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Industrial Policy in the Twenty-First Century

Challenges for the Future

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Abstract

Industrial policy has attracted considerable controversy in the development context. This paper makes a case for a pragmatic and limited approach to interventions as a means of stimulating industrialization in the context of current and future challenges facing newly industrializing economies. It begins with a simple definition of industrial policy, a brief survey of the theoretical case, and a taxonomy of different possible interventions. Recent empirical evidence on the role of industrialization in development is examined, whilst considering how far government policy per se has contributed to manufacturing success. Finally, a series of key issues for today's industrializing economies that industrial policy needs to address are highlighted.

Keywords: industrialization, government, trade, protection, productivity, exports

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1 Introduction

Industrial policy has attracted considerable controversy in the development context, possibly out of all proportion to its potential impact (either positive or negative). Arguably, the intensity of the debate stems from the fact that here the structuralist and neoclassical traditions of development studies meet head-on, with the former seeing industrial policy as a means of correcting for the limitations of markets and the latter seeing it as the highpoint of 'government failure'. This paper makes a case for a pragmatic and limited approach to interventions as a means of stimulating industrialization in the context of current and future challenges facing newly industrializing economies. It begins with a simple definition of industrial policy, a brief survey of the theoretical case and a taxonomy of different possible interventions. The second section considers how far government policy per se has contributed to manufacturing success, drawing on the very extensive literature in this area. The third highlights a series of key issues for today's industrializing economies that industrial policy needs to address, and the final section concludes.

2 What is the case for industrial policy?

The term industrial policy is used here in the sense of policy interventions designed to affect the allocation of resources in favour of industry (principally manufacturing) as distinct other sectors. Such interventions may also affect resource allocation within industry in favour of either particular branches or sub-sectors or particular firms (so they may be 'selective' rather than 'functional'). Interventions can involve either the price mechanism or direct controls and be focussed on export as well as the domestic market. Industrial policy in this definition is thus much wider than import substitution trade policies with which it is often associated.

Industrial policy has three dimensions which are sometimes confused in the literature:

- The overall vision or strategic direction the government wishes to set.
- The process whereby a dialogue is established with the key actors in the private and public sectors.
- The policy instruments used to affect change.

Even if there can be broad agreement on the vision—a competitive and dynamic industrial sector—there can be different paths to achieving this with varying degrees of public ownership, consultation with the private sector, direct controls, fiscal incentives, and openness to trade.[1]

The theoretical basis for industrial policy as defined here focuses on two propositions, the first relatively uncontroversial and the latter rather more so.

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[1] Hausmann, Rodrik, and Sabel (2007b) highlight the process aspect of industrial policy and illustrate it in relation to South Africa.

i) Markets (particularly in developing countries) fail to produce a social optimum due to factors like externalities, lack of information, monopolization or social barriers;

ii) Manufacturing industry has a special role in growth due to its greater scope for generating high levels of and growth in productivity (at least at relatively early stages of development) and externalities.[2]

The early development literature was full of analyses of how market failures could be overcome by government intervention; through coordinating investments to overcome demand constraints (the big push/balanced growth) analyses of Rosenstein-Rodan and Nurkse, through encouraging the absorption of the labour surplus in manufacturing (the Lewis model), and through building learning-by-doing (through infant industry protection). Significantly the original neoclassical tradition of the development literature equally embraced market failure and acknowledged the need for intervention to address this. The difference was that in this analysis optimal interventions should be designed to minimise by-product costs and thus should be based on the price mechanism through tax subsidy measures.[3] Unlike later policy interpretations, in this analysis subsidies to compensate for market failures were wholly acceptable. The rationale for interventions based on market failure logically implies that support should be offered equally to all participants in the market ('functional' support). The functional versus selective distinction is never precise since only certain firms will benefit from even broad changes in policy; for example, only producers of internationally tradable goods gain from an exchange rate devaluation and only firms large enough to conduct R&D gain from tax credits related to this type of expenditure.

The clearest statement of the original case for manufacturing as a special 'engine of growth' though its capacity for productivity growth and externalities comes from the work of Nicholas Kaldor who highlighted the capacity of manufacturing to generate 'dynamic increasing returns', that is rising productivity through the expansion of production. This is in contrast to agriculture, where productivity growth was seen as arising through labour-saving technical change and the movement of workers off the land, and to services, which respond passively to increases in other sectors (although it is now understood that this analysis underestimated the potential for new branches of services linked with the computer-based technology to generate sustained productivity growth and behave in the same way as manufacturing).[4] More recent theorizing following Krugman has extended this analysis of dynamic sectors by building

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2 Rodrik (2007) associates industrial policy with any form of selective intervention not just that favouring manufacturing. Arguably this broadens the concept too far to be very useful. He also adopts the broad definition of industrial policy used here to cover both functional and selective and market-based as well as direct measures.

3 Corden (1974) is the classic statement of this 'policy hierarchy' approach. For example, instead of compensating new manufacturing activity for paying a wage above the opportunity cost of rural labour by granting tariff protection (and thus penalizing consumers) compensation should be through an employment subsidy (whose cost could be spread over all tax payers not just consumers of the product in question).

4 Weiss (2002: ch. 4) sets out the Kaldor case. The introduction of the selective employment tax (to tax service sector employment) in the UK in the late-1960s designed by Kaldor was a dramatic (and highly controversial) example of industrial policy in a developed economy context.

increasing returns into trade theory models and thus highlighting the importance of 'first mover advantages'. Once established (perhaps behind tariff barriers) an activity can build on its productivity growth to become internationally competitive. Similarly more recent new economic geography models have stressed the importance of location externalities ('agglomeration effects') arising through labour market effects, networks of suppliers, or various knowledge spillovers. Not all of these agglomeration effects need arise from manufacturing but many will, and arguably the sector has greater capacity to produce these externalities than does services.[5]

The 'self-discovery' model of Hausmann and Rodrik (2003) sets out the case for subsidising risk-taking activity in the introduction of new products and technologies as all potential followers gain from the actions of innovators. Manufacturing need not be the only activity where this type of externality occurs, but provided innovation is more prevalent there the model again provides a justification for its special place in growth. If increasing returns and externalities are the rationale for intervention logically this implies selectivity in support, since the scope for these effects will vary both between branches and between firms in branches.

In brief there is no shortage of theoretical arguments that can be utilized to make a case for industrial policy. The objections relate to its feasibility and the possibility of policy 'capture'.

3 Different perspectives on industrial policy

In the literature two competing perspectives have emerged on the role and application of industrial policy. One can be characterized as a 'promotional' approach. Here governments are recommended to think big and to support and promote either sub-sectors or firms within these. The aim is to shift fairly rapidly into new, dynamic, and technologically sophisticated activities. Some of these may be quite different from the goods in which the economy is currently specialized. Since by definition some will be new activities for the economy firms may need financial incentives to justify the risk involved. Governments are perceived as promoters who act as catalysts and who provide the financial support needed during the learning period of the new firms and assist in the process of industrial start-up with training, export marketing, and the general coordination of support activities.

The other perspective, which can be characterized as a 'market-based' approach, sees governments as facilitators whose role is to address the malfunctioning of markets either to correct for externalities or provide the information and infrastructure needed by firms. Although this role may seem modest it can be substantial where governments interpret market failure in a broad sense, for example providing credit where the financial sector is risk averse, or training where firms under-invest due to the risk of workers leaving. From this latter perspective the facilitating government corrects for failures, whilst leaving firms to decide how far they wish to innovate and upgrade their

5 UNIDO (2009) presents data on the empirical significance of agglomeration effects from manufacturing. Collier and Venables (2007) have a useful discussion of their significance in modern manufacturing.

production; support is available to all firms affected by the market failure not to a selected few.

These distinctions can be linked with the concept of 'economic distance' defined in terms of the similarity between the skills and technological capabilities required to produce different sets of goods. Thus distance is low where similar capabilities are required to produce two goods and high where markedly different capabilities are involved. The promotional approach can be thought of as an attempt to move into the production of dissimilar or distant goods and the market-based one to a closer or similar set of goods to those in which the economy is already specialized. Quantification of economic distance is complex although there have been recent efforts based on the probability that pairs of countries have a comparative advantage in the same two goods.[6] The difference in approach to economic distance underlies the debate on industrial policy between Lind and Chang (2009). When Lin writes of a facilitating state that supports activities with a comparative advantage and Chang of a more interventionist state that funds technological upgrading, they are, in effect, discussing different strategies towards distance, with Lin advocating a move to closer and Chang to more distant product lines to those in which an economy is currently specialized.

Practical advice can of course draw on both approaches. The most recent academic interpretation of industrial policy, as developed by the Hausmann-Rodrik team at Harvard University has been applied to a number of countries and draws on both perspectives. For example, in their analysis of the policy options for South Africa Hausmann, Rodrik, and Sabel (2008a) argue that industrial policy should work at two levels. At the first micro level (what they term 'in the small') this involves a regular dialogue between the government and the private sector where bottlenecks and market failures are identified and the government plays a coordinating and facilitating role to remove these. The second level (what they term 'in the large') involves a more ambitious role for government in providing funds in the form of risk capital for innovative ventures though a public venture capital fund or a development bank. The aim is to support risk-taking activities that are genuinely new to a country and represent a major shift away from current specialization. The rationale for public support is that risk takers who innovate provide a path for others to follow and thus create a form of external benefit for which they are not compensated, so in the absence of public support there will be too little risk-taking and innovation. Since, as noted above, a lack of funds for new activities can be interpreted as a credit market failure, this is compatible with the market-based perspective. However, aspects of their recommendations suggest elements of a promotional approach where the government selects a priority area and then looks for and supports private investors to develop it. Since the support that can be offered will be limited, in practice either explicitly or implicitly governments will be favouring some areas over others.[7]

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6 Distance is calculated for pairs of individual products (*i* and *j*) based on the probability that countries in the world have a specialization (revealed comparative advantage ratio above unity) in both. Goods thus are similar where there is a high probability that if a country is specialized in *i* it will also be specialized in *j*; see Hausmann and Klinger (2006).

7 Hausmann and Rodrik (2006) describe this dilemma dramatically as being 'doomed to choose'.

What sort of intervention is likely to be involved with industrial policy under the broad definition used here? Table 1 sets out a simple taxonomy distinguishing between 'market-based' and 'promotional', where as noted above roughly the former aim to correct for market failures as they affect existing activity and the latter to promote or create new activities with the potential for productivity growth and externalities (or to restructure activities with potential). 'Functional' means widely available as opposed to 'selective', which refers to favoured activities or firms (although as noted above the distinction is never precise). Although the correspondence is not exact, the old-style selective measures associated with past industrial policy in many low- and middle-income countries roughly equate to promotional measures and the market-based measures correspond to what is seen as legitimate market corrections in conventional policy-thinking.

Each measure has its advantages and disadvantages. Government expenditure on infrastructure provision, for example, may lower production and transport costs and boost the incentive to invest in industry. However, it has to be financed and thus places strong demands on fiscal policy. Tax concessions of various types do not involve direct expenditure, but only benefit firms after investment decisions have been made. The availability of credit will be important to investors where the commercial banking system is not playing its financial intermediation role effectively, but where domestic savings are insufficient external funds will have to be found. How far credit should be available at a concessional or subsidized interest rate is highly controversial. Low-interest loans raise the incentive to invest, but run the risk of encouraging low-return activities, since investors do not need to cover the opportunity cost of the funds. In addition, they may, if used widely, shift the choice of technology in a capital-intensive, labour-saving direction. Import protection has the great attraction of not requiring additional revenue, since support for investors is provided by domestic consumers of the protected goods. However, whilst the theoretical case for protecting infant industries is well-established, protection can also create the wrong incentives through an anti-export bias and the sheltering of high-cost producers.

As set out, the degree of controversy over these measures is meant to increase moving down the table. Thus most governments subsidise private R&D, provide some state investment in research with industrial potential and fund labour training. The market-based measures have been described in many countries as 'competitiveness policy' and most countries apply some or all of these. On the other hand developing country governments are typically warned against selective promotional measures, particularly because of the risk of rent-seeking, and WTO rules, and those of regional trading agreements limit the scope for promotional measures.[8]

4 Industrial policy and growth

Empirical evidence suggests that the arguments from the early development literature on the role of manufacturing have broadly stood the test of time. Particularly at

[8] Chang (2009) makes the point that the freedom of discretion is greater than might be thought since although some selective subsidy measures are in principle 'actionable' at WTO, this does not mean complaints will be made (particularly where a country plays a small role in world or regional trade) and restrictions do not apply to domestic as opposed to trade-related subsidies.

relatively low-income levels a dynamic manufacturing sector will be important in raising income, creating jobs, and diversifying exports. It is well-established that as countries grow up to a threshold income level the share of manufacturing in GDP rises and recent work has linked a rising share of manufacturing with growth accelerations and with a diversification of exports, which in turn has a positive effect on growth.[9] However, the evidence that manufacturing remains an important sector, particularly for relatively low-income economies that are well below the threshold at which the manufacturing share in GDP stabilises, does not demonstrate that earlier industrial policy interventions per se have had a positive effect. Because of the diversity of experience it is difficult to establish major generalizations from what is a vast literature. However, there are some things we do know.

It is well-established that today's industrialized economies offered various support to their industries at their take-off stage (Chang 2002). Post-1945 success with versions of industrial policy in developed economies has been claimed in, amongst others, France (through indicative planning), Finland (through technology policy), and Ireland (through targeting of high-technology foreign investment). In terms of foreign trade, it is clear that free trade has been a policy of the economically strong, adopted when their economies were competitive enough to benefit from opening to foreign competition. This generalization applies, for example to the UK and USA in the nineteenth century and to Japan in the 1960s, Korea and Taiwan in the 1980s and more recently China in the 1990s. None of these economies were 'early trade liberalizers', although all have benefited greatly from liberalization when it came.

East Asia is the region of the developing world where there is the most plausible case for the successful application of industrial policy. Japanese experience with state financial support for selected industries though subsidized directed credit programmes, and the use of 'administrative guidance' and control over licenses for technology imports to influence industrial structure, greatly influenced policy in Korea and to a lesser degree Taiwan (Weiss 1986). Although all economies in the region applied some or all of the measures listed in Table 1 there was never a unique East Asian model (when one is mentioned it is usually a simplified version of policy in Korea circa 1970) with the emphasis on different measures varying between countries and changing over time within the same country. Broadly speaking this change reflected a shift between the early promotional measures to the market-based ones. At the early stages of industrialization key sub-sectors were highlighted and promoted strongly with directed credit, import protection, and favours in licensing. As manufacturing became more sophisticated and the technologies used more complex this selective approach was gradually replaced by a functional one more supportive of the decisions of firms themselves. The distinction is roughly between initially creating winners and later letting them emerge. The mix of policy measures was sometimes complex. China, for example, has employed a twin track approach of liberalizing the economy to foreign trade, through special economic zones and later WTO entry and encouraging foreign investment and the transfer of foreign technology. At the same time it has employed

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9 ADB (2007) examines these issues for developing Asia, finding support for the special role of manufacturing in growth; Hausmann, Hwang, and Rodrik (2007a) make the case that what you export matters and that high-value (chiefly manufactured exports) generates more rapid GDP growth, controlling for other factors. However, there is also emerging evidence that in some countries (most notably India) parts of the service sector are also playing this role.

measures to support large national conglomerate firms and to encourage local R&D (Nolan 2001).[10]

However, the record with industrial policy, even within East Asia, is both mixed and controversial. It is seen as much more effective in Korea, Taiwan, and Singapore than elsewhere. In Indonesia, the Philippines, and Malaysia, for example, it is viewed principally as driven by cronyism and patronage rather than rational economic calculation and associated with high-cost protectionist trade policy.[11] Where it worked well key characteristics of policy appear to be flexibility, so measures changed over time in line with economic conditions, use of performance requirements, where special support was time-limited and conditional on achieving specified targets, and a focus on exporting. Also where it worked well governments were strong enough to avoid capture by producer interests and could take decisions on a national not sectional basis. This independence of the planning bureaucracy seems to have been more important than their technical calibre (at least in Korea and Taiwan, but possibly not in Singapore).[12]

However, even in the acknowledged success stories empirical studies have had difficulty in demonstrating that industrial policy made a difference. This is partly because much of the theoretical case rests on externalities of various types which are difficult to pin down empirically, particularly when they are of the technological type and operate at the sector or economy-wide levels. In addition, any counterfactual test of what would have happened without policy intervention is little more than speculative.[13] Given this empirical ambiguity advocates of industrial policy largely base their case on the association between government support of various types, which raised the profitability of manufacturing, and subsequent export success from the promoted activities. As Stiglitz (2001: 19) puts it

> The fact that almost *all* economies of the region had industrial policies (with the exception of Hong Kong, China which benefited from the industrial policies of its neighbour, Mainland China) *suggests* that such polices were an important part of their growth strategies, whether or not the highly imperfect econometric techniques for quantifying such impacts succeeded in verifying such claims (emphasis in the original).

Elsewhere in the developing world evidence on the success of industrial policy is far more difficult to find. In India, for example, the import substitution programme of the

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10 In an otherwise excellent book on Chinese economic development Bramall (2009) argues that by entering WTO China has abandoned the tools of industrial policy that created the successful industrialization of Korea and Taiwan. This fails to recognise that trade liberalization on its own terms and at its own pace has been an integral part of industrial strategy in China. WTO entry ensured China's most favoured nation status which was critical for its manufactured exports. Exchange rate protection, through deliberate undervaluation, has been retained as a key policy measure.

11 Weiss (2005) surveys the evidence in more detail.

12 Chang (2009) stresses this and points as evidence to the fact that in the early 1960s Korea sent civil servants to attend training programmes in the Philippines and Pakistan two countries not known for the success of their measures to support industry.

13 Detailed work reported in Pack (2001) and Noland and Pack (2003) based on input-output relations and assumptions about productivity growth and knowledge transfers suggests positive, but modest impacts on GDP growth from industrial policy in Korea and Taiwan, respectively.

1960s and 1970s has been associated with high cost, uncompetitive production, and the system of licensing controls (the Licence Raj) that began to be dismantled gradually in the 1980s is seen a major obstacle to private sector initiative. The most that can be claimed for industrial policy over a period of thirty years is that through its learning effects it may have laid the ground for the growth acceleration after the liberalization of the early 1990s (Rodrik and Subramaniam 2005). In Sub-Saharan Africa most industrial policy in the early post-colonial period was a version of import substitution, largely leading to high-cost, low-quality production for small domestic markets. The shift towards manufactured exports in the 1990s after the reforms of the structural adjustment era has been modest and African economies suffer from serious deficiencies in infrastructure, service provision, and access to credit which make it difficult for them to overcome entry barriers into export markets (UNCTAD 2008).

The region where the contrast with East Asia is made most frequently is Latin America. In 1960 the latter was by far the more industrialized region, with a tradition of government intervention and a technically skilled bureaucracy. However, in terms of manufacturing it has been long left behind by East Asia and it is difficult to find case studies of the successful impact of industrial policy in the region (Weiss and Jalilian 2004).[14] Arguably none of the explanations of the much poorer performance of industrial policy in Latin America as compared with East Asia are wholly convincing on their own; they include lack of performance requirements ('too much carrot and too few sticks'), greater corruption and bureaucratic capture, a premature shift to 'secondary import substitution', and a lack of incentive to focus on manufactured exports due to either larger domestic markets or greater availability of natural resources than in East Asia.

In short, the recent track record of industrial policy in the developing (as opposed to the developed) world suggests that it was too often associated with import substitution policies that failed to deliver internationally competitive production and that whilst in principle it can work effectively (and has done so in a few countries) it is difficult to implement. Further the shifting use of industrial policy in the successful cases (from what is termed here promotional to market-based measures) indicates the need for flexibility and for tailoring interventions to the state of the economy and the broader international environment. International experience, drawing particularly from East Asia, suggests that the precise mix of instruments used in the application of industrial policy is less important than the pursuit of several broad principles to ensure that these lead to genuine industrial development as opposed to increasing the profits of the recipients (Weiss 2005). These conclusions can be summarized as follows:

- A regular dialogue with the private sector, through industry associations or chambers of commerce to identify problems is important provided governments can avoid capture by producer interests.
- Clear performance criteria should be established so the success or otherwise of an intervention can be judged and there should be transparency regarding who receives government support.

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14 The fact that the examples cited for the success of industrial policy in the region are typically Embraer aircraft in Brazil and the salmon industry in Chile, supported by Fundacion, Chile, shows the limited range of options. One might add the automobile sector in Mexico, supported by a special programme to raise local content and generate exports (Ros 1994).

- Support should be time-limited not open-ended, so recipients have an incentive to improve efficiency by the end of the period specified.
- As far as possible support should be for broad activities (such as R&D or labour training) or sectors (like electronics) rather than to individual firms to avoid distorting competition and establishing monopolies.[15]
- Exporting should be encouraged as a means of introducing competition and opening a sector to foreign technology.

5 Challenges for the future

There are many possible future challenges ahead that a version of industrial policy can help to address and five are identified here.

5.1 Financial sector reform

In many countries a key aspect of industrial policy will be to create or sustain an adequate system of financial intermediation that ensures that the long-term funds needed for industrial investment are forthcoming. In many countries it is still difficult to access long-term credits, and where these are available a high-risk premium is built into lending rates of interest. Poor corporate governance and lack of transparency in business operations are said to have made it difficult for banks to assess credit risk and forced them to rely on collateral-based lending with high-risk premiums, particularly for small and medium enterprises. Alternative models of financial intermediation include lending through a commercial banking sector with a sufficiently long-term horizon, the use of equity through venture capital schemes, and a state-owned industrial development bank. In many lower and middle-income countries the commercial banking sector is not sufficiently developed to play this intermediation role adequately, which opens up a key role for public intervention.

Where there is a reasonably well-developed stock exchange state-funded venture capital schemes provide a mechanism to support innovation with a ready exit strategy through the sale of the government equity stake once a company is on a sound footing. Alternatively public funds can be channelled through a state industrial development bank. State-owned development banks have gone out of fashion in recent years with many advising that a preferable option is the development of a commercial banking sector that can provide long-run finance on a more efficient basis. The case against development banks is that by attempting to combine commercial, economic, and social objectives they can fund unviable projects which squander national resources. To avoid such risks clear criteria need to be established before projects are accepted. These must focus on the demonstrated potential net benefits to the economy from the projects concerned, as well as their financial viability. Techniques for assessing both economic and financial returns of projects are readily available and have been applied by

[15] There is some dispute as to whether sector targeting is sensible, with some preferring to stress support to activities that generate externalities and may span several sectors; see Hausmann and Rodrik (2005: 79).

international development agencies for many years.[16] To avoid the risk of multiple objectives confusing decision-taking it is preferable not to incorporate employment generation or distributional change as separate criteria for project acceptance, leaving policy instruments other than development bank funding (such as labour training or social sector expenditure) to address these important considerations directly.

5.2 Breaking into global production networks

As is well-known, globalization has meant that in many branches of manufacturing—with low weight to value ratios and technical divisibility of production—there has been a growing trend to fragmentation of production. This has allowed low-wage economies to be integrated into global production networks either as supply contractors or 'own equipment manufacturers'. The parts of the developing world which have been least successful in integrating their producers into these networks—chiefly Sub-Saharan Africa and Latin America—are where manufacturing export growth has been slowest. In future decades the evolution of these networks is likely to be driven by two factors: the continued decline in 'trade costs' (the cost of doing business globally, including transport and communication costs) and the increasing global concentration of production amongst lead firms and their first-tier suppliers (Nolan, Zhang, and Liu 2008). These factors will be expected to work in contrary directions with the former making it easier and the latter more difficult for inexperienced developing country firms to break into these networks. However, the expectation must be that niches still exist for newcomer firms and that state support will be helpful in accessing these. Potential industrial policy measures range from export-marketing facilities, trade credit (and possibly time-limited export subsidies which are allowable for least developed countries) for small local firms to investment incentive packages, and supportive infrastructure investment for foreign investors. In dealing with foreign investors there are now clear restrictions imposed by WTO rules and it is no longer possible to link incentives with export or local content targets, as was done in the past, although non-trade-related targets like employment or output growth) can be used. Other wider aspects of the 'investment climate' relating to governance and institutional issues will also need to be addressed.[17]

5.3 Facing competition from the reemerging giants

Most forecasts suggest that China, and to a lesser degree India, will have a major impact on the pattern of global growth.[18] For developing countries with a competitive manufacturing sector this poses a great opportunity to export to these large rapidly expanding markets. Neighbouring economies in East Asia have already seen a significant rise in their exports of equipment, parts and components (often as part of trade within regional production networks) with these economies running trade surpluses with China. In addition with the increasingly affluent consumer markets in the two giant economies there is an opportunity for the export of competitively priced

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16 Textbooks such as Curry and Weiss (2000) or Potts (2002) make clear the distinction between economic and financial effects.

17 Boardman (2007) gives a detailed assessment of investment climate issues holding back African manufacturing.

18 See the detailed analyses in the chapters in Winters and Yusuf (2007).

consumer goods, of a product quality and style unsuited to the markets of higher income economies.

On the other hand middle-income developing economies with well-established manufacturing sectors face a major competitive threat from China, in particular, both in their traditional export markets of North America and Europe and potentially in their home markets as well. China has been competing at both the low-technology unskilled labour-intensive and high-technology skill-intensive ends of the product spectrum, and its gains in export market share at the expense initially of other East Asian economies and more recently of Latin and Central American economies have been well documented.[19] Greater competition in domestic markets may come if there are further reductions tariffs for manufactures, as part of the WTO negotiating process. Average applied tariffs for non-agricultural goods are now relatively low (10 per cent to 15 per cent) in most middle- income economies, but there are peaks for sensitive items so average bound tariffs in India, Brazil and Mexico, for example, are 30 per cent to 35 per cent.[20] Reductions in these will create competitive pressure on domestic firms.

To meet this competitive pressure middle-income developing economies need to upgrade their technological capability. This is likely to require state support, for example in the form of training initiatives, publicly funded research centres, incentives for private sector R&D, and venture capital funding to support risk-taking. The case for boosting the higher technology segment of manufactured exports is strengthened if the long-term trend—whereby these types of manufactures have been the fastest growing element of world trade—is continued.[21]

Similarly at lower levels of technological sophistication low-wage economies in Africa may also see their domestic markets threatened by cheaper goods from China. In many products higher productivity allows Chinese goods to be produced at lower unit costs than in most African economies despite significantly higher wages in China. There is a fear in many countries that the route to industrialization through the production and subsequent export of labour-intensive manufactures like textiles, clothing, footwear, and toys may be blocked by Chinese competition. How far this threat will be ameliorated in the medium-term by appreciation of the Chinese currency is unclear and there is a significant agenda for African governments wishing to address lack of local competitiveness through a supportive industrial policy.

5.4 Addressing climate change

One certainty is that future industrialization will be strongly influenced by governments' reaction to climate change. The key issue here is the energy, and therefore carbon emission, content of different manufacturing outputs and the future cost that is imposed on producers of such emissions. Estimates of the damage caused per ton of

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19 See for example Lall and Albaladejo (2004), and Jenkins, Dussel Peters, and Mesquita Morreira (2008).

20 Data are from the WTO website.

21 UNIDO (2009) reports that in the short period 2000–05 it is resource-based manufactures that have grown most rapidly, although over longer period 1990–2005 the higher technology goods have had the most rapid growth.

carbon emission provide a value for the 'social cost of carbon' which in theory should form the basis of an optimal carbon tax to be levied by national governments.[22] Whether future carbon charges are through taxation or through the price emerging from a market in permits to use carbon the expectation must be that in the longer term there will be a major impact on both sources of energy and the location of energy-using industries. If similar carbon charges are not adopted in all countries there will be a further migration of energy-intensive heavy industries, like steel, chemicals, non-ferrous metals, petrochemicals, cement, and pulp and paper, to the developing world, assuming similar carbon charges are not adopted there. To some extent this migration is already taking place, driven by differences in wage and raw material costs, but an additional cost of carbon would accelerate the process.

If there is a global ceiling on emissions, then global welfare will be unaffected by this migration, but the recipient country would benefit from the national value added created by the migrating industry. However, if the notion of a global ceiling is unrealistic then there will be a trade-off between the national gain and the negative global externality created by the contribution to global warming. Insofar as individual countries sign up to post-Kyoto emissions targets, it will be necessary for government policy to support the adoption of best-practice energy-efficient technologies. From a global perspective if breakthrough technology (such as carbon capture and storage) becomes commercially viable there is a strong case that it should be transferred to poorer countries as part of overseas development assistance at its marginal (not full) cost.

5.5 Avoiding jobless growth

Manufacturing industry can play a key role in growth, as discussed above, through creating high-productivity jobs. Historically in the developed economies, and more recently in the successful newly industrialized economies, this wage income has helped greatly in pulling large sections of the population out of poverty. Experience of poverty reduction in China in the 1990s with millions of workers migrating from the central and western parts of the country to take up manufacturing jobs in the coastal areas and special zones is dramatic evidence of this.

It is well-known that as the manufacturing sector grows in technological sophistication and in the level of labour productivity the employment elasticity with respect to output declines, sometimes steeply.[23] What has become a concern more recently has been the slow rate of job creation in manufacturing in economies with relatively low income levels. In most of Latin America, for example, manufacturing share in income and employment is now very similar to that in Europe and North America whilst the income per capita level is much lower creating what has been termed 'premature deindustrialization', with the risk that new entrants to the labour market end up in low-productivity activities in services or informal parts of manufacturing.

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22 Tol (2009) gives a comprehensive survey of estimates of the social cost of carbon. He points out that substantial reduction in carbon emissions requires a carbon tax of at least US$50/ton of carbon.

23 For example for the period 1980–2004 Felipe et al. (2007: table 2) calculate employment elasticities in manufacturing of 0.81 and 0.55 for the Philippines and Thailand, respectively and of 0.14 for both Korea and Taiwan.

In part such trends may reflect the direction of global technical change that may continue in the future, but low employment growth may also be due to factors that industrial policy needs to address. In some countries, particularly India, it has been argued that inflexible labour markets with significant employment protection rights dissuade employers from taking on new workers. There is some evidence supporting this from analysis across states in India with different labour laws, but it remains controversial, particularly since a skilled and permanent workforce (as opposed to one that is a low-cost and transitory) should offer a superior longer term route to international competitiveness.[24]

Slow overall employment growth in manufacturing may also be due to the coexistence of expanding and declining branches of the sector. This has emerged as a major issue in China, for example, with a dramatic fall in the number of workers employed in the state owned enterprise sector in the last ten years and only a modest increase in overall manufacturing employment.[25] The role of industrial policy here will be to accelerate the assimilation of retrenched workers through retraining and to support temporarily the restructuring of failing activities, which are judged to have a long-term future. As the impact of globalization and freer trade spreads across the developing world we can expect acceleration in the reallocation of resources within and between sectors and the case for state guidance of this process will be strengthened.

6 Conclusions

The case argued here is that industrialization remains an important objective for most developing countries and that there are numerous theoretical reasons why well-designed industrial policy interventions, whilst no panacea, can help. Paradoxically, one can argue that where such interventions are most needed (in the lowest income countries with thin markets and a small private sector) the capacity to introduce them is weakest. There are plenty of practical problems that can be identified and what will be feasible will be context-specific. Broadly speaking the challenges for governments to address in middle-income economies relate to competitiveness and the development of technological capability. For poorer countries, well within the international technology frontier, support will have to focus on export upgrading using imported technology, location within global production networks, and the removal of key bottlenecks to successful investment.

How governments can help with specific policy interventions will need to be identified as part of a regular dialogue with the private sector through industry or trade associations, so critical aspects of the business environment can be highlighted.

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[24] This has been debated intensely in the Indian context. Overall since the early 1970s formal sector employment in manufacturing in India has been growing at little more than 1 per cent annually (with no acceleration in the post-1991 period), although growth in informal sector employment appears to have been considerably higher (Gupta, Hasan, and Kumar 2008).

[25] Official figures suggest only a very modest rise of 3.4 million extra workers employed in manufacturing between 1991 and 2003 (when the data series stops; see www.adb.org). Corrections to this data to account for the omission of workers from what was the township and village enterprises sector and migrant workers suggest total manufacturing employment in 109 million in 2002 (as compared with the official figures of 83 million), but still suggest the same trend of a slow overall growth with employment peaking at 130 million in 1996 and declining subsequently with the changes in ownership and restructuring (Bramall 2009: 426).

Constraints identified in this way, whether lack of long-term credit, shortage of power, lack of labour skills, or 'dumping' by foreign competitors or temporary import surges, can set the agenda for policy interventions.

This paper has argued that industrial policy should be viewed as widely as possible, encompassing the range of measures in Table 1 (and other possible ones not included there). In terms of past debates the inward- versus outward-looking debate is now largely resolved. There is scope for 'natural' import substitution, created by large domestic markets and trade costs, but new policy-induced programmes make little sense aside from the larger countries and even there on only a temporary and selective basis. Current bound tariff rates in many countries allow this sort of temporary protection, and whilst it may provide a short-term boost to profitability, it has to be combined with initiatives to support productivity growth and exports.

In terms of the promotional versus market-based distinction used in Table 1 at lower income levels when markets are thin and options are limited, promoting a number of key activities may make sense. This is likely to require dealing with major foreign investors with a negotiated package of special incentives. As economies grow and the manufacturing sector becomes more complex the case for such selectivity weakens because of the difficulty of setting priorities. If too many activities are treated as priorities the system becomes ineffectual.[26] This is where the availability of functional support available to all who wish to take it up becomes relevant. Support for risk-taking though public sector venture capital funds is an important aspect of this strategy that has a sound basis in economic theory.

In summary, there is much that can and needs to be done without a reversion to failed, relatively closed economy, interpretations of industrial intervention.

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[26] As evidence of the difficulty of setting priorities in an era of rapid technical change nearly 200 products were listed as 'strategic' in Taiwan in the late 1980s as part of its targeting high technology activities, although less than half of these had asked for special assistance (Smith 2000: appendix D).

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Table 1: Industrial policy taxonomy

Market-based measures	Coverage	Rationale
R&D tax credits	Functional	Technology spillovers and risk-taking externalities
State industrial research and education	Functional	Creation of national technological capability
Labour training subsidy	Functional	Labour training externality
State venture capital funds	Selective	Risk-taking externality
State export promotion agency	Functional	Lack of information and provision of a public good
Infrastructure provision for Special Economic Zones	Functional	Encouragement of clustering and agglomeration effects
Profits tax holidays	Functional	Encouragement of manufacturing investment
Undervaluation of exchange rate	Functional	Encouragement of internationally traded activities, including manufacturing
Promotional measures		
Temporary financial assistance	Selective	Funding to allow restructuring of uncompetitive activities
Temporary import tariff protection	Selective	Protection of uncompetitive activities requiring restructuring
State procurement policy	Selective	Priority in access to public sector contracts
Export subsidy	Selective	Differential rates of subsidy based on productivity potential
Import tariffs	Selective	Differential rates of protection based on productivity potential
Directed credit	Selective	Priority allocation of credit based on productivity potential
Profits tax holidays (selective)	Selective	Favourable tax treatment for foreign investors
Incentive packages of tax, loans and infrastructure	Selective	Favourable treatment for foreign investors

Source: Weiss (2011: Box 7.1).