), such that  $\bar{L}$  denotes employment associated with labour market rigidities. Then  $L/(L-\bar{L})$  can be interpreted as an indicator of the degree of downward rigidities in labour adjustment. Its plausible range is from unity (indicating no rigidity) to infinity (complete rigidity). For example, a value of two means that of the total labour employed, half is associated with rigidities in the labour market. Simple manipulation then gives:

$$\frac{L}{L-\bar{L}} = \left[ \frac{((\Delta q + \Delta p) - \Delta w)\sigma}{\bar{\mu}(1-\alpha)\Delta l} + \frac{(1-\sigma)\Delta k}{\Delta l} - \frac{\sigma\alpha}{1-\alpha} \right] - \left[ \left( \frac{\sigma}{1-\alpha} \right) \left( \frac{1}{\Delta l} \right) \right] \left( \frac{\Delta \log \mu}{\bar{\mu}} \right)$$

indicating that pricing power and labour market rigidity are inversely related. The intuition is that with rising pricing power, for any given level of rigid labour input,  $\bar{L}$ , the ability to price above marginal cost of production allows a more ready expansion of flexible labour input into production ((since firms have enhanced capacity to pass on costs), and hence a fall in the index of labour market inflexibility  $L/(L-\bar{L})$ ). Conversely, as competitive pressure on output markets increases, for a given level of rigid labour input, the



Period	Inflexibility Index	Percent Inflexible
1972-86	4.25	77
1973-87	3.58	72
1974-88	3.09	68
1975-89	2.76	64
1976-90	2.58	61
1977-91	2.51	60
1978-92	2.55	61
1979-93	2.66	62
1980-94	2.84	65
1981-95	3.05	67
1982-96	3.28	70
1983-97	3.51	72
1984-98	3.72	73
1985-99	3.89	74
1986-00	3.99	75
1987-01	4.01	75
1988-02	3.93	75
1989-03	3.72	73

Table 7: Labour Market Inflexibility

willingness of firms to employ flexible labour inputs declines (since there is reduced capacity to pass on the cost), and hence the index of labour market inflexibility rises.

The result from Fedderke and Hill (2011) was that the measure of labour market inflexibility,  $L / (L - \bar{L})$ , in South Africa has been rising over the 1970-2004 period. In Table 7 we report the values of the  $L / (L - \bar{L})$  index found in that study, and as well as the implied proportion of the labour force that is subject to rigidities. The implication is that the proportion of the labour force in manufacturing that has been subject to rigidities, has consistently been in the 60-75% range. What is more, while there is some evidence of cyclical variation, and increases in labour market inflexibility toward the end of the sample, there is no evidence of a consistent trend downward or upward over the whole sample - consistent with the findings of a constant mark-up reported in Aghion et al (2008).

A further implication of these findings is that a reduction of the pricing power of industry, in the absence of any lowering of employment associated with rigidities ( $\bar{L}$ ), would serve to raise the proportion of labour that is subject to inflexibilities further, by decreasing  $L$  in relation to  $\bar{L}$ . In Table 8 we detail the impact of incrementally reducing the level of the mark-up from the average found in the Aghion et al (2008) study in the South African manufacturing sector (0.54), through the range of values to the level of the mark-up found in China (0.34). We consider the impact both for the value of  $\sigma$  actually found in the data (0.875)

for South Africa, as well as the higher elasticity value associated with standard Cobb-Douglas production technology under constant returns to scale (1). We also consider the impact both under a labour share in value added of 0.5, and a share of 0.7.

The implication of the simulations is that, in the absence of labour market reform that would serve to change employment associated with rigidities (i.e. which would leave  $\bar{L}$  unchanged), the reduction in the mark-up would be associated with an increase in the labour market inflexibility index from 3.72, the actual value found by Fedderke and Hill (2011) for the 1989-2003 period, to a minimum of 6.1, and a maximum of 8.26. This range of values of the labour market inflexibility index implies a proportion of the total labour force subject to inflexibilities between 84 and 88%.

Given that the falling pricing power of industry is associated with lower employment of flexible labour inputs (thereby raising the proportion of the labour force that is subject to inflexibilities), the implication is further that the decline in the mark-up of price over marginal cost of production will be associated with job losses in the manufacturing sector. Again, Table 8 details the magnitude of these losses, under the alternative assumptions concerning  $\sigma$  and  $\alpha$ . we find that for the full reduction in the mark-up from 0.54 to 0.34, job losses would range between approximately 185,000 and 242,000, equivalent to 13% and 17% of average total manufacturing employment for the 1989-2003 period, or 15% and 19% of actual employment at the close of 2008.

The magnitude of these job losses, under the reality of labour market inflexibility in South Africa, may provide the political economy explanation of why pricing power in the manufacturing sector has not been more aggressively pursued by South African policy makers.

Finally, note that there are a further set of implications that are relevant to policy interventions designed to stimulate employment growth. Fedderke (2012) shows that under a simple growth model in which the production function is homogeneous of degree one, in which equilibrium labour demand sets the marginal product of labor equal to the real wage, and in which labour supply responds to the wage and structural

$\sigma$ :	0.875			0.875			1			1		
$\alpha$ :	0.5			0.7			0.5			0.7		
$\bar{\mu}$ :	0.34			0.34			0.34			0.34		
	Inflex Index	% Inflex.	Empl Loss	Inflex Index	% Inflex.	Empl Loss	Inflex Index	% Inflex.	Empl Loss	Inflex Index	% Inflex.	Empl Loss
$\mu$ :												
0.54	3.72	73		3.72	73		3.72	73		3.72	73	
0.53	3.82	74	19178	3.88	74	19178	3.83	74	19178	3.90	74	19178
0.52	3.91	74	19178	4.04	75	37845	3.94	74	19178	4.09	76	56021
0.51	4.01	75	37845	4.21	76	56021	4.06	75	37845	4.28	77	73725
0.50	4.12	76	56021	4.38	77	73725	4.17	76	56021	4.47	77	73725
0.49	4.22	76	56021	4.55	78	90974	4.29	77	73725	4.67	78	90974
0.48	4.33	77	73725	4.73	79	107787	4.41	77	73725	4.87	79	107787
0.47	4.43	77	73725	4.91	79	107787	4.54	78	90974	5.08	80	124180
0.46	4.55	78	90974	5.10	80	124180	4.66	78	90974	5.29	81	140168
0.45	4.66	78	90974	5.28	81	140168	4.79	79	107787	5.51	82	155766
0.44	4.77	79	107787	5.48	82	155766	4.92	79	107787	5.73	83	170988
0.43	4.89	79	107787	5.67	83	170988	5.06	79	107787	5.95	83	170988
0.42	5.01	80	124180	5.88	83	170988	5.20	80	124180	6.18	84	185848
0.41	5.14	80	124180	6.08	84	185848	5.34	81	140168	6.42	85	200358
0.40	5.26	81	140168	6.29	84	185848	5.49	82	155766	6.66	85	200358
0.39	5.39	81	140168	6.51	85	200358	5.63	83	170988	6.91	86	214530
0.38	5.53	82	155766	6.73	85	200358	5.79	83	170988	7.17	86	214530
0.37	5.67	83	170988	6.96	86	214530	5.94	83	170988	7.43	86	214530
0.36	5.81	83	170988	7.20	86	214530	6.11	84	185848	7.70	87	228377
0.35	5.95	83	170988	7.44	86	214530	6.27	84	185848	7.97	88	241909
0.34	6.10	84	185848	7.69	87	228377	6.44	85	200358	8.26	88	241909

Table 8: Labour Market Inflexibility Impacts and Employment Losses under Mark-up Reductions

conditions in the labour market:

$$\begin{aligned}\eta_{NY} &= \frac{\varepsilon_{NW}^S \zeta_{NK} \varepsilon_{KY}}{1 - \varepsilon_{NW}^S \zeta_{NN}} \\ \eta_{WY} &= \frac{\zeta_{NK} \varepsilon_{KY}}{1 - \varepsilon_{NW}^S \zeta_{NN}}\end{aligned}$$

where  $\varepsilon_{NW}^S$  denotes the labor supply elasticity with respect to the real wage,  $\zeta_{NK}$  denotes the elasticity of the marginal product of labor with respect to capital,  $\zeta_{NN}$  denotes the elasticity of the marginal product of labor with respect to labor,  $\eta_{NY}$  denotes the employment elasticity with respect to output,  $\eta_{WY}$  denotes the wage elasticity of output growth, and  $\varepsilon_{KY}$  denotes the elasticity of output with respect to capital.

The point is that the elasticity relations associated with the labour market are interdependent, so that findings on one elasticity, carry implications for the remaining elasticities that relate to the labor market. Specifically:

$$\begin{aligned}\frac{\partial \eta_{NY}}{\partial \varepsilon_{NW}^S} &= \frac{\zeta_{NK} \varepsilon_{KY}}{(1 - \varepsilon_{NW}^S \zeta_{NN})^2} > 0 \\ \frac{\partial \eta_{WY}}{\partial \varepsilon_{NW}^S} &= \frac{\zeta_{NK} \varepsilon_{KY} \varepsilon_{NW}^S \zeta_{NN} - \zeta_{NK} \varepsilon_{KY}}{(1 - \varepsilon_{NW}^S \zeta_{NN})^2} < 0 \\ \text{given } \zeta_{NK} &> 0, \varepsilon_{KY} > 0, \zeta_{NN} < 0, \varepsilon_{NW}^S > 0\end{aligned}$$

as illustrated in Figure 13.

For our purposes the interdependencies are relevant in terms of inferring plausible means of stimulating employment creation.

Consider first the implications of the current existing condition of the existence of strong pricing power in output markets. In the presence of a high mark-up (without changing labour market rigidities), the implication is that the labour market has a relatively high proportion of variable cost labour ( $L / (L - \bar{L}) \rightarrow 1$ ), which suggests that the elasticity of employment with respect to output is relatively high ( $\eta_{NY}$  is relatively high). Evidence supporting this inference is evident from Figure 14, showing the employment response in South Africa to the downturn in output following the sub-prime financial crisis of 2007/8. The evidence shows that South African output was negatively impacted by the international financial crisis of 2007, with

a decline in real output from the middle of 2008 through the middle of 2009. The decline in real aggregate output in South Africa was of the order of 1.5%, while aggregate employment fell by 6.7%. The inference of a high elasticity of employment with respect to output is thus consistent with the evidence. It now follows that if  $\eta_{NY}$  is relatively high, then the elasticity of labour supply with respect to the wage ( $\varepsilon_{NW}^S$ ) must also be relatively high, while the responsiveness of wages to changes in output ( $\eta_{WY}$ ) is relatively low. Figure 15 illustrates.

Under these conditions, efficient policies focussed on job creation should favour economic growth, since employment responds relatively strongly to economic growth, growth does not generate excessive wage pressure, while labor supply responds strongly to whatever wage increases do emerge.

Now consider the implications of *lowering* the strength of pricing power in South African industry (again without changing labour market rigidities,  $\bar{L}$ ). With reduced pricing power, the labour market has a relatively low proportion of variable cost labour ( $L / (L - \bar{L}) \rightarrow \infty$ ), which suggests that the elasticity of employment with respect to output is relatively low ( $\eta_{NY}$  is relatively low). It now follows that if  $\eta_{NY}$  is relatively low, then the elasticity of labour supply with respect to the wage ( $\varepsilon_{NW}^S$ ) must also be relatively low, while the responsiveness of wage to changes in output ( $\eta_{WY}$ ) is relatively high. Figure 16 illustrates.

Under the conditions of lowered pricing power (and continued labour market rigidity), policies likely to be efficient at creating employment growth will be changed from those that would be appropriate under high pricing power. Since employment does *not* respond significantly to economic growth, while economic growth generates upward pressure on real wage costs without much of a labor supply response, the policy recourse would be one of moderating real wage growth, or conceivably lowering real wages.

### 3.4 Some Preliminary Conclusions

In this section of the paper we have considered in some detail the possible consequences of maintaining lower pricing power in manufacturing industry.

We noted that lower pricing power is associated with higher productivity growth. Both international evidence (China and India), and the concrete evidence available for South Africa on the magnitude of the growth impact, suggests that if South Africa had maintained lower pricing power in its manufacturing, both

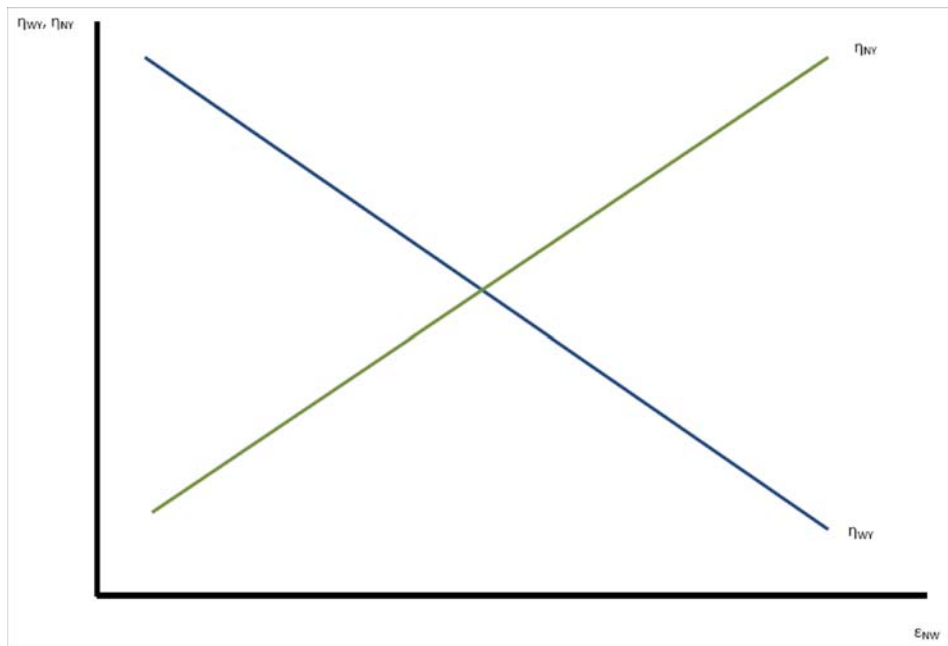


Figure 13: Labour Market Elasticity Interactions.

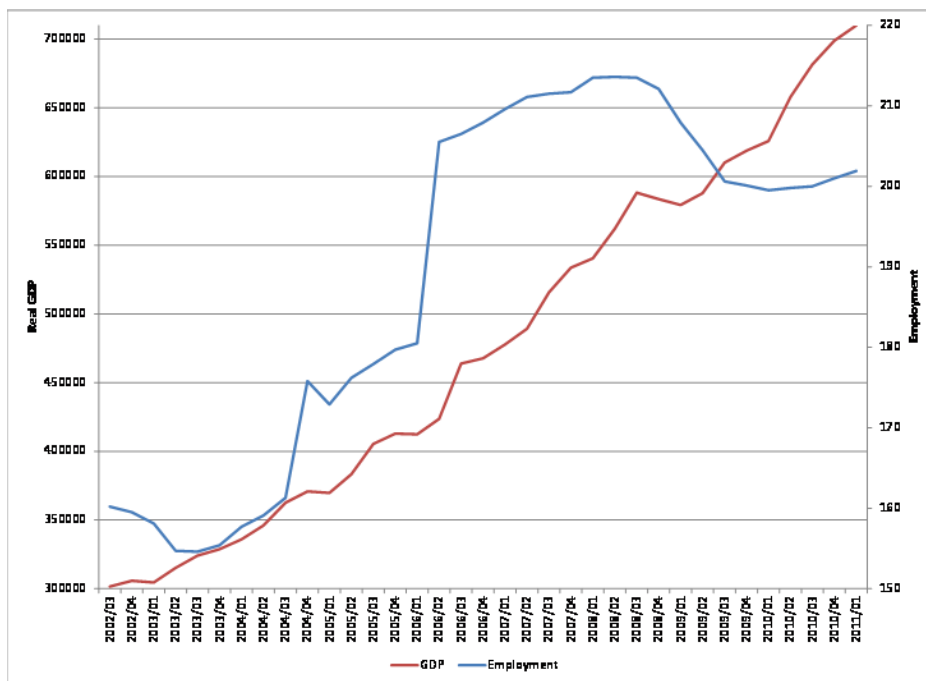


Figure 14: Employment and Output in South Africa

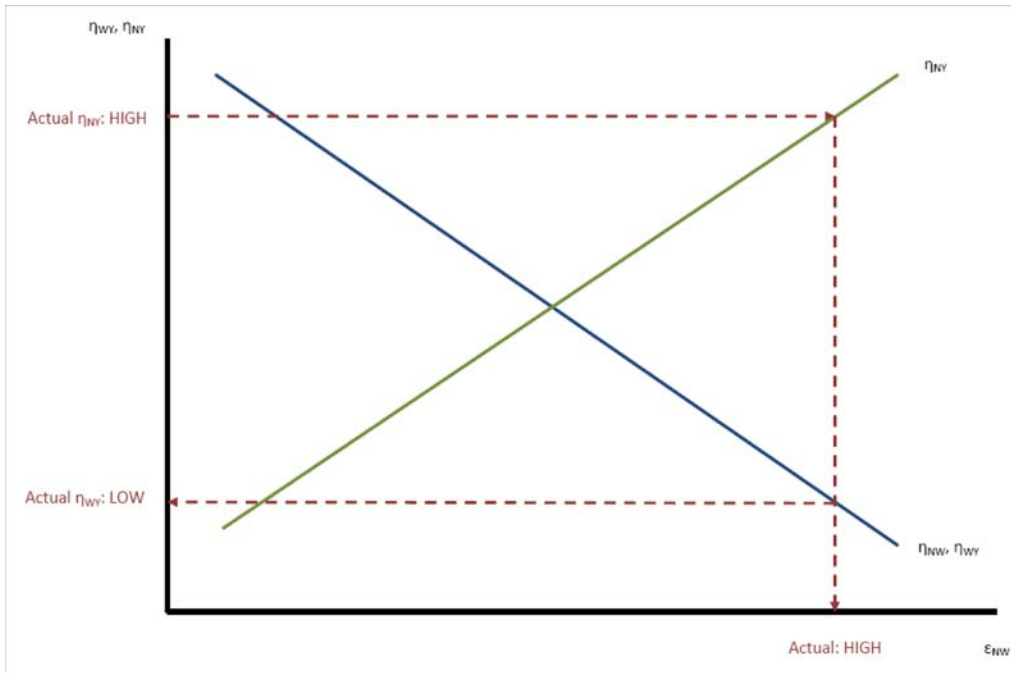


Figure 15: Actual Labour Market Elasticities

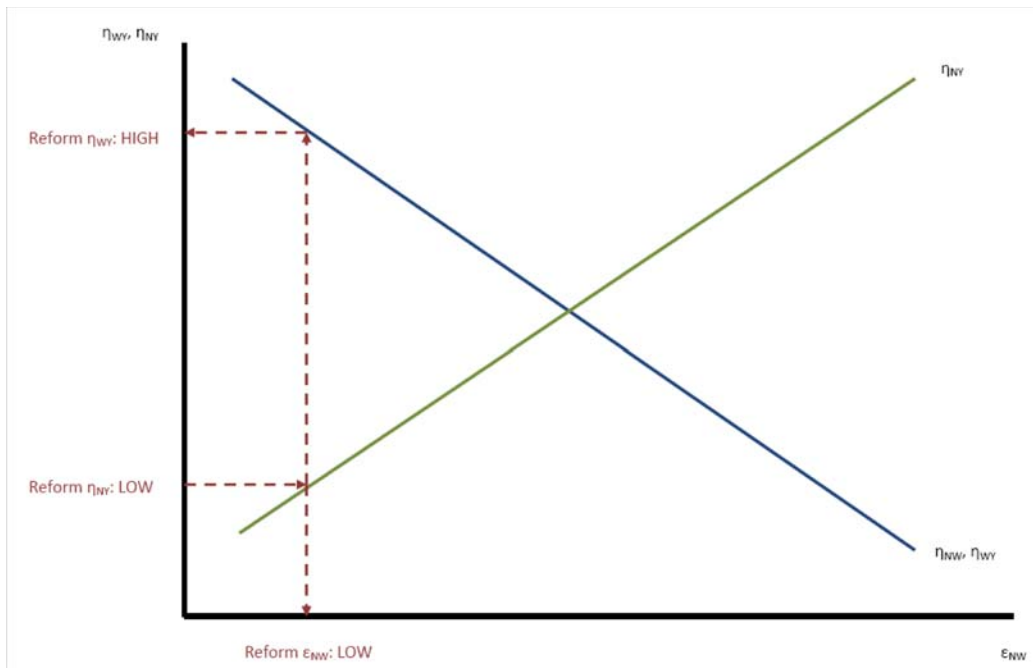


Figure 16: Labour Market Elasticities under Lowered Pricing Power

the absolute and the relative size of manufacturing in South Africa would have been substantially larger than it actually was by the close of the 2000s.

What is more, even when taking into account significant labour-saving trends in the manufacturing sector, the additional output growth would nevertheless have generated significant employment. Again, the impact would have been both in absolute terms, as well as in terms of the relative contribution of manufacturing to total employment.

However, we also noted significant caveats to these findings. Reductions in pricing power in manufacturing sector output markets, without changing the extent to which employment is subject to rigidities, would necessitate a shift in policies targeted at employment creation from output-growth generating policies, to policies that emphasize wage restraint, and possibly real wage reductions.

It follows, that such policy is likely to face significant political economy constraints. This may provide one account for the relative absence of policies in South Africa targeted at reducing pricing power on the part of producers.

## **4 Policy and Pricing Power**

The implication of the discussion thus far is that there are significant benefits that follow from the promotion of competitive pressure, thereby limiting the pricing power of producers.

This is austere medicine, embracing a Schumpeterian view of economic development that emphasizes a relentless pursuit of efficiency, and the acceptance of the inevitability that growth will be associated with creative destruction that eliminates inefficient producers and allows the entry of new producers that replace established firms.

In this section we consider three possible limits to the need to promote competitive pressure on industry. First, we consider whether there is evidence to suggest that new start-ups are more fragile than established firms, and thus would stand to benefit from a higher mark-up of price over marginal cost as they become established. Second, we consider whether there is any evidence that might suggest that high domestic mark-ups (and industry concentration) improves the ability of firms to export more successfully. Third, we explore the question of whether there is any conceivable role for industrial policy.



Finally, we also turn to the question of whether there exist any macroeconomic policy implications from our findings.

#### 4.1 Does It Harm New Firms?

One concern with any policy intervention designed to lower pricing power in industry, is that it might destroy the viability of new start-ups.

Entry, growth, and establishment of a new venture might require rates of return that compensate entrepreneurs for risk-taking behaviour. Such arguments are often invoked in order to justify industrial policy designed to maintain high rates of return for new ventures, to maintain rates of return for sectors or firms that are experiencing failing viability, and in lieu of raising competitive pressure on industry.

Such concerns appear plausible.

To investigate whether they receive empirical support, we examine evidence on the magnitude of mark-ups maintained by firms in a successful manufacturing sector, but account for the fact that there is both entry and exit during the sample period. Having data on both entry and exit of firms allows us to differentiate amongst range of firm-types. It allows us to identify *stable* firms that are present from the outset of the sample period, and remain present at the end of the sample period. It allows for the identification of all firms that *fail* and hence exit during the sample period, irrespective of whether they were previously established in the industry or not. It also allows for the isolation of firms that both enter their industry, but then fail before the close of the sample period - in effect *start-up ventures that fail*. We can distinguish *new ventures* that fail, from those that *succeed*, in the sense that they enter their industry in the sample period, and stay until the close of the sample.

To do so, we return to our sample of Chinese manufacturing firms, over the 1998-2008 period. we reestimate under equation (5), and distinguish between the following classes of firms:

- All firms: All firms observed in the sample, regardless of whether the firms were continuously present, entered or exited during the sample period. This provides a sample total of 373,558 firms, for a total of 1,178,670 observations.
- Stable firms: Firms that were continuously present in the sample - i.e. that neither entered, nor

	(1)	(2)	(3)	(4)	(5)	(6)
	Firms Always Present No Entry or Exit	All Firms in Sample	Exiting Firms Only	Firms Present 1998-2003	Firms that Entered and Exited	Firms that Entered and Stayed
$\mu - 1$	0.14*** (0.0064)	0.20*** (0.0021)	0.21*** (0.0040)	0.25*** (0.0060)	0.21*** (0.0082)	0.22*** (0.0040)
$R^2$	0.16	0.16	0.11	0.08	0.15	0.19
# Firms	20850	373558	130739	86605	43459	171645
N	172024	1178670	308781	155510	76947	454740

Figures in round parentheses denote standard errors. \*\*\* and \*\* denotes significance at the 1% and 5% level respectively.

Table 9: Mark-ups in Chinese Manufacturing Industry Across Firms that Entered and Exited - All Estimations Include Fixed, Time and Industry Effects

exited during the sample period. This provides a sample total of 20,850 firms, for a total of 172,024 observations.

- Failing firms: All firms that exited at any point in the sample period, irrespective of whether they were previously established in the industry or not. This provides a sample total of 130,739 firms, for a total of 308,781 observations.
- Start-ups that fail: Firms that enter their industry, but exit before the close of the sample period. This provides a sample total of 43,459 firms, for a total of 76,947 observations.
- New ventures that succeed: Firms that enter their industry, and do not before the close of the sample period. This provides a sample total of 171,645 firms, for a total of 454,740 observations.
- Finally, we also consider firms that were present during the first half (1998-2003) of the sample period. This provides a sample total of 86,605 firms, for a total of 155,510 observations.

Results are reported in Table 9, with  $\mu - 1$  denoting the estimated magnitude of the mark-up.

Our findings do not support any suggestion that new ventures require special support, by virtue of experiencing a lower rate of return on their capital. On the contrary: firms in the Chinese manufacturing sector that were established, and remained in continued existence throughout the sample period, had a mark-up of only 14%. This is considerably lower than the mark-up of firms that exited during the sample period, which report an estimated mark-up of 21%, regardless of whether they exited during the sample period, or both entered and exited during the sample period. What is more, firms that entered, and were

successful in the sense that they did not exit during the sample period, recorded an estimated mark-up of 22% that is not statistically significantly different from that estimated for firms that failed (21%).

As a result, there is little evidence to suggest that new entrants require higher mark-ups (hence return on capital) in order to be successful.

## 4.2 Industry Structure and Possible International Competitiveness

But do firms and industries that have a higher mark-up on marginal cost of production, prove to be more successful in export markets?

The presence of significant pricing power in industry carries with it implications for industry structure beyond the sectoral composition of output. Specifically, it leads to the expectation of significant industry concentration also. This is confirmed by the empirical evidence, which documents rising concentration levels over the last three decades of the twentieth century.<sup>12</sup> More recent evidence from the large sample survey of manufacturing firms for 2005 confirms that the trend has continued - see the average levels of concentration as measured by the CR4 and CR10 ratios in Figure 17.<sup>13</sup>

But there is an alternative account for the rising industry concentration. This would attribute rising industry concentration in South Africa to the exploitation of productive efficiencies due to *internal* economies of scale in production, which would favour large firms over small firms in efficiency terms. Combining internal scale economies with a domestic South African market that is small relative to efficient scale of production, would favour the emergence of concentrated industrial structures. Small market size would also likely limit the extent to which significant *external* scale economies could be realized - with large numbers of small to moderately sized firms servicing a relatively large market. The net implication is that a break-out by firms into a realization of efficiencies through scale economies in countries with small domestic markets, would of necessity require a significant focus on export markets. Figure 18 provides an illustration.

Productive efficiency as a function of scale of operation due to for instance specialization of capital stock, impacts of setup and downtime costs, and of "learning-by-doing" effects are well documented in the

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<sup>12</sup>See Fedderke and Szalontai (2009) and Fedderke and Naumann (2011).

<sup>13</sup>The summary evidence is not driven by outlier sectors with high concentration levels. Fedderke (2010) presents evidence that confirms that the rise in concentration is general across most manufacturing sectors.

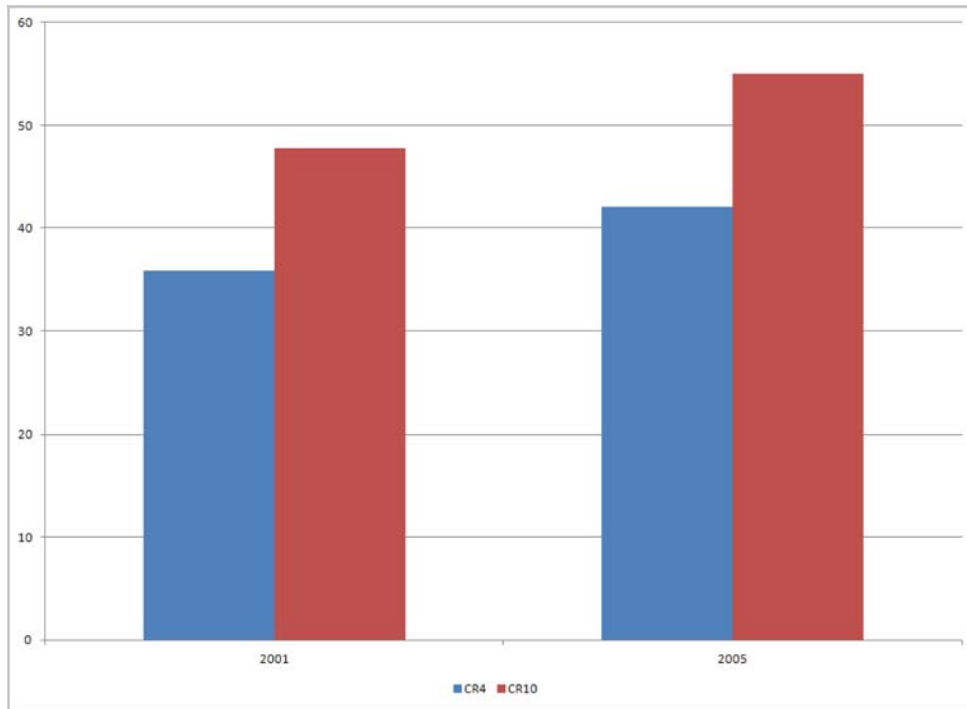


Figure 17: Concentration Ratios in South African Manufacturing 2001 and 2005: CR4 and CR10 denote the proportion of output contributed by the largest 4 and 10 firms respectively.

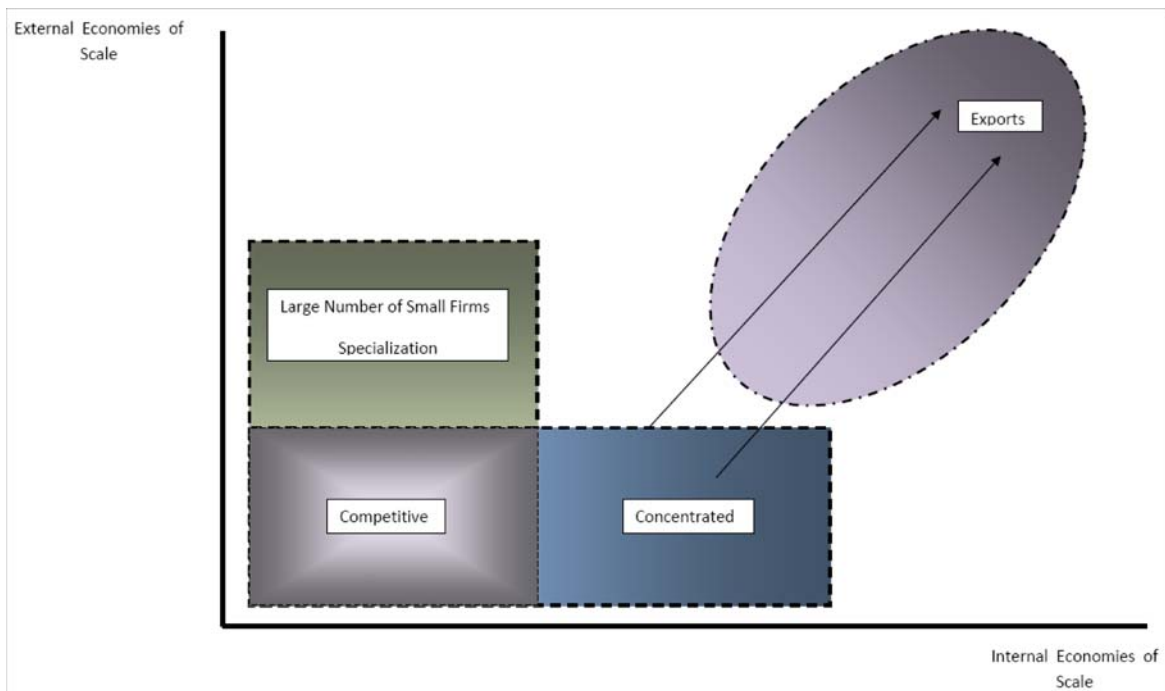


Figure 18: Internal and External Scale Economies and Market Size.

literature.<sup>14</sup> Losses in allocative efficiency due to market concentration through non-competitive pricing, X-inefficiency and potential rent-seeking are of course foundational to any microeconomic analysis of market structure, while recent contributions have identified the possibility of negative impacts on the rate of productivity growth.<sup>15</sup> This conflict has been particularly emphasized in the context of small open economies.<sup>16</sup> The inference drawn for policy purposes has been that for small open economies competition *per se* cannot be regarded as necessarily welfare enhancing, such that focusing on market structure and market concentration is misleading, and that productive efficiency considerations should be the primary, perhaps sole focus of competition policy.<sup>17</sup>

However, the evidence does not support that either the presence of pricing power, or market concentration has supported the exploitation of scale economies in order to access export markets.

In Table 10 we report the impact of both pricing power (as measured by the mark-up) and industry concentration as measured by the Rosenbluth Index of concentration on export, import and net export levels (controlling for output, the exchange rate, anti-export bias, fixed and time effects).<sup>18</sup> Neither pricing power nor industry concentration is statistically significantly associated with any of the trade variables - though pricing power is negatively associated with export, import and net export levels, while concentration levels are positively associated. There is thus no support for the suggestion that significant market power in the domestic market, allows South African manufacturers to pursue more aggressive export strategies in international markets. If anything the reverse is true. Moreover, the negative impact of pricing power on imports, suggests that the presence of pricing power in domestic markets, may prevent entry into markets by foreign producers, thereby limiting competitive pressures on domestic markets.

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<sup>14</sup>See for instance the discussion in Fuss and Gupta (1981) on the former, and Arrow (1962) and Romer (1986) on "learning-by-doing."

<sup>15</sup>See Aghion et al (2004).

<sup>16</sup>For Australia see Caves (1984), on Canada see Kemani (1991), and for New Zealand Evans and Hughes (2003). In other small and developing country contexts the conflict appears to be less fully understood as affecting competition policy - see Gal (2001) for Israel.

<sup>17</sup>See for example Singh and Dhumale (1999), Hoekman (2003) and Gal (2001)

<sup>18</sup>Due to data constraints in South Africa, we do not employ the more conventional Herfindahl index. The Rosenbluth index, defined as:

$$RI = \left\{ 2 \sum_{i=1}^n (i.ms_i) - 1 \right\}^{-1}$$

where  $ms_i$  denotes the market share of the  $i$ 'th ranked firm, and  $n$  denotes the number of firms in the market, loads on the same underlying indicators as the Herfindahl.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Exports	Exports	Exports	Imports	Imports	Imports	Net exports	Net Exports	Net Exports
$\mu - 1$	-1430.94 (2764)	-	-955.532 (3827)	-3286.89 (3090)	-	-3592.08 (3186)	-0.045 (0.245)	-	-0.067 (0.265)
$CC$	-	20721.1 (2.01e+004)	19536.9 (1.7e+004)	-	10547.4 (2.09e+004)	6095.71 (1.8e+004)	-	-0.846 (0.820)	-0.929 (0.937)
$R^2$	0.56	0.60	0.60	0.31	0.34	0.35	0.16	0.24	0.24
N	368	203	203	368	203	203	368	203	203
Within	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Figures in round parentheses denote standard errors. \*\*\* and \*\* denotes significance at the 1% and 5% level respectively.

Table 10: Pricing Power and Concentration and Trade Performance; regressions control for the exchange rate, output, and antiexport bias of policy as measured by the implicit export tax.

### 4.3 Is There a Role for Industrial Policy?

A separate question concerns the issue of whether there exists a role for industrial policy.

In general economics has become very sceptical both of the feasibility and of the desirability of industrial policy - especially in terms of the ability of policy makers to identify success *ex ante*. However, an alternative conception of industrial policy is that the role of the state is that of ensuring efficiency through the promotion of competitive pressure on industry, in order to ensure maximum efficiency in production.

To explore this possibility, consider again evidence from the Chinese manufacturing sector. The Chinese manufacturing sector is distinguished by the presence of firms that have either a significant level of state ownership of equity, or are under complete state ownership. We therefore repeat the estimations of the preceding section, but control both for the presence of state equity holdings, and an interaction term between the presence of state equity holdings and the term that identifies the magnitude of the mark-up. We therefore estimate: The empirical specification we estimate is given by:

$$NSR_{it} = \gamma_0 + \gamma_1 RGR_{it} + \gamma_2 S_{it} + \gamma_3 RGR_{it} S_{it} + \varepsilon_{it} \quad (6)$$

$$\text{where } RGR_{it} = \alpha_{it} \cdot [\Delta(w + l) - \Delta(r + k)]$$

with all notation defined as before, and with  $S_{it}$  denoting the a categorical variable for any firm  $i$  in period  $t$  that is an SOE.

We report results in Table 9 - and we again consider evidence for stable firms, exiting firms, as well as

	(1)	(2)	(3)	(4)	(5)	(6)
	Firms Always Present No Entry or Exit	All Firms in Sample	Exiting Firms Only	Firms Present 1998-2003	Firms that Entered and Exited	Firms that Entered and Stayed
$\mu - 1$	0.15*** (0.0067)	0.20*** (0.0021)	0.21*** (0.0040)	0.27*** (0.0060)	0.22*** (0.0085)	0.22*** (0.0033)
$(\mu - 1) \times S$	-0.07** (0.01)	-0.09*** (0.0062)	-0.11*** (0.0091)	-0.11*** (0.0154)	-0.07** (0.0285)	-0.01 (0.0236)
$S$	-0.03*** (0.0085)	-0.02*** (0.0059)	-0.02 (0.0111)	-0.02 (0.0190)	-0.02 (0.0421)	-0.02 (0.0192)
$R^2$	0.16	0.16	0.11	0.08	0.15	0.19
# Firms	20850	373558	130739	86605	43459	171645
N	172024	1178670	308781	155510	76947	454740

Figures in round parentheses denote standard errors. \*\*\* and \*\* denotes significance at the 1% and 5% level respectively.

Table 11: Mark-ups in Chinese Manufacturing Industry Across Firms that Entered and Exited - All Estimations Include Fixed, Time and Industry Effects

successful new entrants into the market as defined for section 4.1.

Our findings are that state equity holdings appear to significantly affect the behaviour of firms in the Chinese manufacturing sector. In particular, state equity holdings appear to *moderate* the size of the mark-up of price over the marginal cost of production, regardless of the class of firms for which we estimate the magnitude of the mark-up.

Thus we find that for all firms in the sample (irrespective of entry or exit) the mark-up is 20% over marginal cost of production, while for firms with state equity holdings, the mark-up is lower by 9%, giving a net mark-up of 11%. This is also true for established firms that are present in the sample throughout the sample period. While for all such firms the mark-up is 15%, those with state equity holdings the mark-up is lower by 7%, giving a net mark-up of 8%.

The implication is that the role of the state in Chinese manufacturing has been such as to moderate pricing behaviour, keeping rates of return in manufacturing low (considerably below those observed in South Africa and India) in favour of output growth. What is more, the constrained pricing behaviour of firms with significant state equity holdings, may have served to limit the ability of firms without state equity to impose higher mark-ups through direct competition effects.

A question that then follows is whether this significant degree of policy pressure to moderate mark-ups, might explain the incidence of failure in manufacturing firms. Specifically, whether for those firms that have experienced failure (exiting their industry) were subject to much more severe disciplining action on the size of their mark-up from firms with state equity holdings, rendering their operation unsustainable.

The evidence does not suggest that failing firms are subject to pressure from firms with state equity holdings of such significance as to have reduced their rate of return below those of firms that remain in the sample. Thus while all firms that exited had an average mark-up of 21%, and those that exited and had state equity holdings had a mark-up 11% lower and hence with a net mark-up of 10%, this is not statistically distinct from the 11% net mark-up for all firms in the sample, and above the 8% net mark-up for established firms. For firms that both entered and exited in the sample period, the evidence suggests that the mark-up lay above that of all firms in the sample - on average the mark-up for start-ups that exit is 22%, while those firms with state equity holdings the net mark-up is 7% lower, or 15% in net terms - no lower than the average for established firms. Failing firms thus do not appear to have either lower rates of return, nor do they seem to have been subject to particularly strong pressure from the state to keep their mark-ups low.

However, we do find that for firms that are successful new ventures (enter the sample, and do not exit), the average mark-up is higher than for established firms (22% versus 15%), but also that there is no evidence of statistically significant downward pressure on the mark-up from firms with state equity holdings. Conceivably therefore, new start-ups benefit from lower policy discipline on their pricing behaviour, until they have become established. On the other hand, we also note that the level of the mark-up even for the new start-ups remains substantially below the level of the mark-up reported for South Africa (54% as a lower bound, 77% as an upper bound), or India (98%). Thus extent to which the Chinese policy environment favour higher mark-ups on successful start-ups, is strictly limited.<sup>19</sup>

Thus the implication is that one form of state intervention in the Chinese manufacturing sector has been to use state equity holdings to constrain the pricing power of firms. This may be one reason for the rapid growth of Chinese manufacturing. In this rather limited sense, therefore, arguably there is a role for industrial policy - by increasing the intensity of competitive pressure, limiting pricing power and thereby raising the potential for sustained productivity growth.

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<sup>19</sup>State equity holdings under new start-ups might also be projected to be lower than in the historical firm population as a whole. This might also serve to explain the absence of a significant disciplining effect.



#### 4.4 Are There Macroeconomic Policy Implications?

The concern in this paper with industrial conduct, its impact on industrial structure and economic growth, of necessity places its focus in a more microeconomic context. Any inference for macroeconomic policy is therefore of necessity a little forced, potentially speculative. This is exacerbated by the fact that in the South African context, more detailed consideration of related evidence, given the absence of national firm level data, is at present not really possible.

Nonetheless, one way to approach this question is through a framework provided by Acemolgu and Zilibotti (1997). They present an overlapping generations growth model, subject to uncertainty, in which the intermediate goods sector is subject to minimum size requirements (in effect a minimum scale requirement in production), which renders the realization of specific projects in the production of intermediate goods uncertain. Savings therefore faces a choice between a safe asset with certain return ( $r$ ), and risky assets associated with intermediate goods production projects subject to higher productivity and hence return ( $R > r$ ), but subject to uncertainty.<sup>20</sup>

They demonstrate that under these conditions, a number of crucial features relevant to our discussion follow. First, the number of risky assets hence the production of intermediate inputs into production (a.) increases in the rate of return of on the risky assets, conversely (b.) increases as the rate of return of on the safe asset falls, and (c.) increases in the level of savings in the economy as a whole. Reason for the third association is that the supply of funds to cover the minimum size requirement of a greater number of risky intermediate good production projects is increased, thereby triggering the necessary investment. They show that the result generalizes under the presence of financial intermediation, and the presence of international trade and capital flows.

This framework provides an account of why South Africa may have continued to observe such high mark-ups, despite liberalization of the economy. Given the limited ability of the South African economy to generate savings (and/or attract sufficient international capital inflows), where investment is subject to minimum scale requirements, the rate of return on capital (the mark-up over marginal cost of production)

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<sup>20</sup>Coincidentally, the model also provides a plausible account of the dual economy structure of South Africa, and of why mark-ups have proved persistent despite trade liberalization. An alternative answer is that the unusually high intensity of regulation in the South African economy favours incumbent firms - see the evidence and discussion in Fedderke (2010).

has to be high to cover the risk generated by uncertainty.<sup>21</sup>

Second, it provides a possible link to the conduct of macroeconomic policy. The immediate policy implication is to increase the supply of savings (and/or capital flows) to the economy, in order to circumvent the constraint that the high mark-ups represent for the South African economy (in growth and employment creation terms). An alternative would be to divert existing savings from safe assets, to more risky but high productivity assets - for instance by lowering the interest rate on government bonds (through a lower borrowing requirement), thereby lowering the return on safe assets, and diverting funds to the more risky asset class.

Finally, note that the inference that follows from the minimum scale constraint is that policy more widely might have to focus not on small firms and start-ups, but on helping firms to grow sufficiently in order to pass the minimum scale criterion.

## 5 Conclusions and Evaluation

In this paper we explored the implications of accumulated evidence on industrial conduct in South African manufacturing sectors. We noted accumulated findings of high, persistent mark-ups of price over the marginal cost of production, both in absolute terms and in international comparative context.

Comparison of South African evidence with comparable evidence for China and India, provides one possible account for the unusual industrial structure of South Africa for its level of development. Simulation exercises, based on evidence detailing the growth impact of pricing power on the South African economy, shows that under reduced levels of pricing power the relative contribution of manufacturing in both output and employment terms could have been much closer to the Chinese case, with its strong manufacturing sector, than what is actually observed for South Africa, which is much closer to the Indian case with a preponderance of service over manufacturing sectors.

Additional evidence confirms that higher mark-ups have not contributed significantly to export performance in South Africa. Evidence from China does not support the hypothesis that it is lower mark-ups that

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<sup>21</sup>This might also account for the high and rising rate of return on assets recorded for large relative to small firms, that we noted in section 2 of the paper.

account for firm failure (in the sense of exit). Moreover, state owned enterprises in China appear to have lowered mark-ups in the Chinese manufacturing sector - suggesting that one role that state intervention can play is to moderate pricing power in industry, as a means of raising productivity growth.

## References

- [1] Acemoglu, D., and Zilibotti, F., 1997, Was Prometheus Unbound by Chance? Risk, Diversification, and Growth, *Journal of Political Economy*, 105(4), 709-751.
- [2] Aghion, P., Blundell, R., Griffith, R., Howitt, P., and Prantl, S., 2004, Entry and Productivity Growth: Evidence from Microlevel Panel Data, *Journal of the European Economic Association*, 2(2-3), 265-276.
- [3] Aghion, P., Braun, M., and Fedderke, J.W., 2008, Competition and Productivity Growth in South Africa, *Economics of Transition*, 16(4), 741-68.
- [4] Aghion, P., Fedderke, J.W., Howitt, P., and Viegli, N., 2012, Testing Creative Destruction in an Opening Economy: the Case of the South African Manufacturing Industries, *Economics of Transition*, revise and resubmit.
- [5] Arrow, K.J., 1962, The Economic implications of Learning by Doing, *Review of Economic Studies*, 29, 155-73.
- [6] Banerjee, A., Galiani, S., Levinsohn, J., and Woolard, I., 2008, Why Has Unemployment Risen in the New South Africa? *Economics of Transition*, 16(4), 715-40.
- [7] Bosworth, B. and Maertens, A., 2010, Economic Growth and Employment Generation: The Role of the Service Sector, in E Ghani (ed.), *The Service Revolution in South Asia*, Oxford University Press.
- [8] Caves, R.E., 1984, Scale, Openness, and Productivity in Manufacturing Industries, in R.E.Caves and L.B.Krause (eds.), *The Australian Economy: A View from the North*, Washington: Brookings Institution, pp313-45.
- [9] Chaudhuri, S., and Ravallion, M., 2006, Partially Awakened Giants: Uneven Growth in China and India, World Bank Policy Research Paper No. 4069.

- [10] Evans, L., and Hughes, P., 2003, Competition Policy in Small Distant Open Economies: Some Lessons from the Economics Literature, *New Zealand Treasury Working Paper 03/31*.
- [11] Fedderke, J.W., 2010, Sustainable growth in South Africa, in L. de Mello (ed.), *Growth and Sustainability in Brazil, China, India, Indonesia and South Africa*, Paris: Organization of Economic Cooperation and Development (OECD), pp147-88.
- [12] Fedderke, J.W., 2012, The Cost of Rigidity: the case of the South African labor market, *Comparative Economic Studies*, forthcoming.
- [13] Fedderke, J.W., and Hill, A.J., 2011, Industry Structure and Labour Market Flexibility in the South African Manufacturing Sector: A Time Series and Panel Data Approach. *Economic Modelling*, 28, 1291-302.
- [14] Fedderke J.W., Kularatne, C., and Mariotti, M., 2007, Mark-up Pricing in South African Industry, *Journal of African Economies*, 16(1), 28-69.
- [15] Fedderke, J.W., and Naumann, D., 2011, An Analysis of Industry Concentration in South African Manufacturing, 1972-2001, *Applied Economics*, 43(22), 2919-39.
- [16] Fedderke J.W. and Szalontai, G., 2009, Industry Concentration in South African Manufacturing: Trends & Consequences, 1970-1996. *Economic Modelling*, 26(1), 241-50.
- [17] Fuss, M.A., and Gupta, V.K., 1981, A Cost Function Approach to the Estimation of Minimum Efficient Scale, Returns to Scale and Suboptimal Capacity, *European Economic Review*, 15, 123.
- [18] Gal, M.S., 2001, Size does matter: the Effects of Market Size on Optimal Competition Policy, *University of Southern California Law Review*, 74: 1437 – 1478.
- [19] Ghani, E., 2011, The Service Revolution, Paper Presented at the ILO Conference, Geneva.
- [20] Hall, R.E., 1990, The Invariance Properties of Solow's Productivity Residual, in P. Diamond (Ed.) *Growth, Productivity, Unemployment*, Cambridge MA: MIT Press.

- [21] Hoekman B., 1997, Competition policy and the Global Trading System, *The World Economy*, 20, 383-406.
- [22] Kemani, R.S., 1991, Merger Policy in Small vs. Large Economies, in R. Shyam Kemani and W.T.Standbury (eds.), *Canadian Competition Policy at the Centenary*.
- [23] Oliveira Martins, J., and Scarpetta, S., 1999, The Levels and Cyclical Behaviour of Mark-ups Across Countries and Market Structures, OECD Economics Department Working Papers No. 213.
- [24] Pack, H., 2008, Should South Asia Emulate East Asian Tigers?, in E Ghani and Sadiq Ahmed (eds.), *Accelerating Growth and Creating Jobs in South Asia*, Oxford University Press.
- [25] Rajan, R.G., 2006, India: The Past and the Future, *Asian Development Review*, 23(2):36-52.
- [26] Rodrik, D., 2008, Understanding South Africa's Economic Puzzles, *Economics of Transition*, 16(4), 769-97.
- [27] Roeger, W., 1995, Can Imperfect Competition explain the Difference between Primal and Dual Productivity Measures? Estimates for US Manufacturing, *Journal of Political Economy*, 103, 316-30.
- [28] Romer, P.M., 1986, Increasing Returns and Long-Run Growth, *Journal of Political Economy*, 94(5), 1002-37.
- [29] Singh, A. and Dhumale, R., 1999, Competition Policy, Development and Developing Countries. TRADE Working Papers.