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Capital intensive industrialisation and comparative advantage: Can South Africa do better in labour demanding manufacturing?

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1. Introduction

Employment creation is a key objective of government policy. All the major policy initiatives since 1994 emphasise this problem. It was central to the RDP, to GEAR and remains a core component of ASGISA. More recent policy statements have placed a major new emphasis on an 'employment intensive growth path'. These include recent National Budgets, the DTI's (2010) Industrial Policy Action Plan, the Department of Economic Development's (2011) 'New Growth Path' document and the National Planning Commission's (2011) National Plan: Vision 2030. These statements of intent are to be welcomed but the reality is that policy implementation and to some extent even the policy itself remains contradictory and conflicted in relation to this objective.

The aim of this paper is to explore the role of industrial policy in the context of South Africa's chronic unemployment problem and the stated policy emphasis on labour absorbing growth. It should be stated at the outset that industrial policy is by no means the only component of a policy package to encourage a more labour absorbing growth path. For instance, one issue which is not directly considered here is whether manufacturing should receive the high level of support that it does in relation to other (more labour intensive) sectors such as agriculture. Nevertheless, industrial policy clearly has an important role to play in a strategy aimed at promoting labour absorbing growth.

Section two asks what should be different about industrial policy in the South African context of massive structural unemployment. The starting point is that while more rapid economic growth is an important objective, at any given level of growth, the economy needs to become more labour demanding. The central question posed, therefore, is whether it is feasible to bring about changes in the economic structure and pattern of development, which would lead to a more rapid increase in labour absorption.

Section three then goes on to examine the link between industrial policy and capital intensive development. Pre-1994, the weight of support was strongly in favour of investment in capital- and energy-intensive enterprises. With the advent of democracy, government set a multiplicity of objectives but *de facto* there was a surprising level of continuity in the ongoing assistance for heavy industry. It is, therefore, to be expected that 'traditional' export sectors have continued to expand and that there has been relatively little diversification into non-traditional manufactured exports.

Section four concludes by arguing that the ongoing bias in favour of heavy industry has been damaging, not only for employment but also for growth. It has also led to South Africa's economy being extremely emission intensive. South Africa's industrial policy has been fairly interventionist but in the wrong direction. It has acted to strengthen competitive advantage in resource-based, capital intensive sectors of manufacturing and undermined the prospects of more labour demanding sectors. Industrial policy needs to shift away from direct or indirect assistance to more capital intensive sectors and should be used to actively promote more labour demanding sectors and sub-sectors.

2. The growth path, comparative advantage and the role of industrial policy

Moving to a more labour demanding growth path means generating higher levels of employment per unit of output. Raising the output elasticity of employment could be achieved in two main ways. Firstly, existing economic activities could become more labour intensive or, secondly, there could be a shift in the composition of output to relatively labour intensive sectors. The first shift may occur as a result of a change in relative factor prices or a change in firm (and farm) size with more small firms (and farms) and a larger informal sector. The second could be achieved via more rapid growth in labour- as opposed to capital-intensive sectors (e.g. agriculture relative to manufacturing) or sub-sectors (e.g. garments relative to steel, or plastic products relative to basic chemicals). It should be noted that we are not proposing that labour intensive methods should be used in modern industry but rather a shift in the growth path, the trajectory along which the economy, and specifically the manufacturing sector, expands.

Comparative advantage and industrial policy

Comparative advantage is not simply a matter of initial endowments but develops over time. Changes in comparative advantage could be market driven or be shaped by government policy, including industrial policy. Proponents of strong industrial policy have argued for 'getting prices wrong' to accelerate industrial development and growth in general (Amsden, 1989). The 'prices' Amsden was referring to here, include the exchange rate and cost of capital and in her conception include selective interventions to support some sectors above others.

But there is also the question of what industrial policy is endeavouring to achieve. It is generally argued that industrial policy is concerned with promoting structural change and improving economy wide efficiency (Chang, 1994). Frequently, this is conceived of as moving up the technological ladder, for example, from agriculture to industry, or the promotion of diversification into non-traditional sectors and the promotion of high technology sectors. In East Asia, for example, industrial policy is generally regarded as having been successful in leading firms to rapidly move into more advanced sectors, the so-called 'flying geese' effect.

From a more neoclassical perspective, Lin (2009) is supportive of a role for industrial policy, but cautions against strategies that defy comparative advantage by supporting activities which are too capital or skill intensive. It is important to note that industrial policy played a key role in initially creating competitive advantage in labour intensive, export industries in East Asia which was the reason that high GOEE's were achieved in these high growth sectors. This underpinned the dramatic success in poverty reduction in countries such as Taiwan, Korea and, more recently, Vietnam (Khan, 2007).

It is argued in this paper that the nature of industrial policy must depend on context and the South African context is one of massive structural unemployment.[1] Unemployed human resources on this scale represent the most glaring 'inefficiency' afflicting the South African economy and result from both 'market' failure and 'government' failure. It follows that if industrial policy is concerned with promoting economy-wide efficiency, it has to be centrally concerned with the trajectory of South Africa's growth path, which in turn means the promotion of employment intensive growth. Improved productivity is another central objective of industrial policy. This is usually construed to refer to labour productivity i.e. the productivity of workers employed in manufacturing. But in the South African context this is an inappropriate indicator as it measures the productivity of our most over-abundant factor; unskilled and semi-skilled labour. Economy wide labour productivity and the incremental capital-output ratio are more appropriate measures and should be of central concern to industrial policy. The point is that, intuitively, it should be much easier (require less capital resources) to raise the productivity of an unemployed worker from zero to a low number than to achieve an equivalent productivity gain in, say, a car assembly plant, where labour productivity is already relatively high. In practical terms this means it would, therefore, make sense to encourage the spread of scarce capital to mobilise under-utilised labour rather than its concentration in sectors, firms and factories where the productivity (of employed labour) is already relatively high.

These kinds of choices are not simply the domain of labour market policy but lie at the heart of industrial policy. The way in which the state intervenes to promote certain types of development is absolutely critical. In the South African context it may not be appropriate, therefore, that industrial policy be aimed solely at its traditional targets – addressing market failures such as underinvestment in R&D and innovation; or the promotion of the 'knowledge economy'; or the promotion of higher labour productivity of employed workers, for instance through beneficiation.

[1] Arguably, another aspect of the South African context is the fact that the capacity to deliver a sophisticated and interventionist industrial policy is extremely limited. While such capacity can be developed over time, it is probably the case that South Africa's industrial policy is much too ambitious.

3. South Africa: Capital intensive development and comparative advantage

There is considerable evidence that the South African economy has been and remains capital intensive. Levy (1992) compared capital intensity in manufacturing in South Africa with countries with comparable (or higher) per capita incomes.[2]For the period 1961-65, capital per worker in manufacturing in South Africa was 112% higher than the next highest country (Mexico) and for the period 1981-85was 48% higher.

For the economy as a whole, Pollin at al (2006:11) present evidence on the employment intensity of output from 1967 to 2001. Labour intensity declined in all sectors except agriculture from the 1970s but the sharpest decline has been since the 1990s. From 1994-2001 employment in relation to output fell by 28% and the sharpest declines in employment intensity over the whole period have been in manufacturing and mining during the 1990s. Surveys undertaken by the World Bank and reported in Clarke et al (2007) also found that South African firms (in manufacturing and services) were more capital intensive than enterprises in most comparator countries.

The evolution of industrial policy

At the time of the transition to democracy there was intense debate about the nature of the problem of slow industrial expansion as well as of the policies needed to address this (Hirsch, 2005). World Bank analysts characterised the South African economy as a protected and distorted economy of the Latin American type, resulting from apartheid policies compounding an import substituting industrialisation strategy (Fallon and Pereira da Silva, 1994; Levy, 1992). Edwards (2001) also argued that ISI policies biased the production structure towards capital-intensive sectors. The Bank's recommendations to redress this situation were trade liberalisation, a reduction of distortions in factor markets and a stable macroeconomic environment, and the 'right' prices to provide an enabling environment to stimulate exports (Fallon and Pereira da Silva, 1994). Levy (1992) further argued that the bias to capital-intensity resulted from the nature of government investment support.

The analysis of the problem put forward by the influential Industry Strategy Project (ISP) was not that dissimilar although their prescriptions focused more on 'supply-side' support and industrial policy interventions (Joffe et al., 1995). The ISP was also highly critical of the high degree of concentration and resultant lack of competition in many industrial sectors. Fine and Rustomjee (1996) offered a somewhat different perspective, arguing that the dominance of the large scale mineral-based industry that comprised South Africa's 'minerals energy complex' should be the starting point for an understanding of industrial development and appropriate industrial policy.

[2] The comparator countries were Brazil, Mexico, Korea and Malaysia.

The ISP and World Bank interpretations prevailed in terms of stated policy, although, in practice, policy sought to promote a multiplicity of objectives, with international competiveness as a central theme. While objectives included support for non-mineral based sub-sectors and higher value added activities, it was understood that mineral based manufacturing would remain important and should be supported by further beneficiation (Hirsch, 2005: 124).

Trade liberalisation was also an important element. Some liberalisation had already taken place by the early 1990s. This included a reduction in quantitative controls on imports, the beginnings of tariff reduction and significant privatisation. After 1994 the liberalisation programme involved removing remaining quantitative restrictions, simplifying the tariff schedule and a significant reduction in average tariff rates. The impact was to reduce effective rates of protection substantially, from a weighted average of 35 per cent on manufactured goods in 1984 to 12.9 per cent in 2000 and then to 9.5 per cent in 2006 (Edwards and Lawrence, 2008).

A range of measures were also introduced to encourage investment, technological improvements and exports, and to support small firms. These have included sector specific adjustment programmes, investment incentives, 'supply-side' incentive programmes, subsidised infrastructure, support measures for skills development and technology, special loan facilities and support programmes for small firms (Black and Roberts, 2009).

The government's concerns about international competitiveness were re-focused on enhancing capabilities in 'knowledge-intensive' activities and advanced technology, with the release in 2002 and 2003 of the *National Research and Development Strategy*, the *Integrated Manufacturing Strategy* and the *Advanced Manufacturing Technology Strategy* (DST, 2002; NACI/DST, 2003; DTI, 2002). These were followed in 2007 by the *National Industrial Policy Framework* (DTI, 2007) and most recently the *Industrial Policy Action Plan* (DTI, 2010) which has introduced an ambitious agenda of policy interventions to stimulate a wide array of priority sectors and activities.

There has, therefore, been no shortage of industrial policy interventions and new programmes, but the net impact is far from clear. Together with trade liberalisation, it was expected that these measures would counteract the previous government's support for large-scale capital-intensive industries and the legacy of poor productivity, and would facilitate the development of non-traditional manufactured exports (Hanival and Hirsch, 1998; Joffe et al., 1995). However, this has only happened to a very limited degree. While the stated objective of policy has been to encourage higher value-added manufacturing, labour-intensive activities and smaller firms, in practice the weight of support has continued to be focused on larger scale, capital-intensive firms and sub-sectors.

Capital intensity and comparative advantage

Assuming no large scale state intervention, the (tradable) sectors which are likely to expand most rapidly will be those with a growing comparative advantage. So the question then arises as to the nature of South Africa's comparative advantage and what role, if any, industrial

policy should have in trying to influence this. One measure is to consider revealed comparative advantage. Policy since 1994 has placed considerable emphasis on becoming competitive to promote exports and was a central objective behind trade liberalisation, for instance.

The trend towards a reduced share for mining in the economy coupled with trade liberalisation might have been expected to herald a new industrial development trajectory, with the growth of more broad-based manufacturing. However, a striking feature since 1994 has been the continued rapid growth of resource based (and capital-intensive) industries. Growth in these sectors, and in the automotive industry, has far outstripped other sectors of manufacturing.

Attempts to develop competitive non-traditional exports especially in relatively labour intensive sectors have been generally unsuccessful. Large scale, labour intensive exports did not materialize. In fact, certain labour intensive sectors have instead proven very vulnerable to import competition. While exports have grown, they have not led to the expected jobs bonanza. Instead, productivity rose rapidly as firms slimmed down and became more competitive. So tariff reductions and a weaker currency supported export growth but it turned out that there was a high degree of path dependence with continued expansion taking place in capital intensive 'traditional' sectors such as basic chemicals, steel and other basic metals. Apart from a dip in 1999 and 2000, minerals, basic metals, basic chemicals and pulp & paper have maintained a share of around 60 per cent of total merchandise exports since 1994.

The share of non-traditional exports did expand from the mid-1980s to the mid-1990s with annual growth rates in excess of 20 per cent in sectors such as motor vehicles, electrical machinery, transport equipment, leather products, beverages, rubber products, printing and publishing and footwear over the period 1988 to 1996 (Black and Kahn, 2002). However, the base was extremely low for many of these products. Much of this expansion was into Africa, coinciding with political acceptability and the ending of sanctions. Africa's share of South Africa's total exports excluding gold increased from just 9.1 per cent in 1988 to 17.9 per cent in 1996. But the diversification of South Africa's exports has effectively stalled, aside from automotive exports which were driven by export incentives under the *Motor Industry Development Programme* (MIDP) introduced in 1995 (Black and Bhanisi, 2007). Edwards and Lawrence (2008) show that non-automotive manufactured exports fell in volume terms by 3.3 per cent per annum from 2000 to 2005.

So South Africa's 'revealed' comparative advantage was, somewhat paradoxically, in relatively capital intensive products and not in labour intensive products. While the economy has significant pockets of sophisticated technological capability and skills, there is also a very large, unskilled group and massive open unemployment but at the same time no apparent comparative advantage in labour intensive production.

However, to conclude that South Africa cannot compete in more labour demanding sectors is problematic for at least two reasons. Firstly, the reality is that South Africa competes in a number of different and sometimes 'contradictory' spheres reflecting a differentiated factor endowment. These include sectors based on its natural resource endowment in minerals and certain agricultural commodities, on capital or energy intensive, large scale industrial

processing, on skills and high technology in certain niche markets and based on low wages in a range of labour intensive areas ranging from clothing to tourism. In other words, South Africa already competes in labour intensive sectors and it is of critical importance for employment that we strengthen our competitiveness in this area. This should be a key objective of industrial policy.

The second reason is that South Africa's revealed comparative advantage has been fundamentally distorted in three main ways. Firstly, the ongoing skills crisis has limited competiveness especially in more labour demanding sectors. Secondly, market power and the pricing of raw and semi-processed materials have conspired against more labour demanding sub-sectors and, thirdly, capital and energy subsidies have increased the profitability of capital- and energy- intensive beneficiation projects in particular.

While these three factors are all important, we deal with the first and second briefly below and then go on to focus on state support for heavy industry.

Market power and input pricing

The market power of large upstream producers in sectors such as steel and chemicals has profoundly disadvantaged more labour intensive downstream production. Downstream development in sectors such as steel and chemicals has been hindered by the market power of large, upstream producers such as Iscor (now Arcelor-Mittal) and Sasol. The lack of competition has enabled them to use import parity pricing, meaning that local fabricators have derived little advantage from low production costs of material such as steel, aluminium and basic chemicals (Roberts and Rustomjee, 2009). This is in spite of the fact that beneficiaries of the 37E tax incentive undertook to set prices at a level which did not lead to higher returns from domestic sales than exports. In similar fashion the potentially labour demanding plastics sector has been rendered uncompetitive by the pricing on inputs derived from large firms such as Sasol.

The skills constraint

The second 'distortion' is that the historical, systematic undermining of black education has limited the supply of skills and therefore hugely raised costs for manufacturing. Since 1994, what can generously be described as the 'false start' in the rehabilitation of black education and artisanal training has continued to militate against competiveness in more labour demanding sectors. The most striking feature about the labour market in South Africa is not so much that wages of production workers are higher than competitors (although in many cases they are), but the exorbitant costs of managers and skilled staff. Based on detailed international survey data in manufacturing and some service sectors, Clarke at al (2007) found that unskilled workers in South Africa earned slightly less than in Poland but somewhat more than in Brazil. However managers' wages were 2.5 and 3 times higher than in Poland and Brazil respectively, and wages of professional and skilled employees in South Africa were also much higher than in the other two countries.

A benchmarking study of the Thai and South African automotive industries came to similar conclusions. It found that the ratio of production workers' wages in South Africa compared to Thailand was nearly three to one, for professionals 6:1 and for artisans an incredible 12:1

(Benchmarking and Manufacturing Analysts, 2009). Even allowing for the possibility of higher qualification levels for skilled staff in South Africa, these differentials create a huge competitive disadvantage for South African manufacturing.

The employment profile of the proxy South African firm is presented in Table 1. Annual median salary and wage figures for the South African firm are then calculated from data collected as part of a Remuneration and Retention Survey conducted by the Durban Automotive Cluster in 2009. As indicated in **Error! Reference source not found.** where the same employment profile is maintained in Thailand, the Thai operation has a very significant labour cost advantage over its South African counterpart.

Table 1: Labour and employment profile of three firms in South Africa, and a comparison of their costs in South Africa versus costs in Thailand

Employment category	Avg. number of employees	Median cost per employee in South Africa	Median cost per employee in Thailand	Ratio; SA to Thailand median costs per employee
Management	18	R 428 500	R 158 148	2.7:1
Professional	17	R 275 500	R 47 520	5.8:1
Supervisors	44	R 122 000	R 29 946	4.1:1
Artisan	40	R 267 000	R 22 080	12.1:1
Production	613	R 53 334	R 19 320	2.8:1
Apprentices	37	R 38 448	R 16 560	2.3:1
Total	769			

Source: Barnes and Black (2012)

For the purposes of quantifying this labour cost advantage for Thailand the employment profile of the proxy South African firm was held constant, with average costs extrapolated to generate the Thai-equivalent figure. On average, establishing the proxy South African firm in Thailand would reduce its management, staff and labour costs by as much as 70%, with the most significant cost differences relating to artisans, professionals and supervisors.

Major initiatives, such as the 1998 Skills Development Act, designed to address this problem have had limited success. This Act established Sector Education and Training Authorities (SETAs) funded by levies on wages. Many smaller companies who experience difficulty claiming back the levy perceive it to be an additional tax on employment.

Support for capital intensification and heavy industry

Our main concern here is with direct and indirect support measures for capital intensive sectors and heavy industry. But it is important to note that the economy in general has been subject to measures which have led to the under-pricing of capital relative to labour. The most direct example of this under-pricing of the simple user cost of capital. Up until the late 1980s,

South Africa experienced very low or even negative short-term interest rates.[3] The inexpensive cost of capital certainly biased investment towards capital intensive projects (Hirsch, 2005).

Furthermore, various taxation policies explicitly lowered the user cost of capital to encourage capital spending. For example, mining companies were allowed to deduct their capital expenditure from their taxable income for the year in which the capital expenditure was made (Samson et al, 2001). Such a tax practice promoted increasing capital-intensity in the mining industry and immediate downstream industries. The Katz commission which investigated aspects of the South African tax structure (cited in Samson et al, 2001:6) also lists various tax distortions such as 'skewed depreciation rules, investment allowances, payroll levies and registration fees' that resulted in the cost of capital being made relatively less expensive. A further fiscal avenue of incentivizing capital expenditure was through exempting businesses from paying VAT on capital inputs (Byrnes, 1996).

Support for heavy industry has a long history in South Africa (Fine and Rustomjee, 1996). It can be dated back to the formation of Iscor and was integral to industrial development during the *apartheid* period, which also included the establishment of giant, self sufficiency projects such as Sasol (Levy, 1992). In part, this form of industrial development reflected South Africa's mineral endowment but as we demonstrate below, there has been very substantial direct and indirect state support for various forms of heavy, industrial development.

The pricing of energy

The growth of resource-based sectors of manufacturing has been on the back of cheap (coal-based) energy and government support to exploit linkages within the 'minerals-energy complex' (Fine and Rustomjee, 1996). For example, aluminium production which dominates the non-ferrous metals sub-sector is based entirely on low priced electricity to process imported bauxite. Cheap electricity has been a function not just of abundant coal resources, but also the extraordinary electricity pricing policy. From its inception, Eskom has seen its prime role being to provide cheap inputs to the mining sector and cheap energy underpinned the development of the mineral energy complex. According to Winkler and Marquard (2009:52) electricity prices in South Africa have averaged around 40% of the US price over the last four decades. Eskom undertook massive over investment in the 1970s and early 1980s increasing its capacity threefold between 1970 and 1982 (Burton, 2011: 41). In 1977, Eskom's investment accounted for no less than 12% of total GDFI in South Africa.

The reason for South Africa's cheap electricity is partly due to natural endowments such as the relatively inexpensive cost of local coal inputs. Low-grade coal that is used for power generation is not of export quality and is thus not significantly influenced by international prices (Winkler and Marquard, 2009:60).Table 2 indicates that the price of coal in South Africa, is significantly lower than the price paid for coal in other countries. Importantly, the comparison also reveals the substantial discount that Eskom received for coal in the generation of electricity compared with other domestic coal users. For example, in 2004 the price for steam coal used for electricity generation in South Africa was almost half of that

[3] Negative real interest rates were experienced in the 1970s and 1980s (Kahn and Farrell, 2002).

paid by industry: US$17.7/toe compared with an industry price of US$33.1/toe (OECD, 2010:57).

Over capacity in the early 1990s meant that the reserve margin reached 40% (Steyn, 2006:38, cited in Burton; 2011:41) and after funding the earlier expansion, government embarked on a policy of setting extremely low tariffs and special incentives to attract huge investments in a series of metal processing plants. In 1991, when Eskom announced its 'price compact', a strategy to reduce decrease the real price of electricity by 20% over a period of five years in order to accelerate economic growth (van Horen, 1997:31). This came on top of a 14% decline in the real price of electricity between 1987 and 1991 (van Horen, 1997:33). In reality, Eskom surpassed their target with electricity prices on average dropping by 43% (and the manufacturing sector's electricity prices dropped by 53%) (van Heerden et al, 2008:2).

Table 2: Steam Coal Prices USD/toe (net calorific value)

	2004	2005
For electricity generation		
South Africa	17.7	21.5
OECD	60.3	68.5
For Industry		
South Africa	33.1	36.3
Russia	52.3	58.1
China	59.9	n.a
OECD	81	95.3

Source: IEA database (OECD, 2010)

Eskom's commitment to cheap electricity was reaffirmed under the new government in 1994 with a stated intention under the Reconstruction and Development Program to lower electricity prices by 15% between 1996 and 2000 (Eskom Annual Report, 1995; cited in van Horen, 1997:34). Overall, between 1970 and 2005, the real price of electricity in South Africa declined by approximately 11% for all sectors (van Heerden et al, 2008a:2).

There are several factors underlying these price reductions. Firstly, Eskom made a commitment to being the 'world's lowest-cost producer of electricity' through productivity improvements and cost containment (Eskom 1995:3 cited in van Horen, 1997:34). Secondly the number of staff employed was reduced substantially between 1985 and 1994 and during the same period the financial health of Eskom improved with reduced finance charges because previous debts had been paid off. Finally, the situation of overcapacity meant that there was no significant capital expenditure on the horizon. Consequently electricity was priced below the long run marginal cost allowing for 'normal rates of return, but only in the absence of building costs to install new capacity' (OECD, 2010:57). This led to the expansion of mineral beneficiation sectors and the aluminium industry in South Africa, for example Alusaf's aluminium smelter near Richards Bay was built in 1996 (Burton, 2011:42).[4]

[4]Now part of BHP-Billiton.

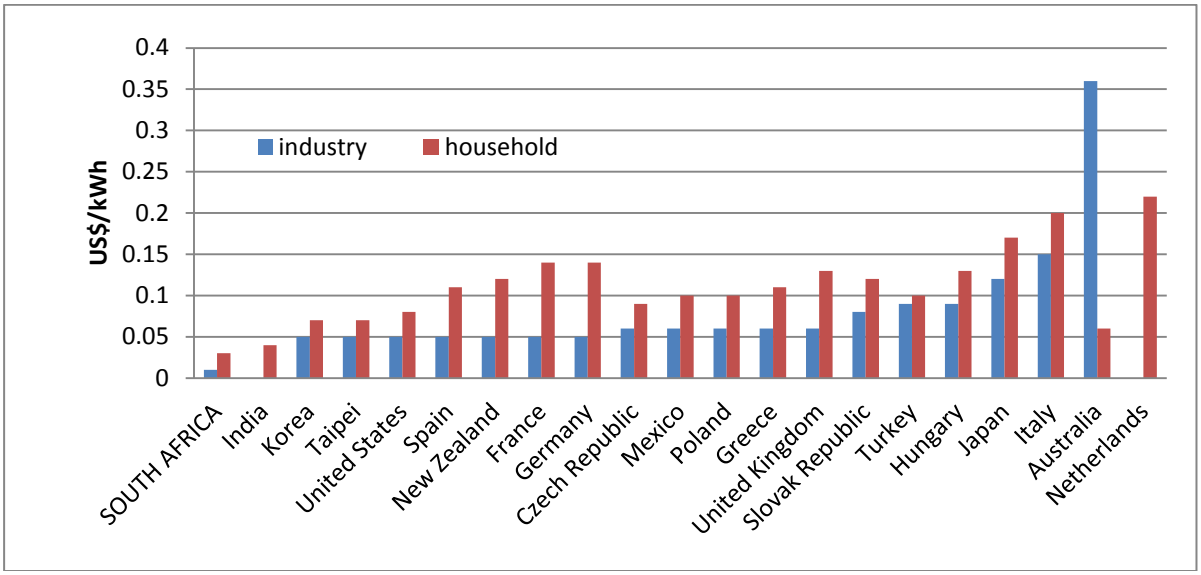
The initial justification of excess generation capacity may have had some validity. However, as late as 2005 the Developmental Electricity Pricing Programme (DEPP) was introduced, marketing low electricity tariffs for a 'minimum of seven years' in order to attract foreign investment. It was supposed to have a provision that cost savings be passed on to local fabricators but this has proved impossible to enforce. The huge, new industrial development zone at Coega near Port Elizabeth, advertised electricity at 'very favourable rates' to attract industrial investment (CDC, 2004; cited in Winkler and Marquand, 2009:58). And with capacity running out, agreements were being reached in 2007 with Alcan for an aluminium smelter at Coega, reportedly at an electricity price around US$0.02/kWh or R0.14, compared with average prices of R0.18 for other industrial users and R0.45 for households (Black and Roberts, 2009). In addition, the smelter investment was in line for investment allowances of R3.3 billion and a tax forfeit in excess of R600 million (Burton: 2011:25). The severe constraints on South Africa's generation capacity led to plans for the smelter investment being cancelled in late 2009. The R21bn greenfield investment would have employed just 800 people, with the product expected to be almost entirely exported in primary form.

Pricing policy has also favoured industrial users ahead of households, who effectively cross-subsidised the manufacturing and mining sectors. While it is the norm that industry users pay less because bulk supply is cheaper to provide, the differentials in South Africa have been particularly large (Figure 1). In recent years there has been much speculation over the so-called 'sweet deals' between Eskom and particular energy-intensive firms who had obtained extremely favourable tariffs, under long term contracts. For example, BHP Billiton was found to be paying only 12c/kWh for electricity.[5]

The state has also played a direct role in subsidising the electricity sector. Steyn (2006:29) reports that during the 1970s expansionary phase, Eskom received a R19.1 billion subsidy as forward cover for loans to cover their infrastructure investments. The present government has similarly provided financial support for Eskom's current expansionary development, with R60 billion directly provided by the government and an additional R350 billion in loan guarantees (Burton, 2011:43).

Figure 1: International Comparison of Electricity Retail Prices (2004)

[5] This was exposed in a leaked Eskom document in 2010 (Burton, 2011:42).



Source: van Heerden et al (2008a)

The nuclear industry has also been a large recipient of public funds. Van Horen estimates that as much as 69% of the Department of Mineral and Energy Affairs annual grant went to nuclear development from the 1970s through to the 1990s (1997:55). This amounts to a subsidy of between 3.3c/kWh and 11.3c/kWh (van Horen, 1997:65).

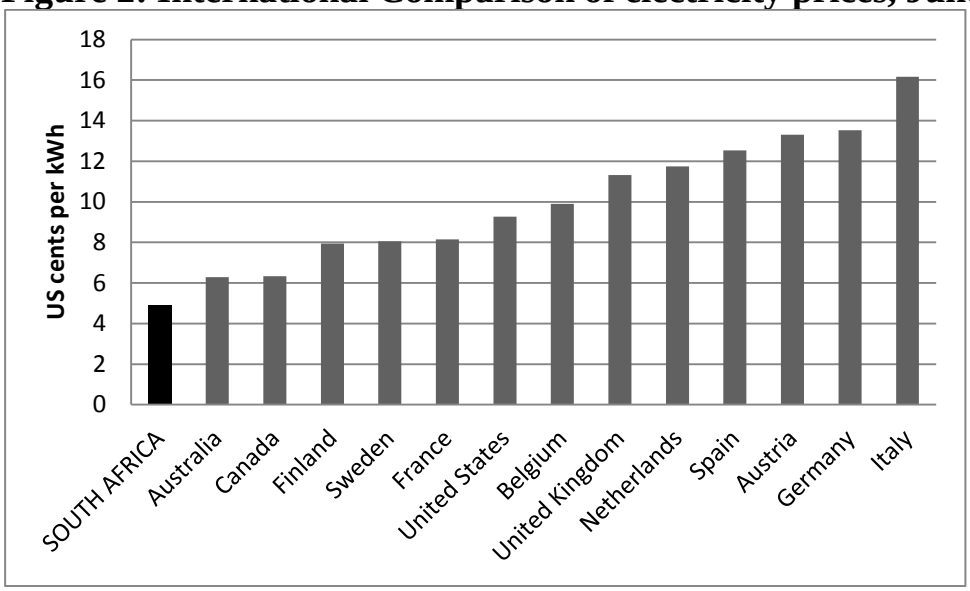
A further intervention by government was in the coal sector in the 1980s. Firms wishing to export coal had to apply to the state for an export permit, which was conditional upon the 'adequate local supply of coal' (Marquard, 2006 in Burton, 2011:43). The supply of the basic input into electricity generation was thus cheaply secured.

The trend of decreasing electricity prices came to an end in 2008 when country-wide power outages revealed that the growth in electricity generation infrastructure had not kept pace with the demand for electricity. This resulted in a massive campaign by Eskom to invest in new infrastructure to meet current and future electricity demand. One of the ramifications has been steep increases in the electricity price over several years, starting with a 34% increase in 2009. Figure 2 below shows that when compared with OECD countries in June 2009, South Africa's electricity was still among the cheapest in the world. Further increases of 24.8% in 2010, 25.8% in 2011 and 25.9% in 2012 (OECD, 2010:57) were also put in place, although the planned 2012 increase was recently reduced.

The secure supply and low price of energy facilitated the development of energy-intensive, heavy industries. However, the long history of artificially low prices has led the economy to its current predicament: where electricity supply is inadequate and prices are rising sharply. The fact that cheap and reliable electricity is no longer guaranteed has limited recent investment in energy intensive industry and was a key factor in Rio Tinto's (previously Alcan) decision to cancel its planned aluminium smelter investment at Coega (OECD, 2010). Furthermore, there has been public outrage at the finding of Eskom's preferential pricing arrangements with large energy intensive industries (such as BHP Billiton, for example). Such deals are now being reviewed in light of changing economic circumstances. In effect, the

electricity pricing structure has exacerbated the impact that South Africa's natural resource endowment has had on the pattern of trade discussed above.

Figure 2: International Comparison of electricity prices, June 2009



Source: OECD (2010)

DTI incentive schemes

The Human Development Report on South Africa (Adelzadeh, 2003:151) lists a range of incentives used by the *apartheid* government, that were biased towards capital-intensive production methods. They included corporate tax incentives, depreciation allowances, tariff rebates, debt financing, subsidised interest rates and also the provision of utilities and infrastructure. These incentives firstly supported a shift towards employing more capital-intensive production techniques and secondly attracted investments by large –scale firms which are typically more capital -intensive than small and medium sized enterprises.

In the late 1980s, there was a change in developmental focus towards encouraging exports. The General Export Incentive Scheme (GEIS), was introduced in the late 1980s and was largely successful in increasing the share of manufacturing in exports. However, the products which received support were biased towards capital and intermediate capital intensive sectors (Edwards, 2001:58). Iscor, although having being privatised in 1989 benefited from export incentives under GEIS of around R175m per year (Roberts and Rustomjee, 2009:60).Thus, against a backdrop of support for capital-intensive sectors, the change in the orientation of industrial policy towards expanding into foreign markets did not result in increasing employment.

Since 1994, the new democratic government has stated their objective to restructure the economy to promote growth and jobs. The major developmental shift has been the change in

focus to support exports and to increase trade liberalisation. However, some of the very substantial support programmes provided by government have reinforced rather than altered the industrial development path. An accelerated depreciation allowance under the 37E incentive was given to major resource-based projects in the 1990s such as Columbus Stainless Steel and Saldanha Steel.[6] One of the conditions of this tax break was to encourage more competitive pricing, where firms 'undertook to price at a level which did not yield a higher income than that obtained from exported products' (Roberts and Rustomjee, 2009:55). However, many firms avoided this requirement by simply not selling to domestic consumers, thus hampering downstream more labour-intensive linkage effects.

The Strategic Industrial Projects (SIP) programme, implemented between 2001 and 2005 aimed to promote local and foreign investments in large scale projects by allowing tax breaks for the purchase of certain assets, such as machinery and buildings. It provided tax relief equivalent to R7.7bn from 2002 to 2005 for large capital-intensive projects many of which are in basic metals and basic chemicals (including four projects undertaken by Sasol) (Black and Roberts, 2009). Most supported investments were in commodity based, capital intensive sectors. According to Roberts (2008), 13 of the 33 SIP recipient projects were in the chemicals sector, and 8 in metals production.[7] The average capital-intensity of SIP supported projects was R3.7million per employee, amongst the most capital-intensive in the manufacturing sector (Roberts, 2008:24).[8]

Large capital-intensive firms that received significant investment allowances from the state included, 'Iscor's (now Arcelor Mittal) Suprachem Ferro-alloy coke plant (R600m), BHP Billiton's Hillside Aluminium (R300m), Anglo-American's former subsidiary HullettAluminium (now Hulamin), Nampak Metal packaging (R80m), Trident Steel (aluminium) (R56m), Tata Iron and Steel's ferrochrome plant at Richard's Bay (R482m and a R144m tax forfeit), Sublime Technologies ferrochrome smelting plant (R139m) and a SAPPI subsidiary' (DTI, 2004:9 cited in Burton, 2011:25).

The SIP has been replaced by Section 12i which provides grants and tax allowances for large investment projects from R200 million to R1.6 billion. The maximum amount that can be claimed is R900m (DTI website, 2011). There has to date been no study that has assessed its efficacy in meeting its targets of promoting new and expanded industrial projects.[9]

Another related project of the DTI is the funding of mega projects (over R1billion) and industrial development zones. State support for such projects is multifaceted including infrastructure support, industrial subsidies, cheap land and water as well as preferential electricity tariffs. These developments are generally aimed at large scale capital-intensive and energy-intensive projects such as Saldanha Steel at Saldanha Bay and Alusaf in Richards Bay. The Coega development in the Eastern Cape, is perhaps the most controversial because of its

[6] The 37e tax incentive expired in 1999.
[7] Beneficiaries of the SIP include: Sasol, Iscor, BHP Billiton, HulettAluminium, Nampak, Trident Steel, Kimberley-Clark, and Nestle (Roberts, 2008: 24).
[8] The tax allowances granted to each firm are significant for example, a 2004 DTI report listed two of these allowances at a value of R900million (Burton, 2011: 25)
[9] The section 12i tax incentive is offered on the basis of the point system which promotes employment, training as well as energy efficiency as amongst other objectives. While these criteria are secondary to the scheme, there has also been no publically available study that assesses whether the recipients meet these conditions.

huge scale. Prior to the electricity crisis, the Pechiney/Alcan (Rio Tinto) smelter was supposed to be the main tenant at Coega and was to benefit from 'investment allowances of almost R3.3billion and a tax forfeit of R600m' (Burton, 2011:25).While there is clearly a need to support development in under-developed regions such the Eastern Cape, it is puzzling that the state opted for such a massive project aimed at attracting heavy industry, which employs relatively few people.

The DTI's Critical Infrastructure Programme (CIP) provides a grant to cover between 10% and 30% of the infrastructure development costs deemed critical to a new development. The fundamental aim of the CIP is to lower the costs of doing business and to stimulate both upstream and downstream linkages (DTI, 2006:8). In principle, this is an example of a factor-neutral incentive as it could benefit a variety of projects and also has a public good component. In practice, many of the beneficiaries have been in the traditional capital-intensive sectors. Rustomjee and Hanival (2008:47) report that 'between 2002 and 2006, around 60% of the approved grants were allocated to the Coega and East London Industrial Development Zones valuing R472m' (cited in Burton, 2011:27). The main beneficiaries in these areas were the motor vehicle sector and the then anticipated Alcan aluminium smelter.Large amounts have been spent by the state to provide infrastructure for the mining, basic iron and steel and basic non-ferrous metals sectors (Rustomjee and Hanival, 2008:49). Burton (2011:24) also draws attention to the new Transnet infrastructure, costing billions and designed to support the mining and mineral beneficiation sectors by connecting the mines with the ports in Richards Bay and Saldanha.

Industrial Development Corporation (IDC) funding

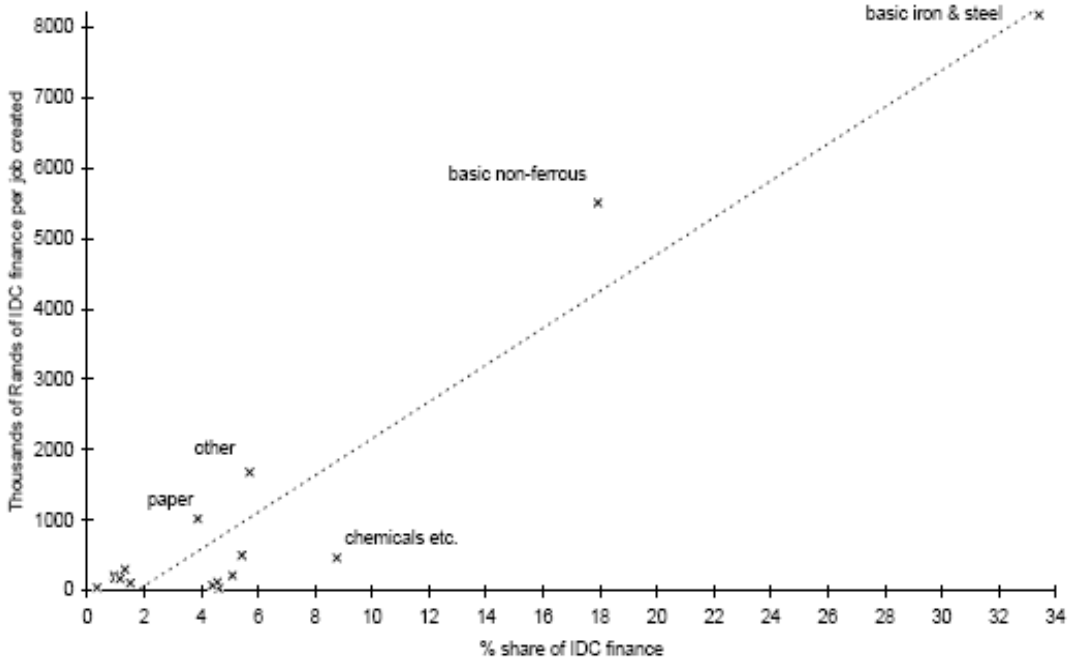
As a state owned finance institution, the IDC plays an important role in influencing economic growth in accordance with government's strategic objectives. The IDC supports firms by providing equity finance and loans, frequently at concessional rates. Historically, it has funded large-scale mineral beneficiation projects and has been closely associated with the parastatals as well as with the large private sector conglomerates.

For instance, the basic chemicals sector is dominated by Sasol, which was initially a state corporation. Its capabilities are derived from huge state financing of its synthetic fuel-from-coal operations which were established for strategic reasons as a result of the sanctions threat (Levy, 1992; Rustomjee et al., 2007). Direct state support for basic metals production was provided in the form of IDC finance for aluminium and stainless steel plants into the 1990s, through state ownership of the main steel producer until 1989, and in the provision of infrastructure over recent decades (Fine and Rustomjee, 1996). Much of the IDC finance in the second half of the 1990s continued to be oriented to large, capital-intensive, resource-based activities. As recently as 1998, the IDC had significant ownership in major corporations including Gencor, Iscor, Billiton and Sasol, and although it has since sold some of its equity holdings, it continues to be a significant stakeholder in heavy industry(Roberts, 2004).

Several authors (e.g.Hirsch, 2005; Roberts, 2004; Edwards, 2001; and Burton, 2011) have identified the IDC as perpetuating the bias to capital-intensive manufacturing via its investment priorities (Roberts, 2004). This was in accordance with the apartheid government's strategic objectives regarding its industrial policy. However, it has continued

well into the 1990s under the new political regime with the majority of IDC funds being used by the basic metals sector supporting initiatives such as Saldanha Steel, Columbus Stainless Steel and the Alusaf expansion (Edwards, 2001). Figure 3 shows the relationship between a proxy measure of capital-intensity (IDC financing/job created) and the percentage share of IDC finance for the period 1993-1998. It shows that the major beneficiaries of IDC loans (basic iron and steel and basic non-ferrous metals) are significantly capital-intensive in terms of the cost per job created.

Figure 3: Relationship between share of sector in IDC financing and IDC finance per additional job created (1993-1998)



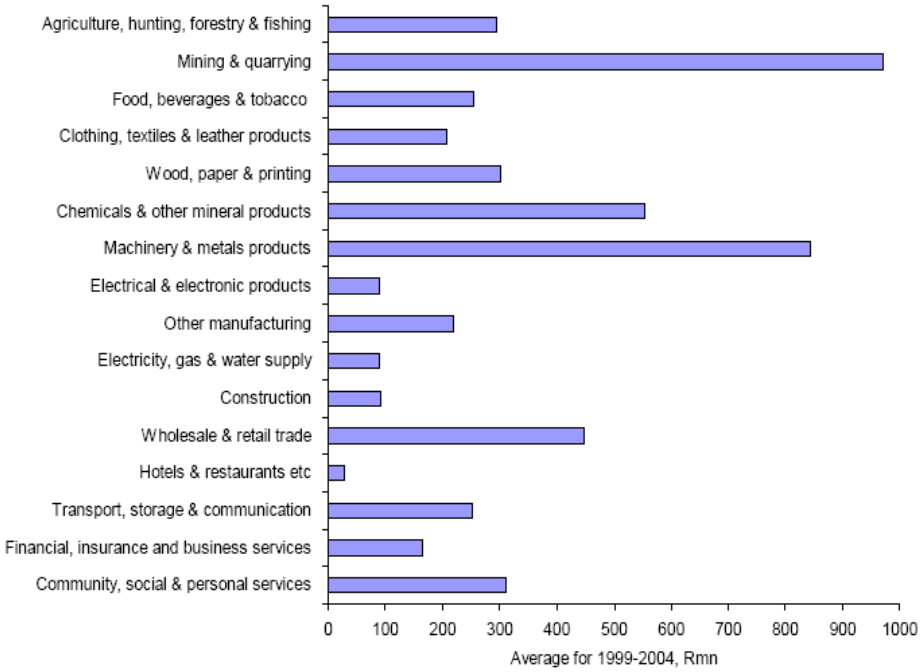
Source: Mondi and Roberts (2005:17)

Since 2000, there has been a shift within the IDC towards greater support for more employment intensive sectors such as tourism and agricultural projects (Roberts, 2004). There has also been a change in focus regarding scale with greater support for small, medium and micro enterprises (SMMEs) as well as black economic empowerment initiatives (BEE) but the lion's share of financing is still directed at large scale, capital intensive projects.

Mondi and Roberts (2005:13) note that within the SMME category the largest recipient is the chemical sector, and within BEE the mining, transport, storage and communications have been chief beneficiaries. Overall a sectoral breakdown of IDC financing for 1999-2004 reveals that the traditional, mostly capital-intensive sectors have continued to benefit from state financing, namely: mining and quarrying, chemicals and other mineral products, and machinery and metal products (Figure 4).[10]

[10] However Mondi and Roberts (2005:8) draw attention to the fact that 'within the metals and chemicals sectors are very labour-intensive activities in metal fabrication and the manufacture of plastic products.'

Figure 4: Total IDC financing by sector, average value for 1999-2004



Source: Mondi and Roberts (2005: 18)

The paper and paper products sector is reliant on timber and has historically benefitted from the *apartheid* government's policies with regard to land and water resources for extensive afforestation. The large paper mills of the two dominant producers, Sappi and Mondi, are also capital and energy intensive. It is notable that South Africa exports around one-third of the pulp produced in the country for processing elsewhere (Genesis, 2005).

The pattern of performance suggests the importance of previous government policies, and 'path dependent' factors, meaning that firms which have developed productive strengths are better able to re-invest and continue to grow. Perhaps the best example of this is the chemicals giant, Sasol, which leads local industry in ongoing R&D spending. The basic chemicals sector which is dominated by Sasol also has the highest investment rates, with levels approximately 50 per cent of value added in the years 2003 to 2007. Investment rates averaging around 40 per cent of value added have also been maintained in the basic iron & steel, non-ferrous metals and coke & petroleum sub-sectors.

4. Conclusion: Reshaping comparative advantage

So South Africa's 'revealed comparative advantage' is, in part, the outcome of its distorted pattern of development. Powerful interests have coalesced around this capital and energy intensive growth path in support of what Fine and Rustomjee (1996) have dubbed the 'mineral energy complex'. Naturally they are opposed to any reduction in this support.[11]While

[11] See for instance, "Paper sector fights Eskom hike proposal", *Business Report*, 13 Jan, 2010.

industrial policy has sought to shift industrial development onto a different trajectory, this has proved extraordinarily difficult and has met with limited success (Black and Roberts, 2009).

But what does this mean in the South African context of high unemployment, an apparent lack of competitiveness in labour intensive sectors and a capital intensive export profile? This structural paradox has created a conundrum for industrial policy. Should policy encourage sectors which display revealed comparative advantage or attempt to create new areas of comparative advantage by encouraging higher valued added activities? Or is it possible to compete more effectively in more labour demanding activities? This conundrum partly explains the Department of Trade and Industry's adoption of a multiplicity of potentially contradictory policy objectives in support of beneficiation, the 'knowledge economy' and labour absorbing growth.

While industrial policy is sometimes narrowly defined as a set of selective interventions to promote industrial upgrading, we would prefer a broader conception – 'improving economy wide efficiency.' In the South African context of large scale structural unemployment, this leads in turn to a focus on employment. Moreover, the bulk of our unemployed labour is unskilled or semi-skilled and can most easily be absorbed into labour intensive activities. As *Business Day* commented, "…we need to create jobs for the workforce we have, not the workforce we wish we had."

It may be theoretically possible and sensible, especially in a mineral rich economy, to have an industrial policy which promotes capital intensive, resource based exports with employment being generated elsewhere in services, (protected) manufacturing for the domestic market or agriculture. Or industrial policy could target more advanced, leading sectors which may lead to little direct employment growth but which would generate the export expansion required to finance development with employment being generated in the protected sectors of the domestic economy. We argue, however, that industrial policy should be aligned with other policies and directly aimed at supporting more employment intensive growth.

Government has very clearly stated the case for a more labour absorbing growth path – but an economy cannot efficiently shift its growth path without shifting its comparative advantage. To move to a more labour absorbing growth path, South Africa will need to compete more effectively in labour demanding economic activities. We are not suggesting that South Africa can suddenly out-compete China in ultra labour-intensive manufactures and neither are we suggesting that South Africa should support, unsustainable, low margin activities. However, this competition cannot be avoided and for inroads to be made into the unemployment problem, South Africa needs to do much better than it has been doing. The playing field has been tilted towards energy and capital intensive firms and sectors – it needs to be tilted towards supporting employment and labour demanding growth.

The question of incentives is crucial. By incentives we mean the whole panoply of prices, taxes, subsidies and regulations which face market participants. It has been shown that there has been a significant bias against employment as a result of South Africa's particular development experience. Growth has favoured capital intensive sectors and constrained labour intensive development. In part, this has reflected differentiated state support across various sectors. Factor prices are a second consideration. The relative prices of capital and

labour do have an effect on the production techniques that are selected and also play a role in the growth strategy in terms of impacting on the growth path that an economy follows. Capital has been subsidised for very large capital intensive projects. Industrial support frequently takes the form of investment allowances and subsidies. The SETA funding for training on the other hand is derived from a tax on the payroll and in fact constitutes a transfer from smaller, labour intensive firms to larger more capital intensive firms. A major set of subsidies has been energy. Electricity has been very cheap and especially cheap for large capital intensive users. Implicit and explicit energy subsidies to these sectors has amounted to billions per year. So one key question is whether the incentive structure can be re-shaped to facilitate employment creation much more strongly.

The case for intervening directly to support employment intensive activities can also be made in the conventional economist's language of addressing market failure. Very high unemployment has major negative external effects. The resultant social dislocation creates huge costs for society. It imposes a tax on poor households, nearly all of which are supporting unemployed members. Higher employment would relieve this burden and lower household costs. Higher employment would also improve educational and health outcomes and reduce the cost of social services.

But what of objectives such as technological upgrading, promoting the knowledge economy and moving up the value chain? These activities can and should be supported and may be complementary to labour absorbing growth in some ways. But in the end they constitute a limited development strategy in the South African context because a large section of the labour force is not equipped with the skills to be employed in these sectors. It can also be argued that higher employment and the growth in labour demanding activities is the best way of encouraging upgrading because income growth at the low end of the income distribution is likely to be the best way of improving educational outcomes and therefore creating a decent platform for vocational and tertiary education.

Placing employment at the centre of industrial policy means support for small firms and training, particularly at a basic level and an examination of the regulatory environment. It also means providing appropriate infrastructure and investments to improve competitive capabilities in more labour demanding activities. This does not necessarily mean that wages should, be driven down although policy makers do need to address labour market rigidities in certain areas. Incentives should subsidise labour and training rather than capital investment, electricity and infrastructure for capital intensive firms. This kind of support will lower unit labour costs, increase the productivity of both capital and labour and encourage more labour demanding investment. The challenge for South African industrial policy, therefore, is to tilt the playing field towards labour absorbing growth in order to mobilise the huge potential of an under-employed and poorly skilled workforce.

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