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**INDUSTRIALIZATION, GROWTH AND DEVELOPMENT
IN PAPUA NEW GUINEA**

by

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FOREWORD

The I.N.A. presents this Discussion Paper by Professor Helen Hughes as a contribution to the ongoing debate on industrialisation in Papua New Guinea. That debate has been largely initiated in this country by the Minister for Industrialisation with his recent White Paper on Industrialisation. It has been placed into a broader perspective by the current discussions on the proposed medium term planning framework. Internationally the argument has been raging for decades but has recently crystallised into an attempt to adjudicate between the advocates of import replacement and those supporting export growth as a basis for a development strategy.

The I.N.A., as an institution, is not partisan in the debate, although as practical business practitioners most of its contributors have firm views on the issue - largely based on practical experience of pursuing commercial activities in Papua New Guinea. As in the past, the Institute makes its formal contribution to the debate by way of a Discussion Paper written by an international expert who has brought her long international experience to bear on the problems of this country.

Professor Hughes is well suited to the task. Her early work in Australia was on the economics of the steel industry. After a long period as Director of the Economic Analysis and Projections Department of the World Bank she returned to Australia in 1983 to take over as Professor and Director of the Development Studies Centre at The Australian National University. Within weeks of taking up that appointment, she accepted an invitation to write this paper for the I.N.A. She arrived to begin her research the week the Hon. K. Stack, Minister for Industrial Development began his process of public consultation as a prelude to his White Paper. The I.N.A. research was delayed due to her subsequent appointment as Deputy Chairman of the Committee to Review the Australian Overseas Aid Program. She visited Papua New Guinea again as a member of that committee and was influential in composing its recommendations on the Australia/Papua New Guinea aid relationship. While at The Australian National University she intends to continue her interest in development issues in the Pacific and indeed in August acted as coordinator of a conference in Vanuatu on the theme of "Women in Development in the Pacific". Women from many Pacific nations, including Papua New Guinea attended.

Professor Hughes' paper is frankly polemical, drawing on experiences in a number of developing countries. Overall she sees structural issues as being the main inhibitor of industrialisation - small fragmented markets, shortage of skills and capital, inadequate communications. She argues that the most important contributions governments can make to overcoming those disadvantages are to provide a general climate favourable to business, including a stable macro economic environment, and to pursue sectoral policies designed either to remove or neutralise the structural deficiencies discouraging investment. While accepting that specific incentives will have a part to play in an industrialisation strategy, she argues that they cannot compensate for most of the basic barriers to development - small markets, inadequate skills, high costs, insecure and unstable social and economic climate.

She argues that all incentives need to involve a careful weighing of the costs and benefits, with such policies being assessed against all other government programs. She also says that, as with narrowly budget-oriented programs, industrial incentives including import tariffs and restrictions, should be set within the context of public accountability and adequate publicity as to the costs, benefits, gainers and losers.

On balance she argues that small developing economies should eschew import replacement in favour of export growth. She also suggests a strategy of building development on the available resource base rather than on wholesale use of imported inputs.

For Papua New Guinea she sees problems and advantages. This country has a reputation for sound economic management and a successful export sector which indicates long term possibilities for debt repayment and profit repatriation - essential if foreign investment is to be encouraged. This country's resource base - especially in minerals, timber and fish - its generally fertile land and proximity to both the dynamic East and South-east Asian economies, as well as the smaller Australian and New Zealand economies with which it has special trading relationships, give it a potential other developing countries lack. The generally favourable attitude to foreign investment and necessary expatriate expertise also helps.

Disadvantages, however, also abound. In addition to the obvious market fragmentation and small size, lack of skills and capital, Professor Hughes sees three major barriers to industrial development in Papua New Guinea.

- . A high cost structure caused by inappropriate labour market traditions and institutions inherited from Australia and to a lesser extent other regulations and traditions built up before independence - e.g. town planning and building regulations.
- . Indigenous traditions, such as those relating to land holding and compensation generally, which slow up the pace of investment planning and create an uncertain climate.
- . An economic environment favouring "rent seekers" rather than entrepreneurs - that is an environment in which the structure of incentives encourages owner's of assets to seek special privileges rather than inducing their use in productive endeavours.

She argues that action to ameliorate these factors, in addition to maintaining a sound macro economic climate and improving infrastructure, is likely to have a greater impact on development than a proliferation of specific incentives.

She assesses various strategies and incentives and gives a range of helpful advice. To give two examples -

- She argues for encouragement to industries processing agricultural raw materials for export - timber, tropical fruits, cut flowers are examples she cites.
- She argues for action to encourage multi shift operations where relevant and other schemes which emphasise employment of labour at the expense of machines.

Not all will agree with all of her conclusions, but her argument is so precise that her opponents will have to similarly clarify their thinking if they wish to dispute her recommendations.

She ends on a note which many in the public and private sectors in this country can probably agree on:-

"The multiplicity of international and national organizations that seek to help developing countries has increased bureaucratic demands on developing countries, often with little positive result. Such organizations need to coordinate their activities with each other much better than they now do to avoid wasting the developing countries' scarce resource of skilled manpower. The developing countries also need to protect themselves against the many demands of such organizations by making their own judgements about their actual positive contributions to industrialization and growth."

Coming from one versed in the ways of international agencies this is advice to be noted. The I.N.A. hopes that this paper is seen for what it is: not a prescription from an itinerant expert, but a thoughtful input to that process of "making their own judgements" which she urges Papua New Guineans to engage in.

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- (2) Land, labour, management, construction, capital equipment, public utilities and raw materials, must be available at internationally competitive prices if manufacturing is to thrive and not be a burden on the rest of the economy.
- (3) Macro-economic policies must ensure reasonable stability of the domestic price level and maintain competitive exchange rates, interest rates, wages and other key prices.
- (4) All incentives to manufacturing have an implicit or explicit cost to the economy: they should be carefully evaluated and such evaluations should be made public to ensure that the costs to the country are exceeded by the benefits.
- (5) Social stability and the rule of national and international law is a necessary condition for industrial growth.

If these conditions prevail, then manufacturing will develop as economic opportunities arise without burdening the rest of the economy with high costs. If they do not exist, large incentives in the form of tariffs, import restrictions and tax holidays will be needed to achieve even limited industrial growth and these incentives will retard the growth of the economy as a whole.

Markets

The principal problems of industrialization in Papua New Guinea arise from the smallness and fragmentation of the domestic market and the high costs of manufacturing for export. The principal impetus to development must therefore continue to come from agriculture, fisheries, timber, mining and other resources to build up an economic base for manufacturing. Manufacturing can only play a limited role until the domestic market grows, skills are developed in the workforce, remuneration is brought into line with productivity, and raw materials

SUMMARY AND CONCLUSIONS

As a late comer to industrialization, Papua New Guinea has the very considerable advantage of being able to draw on the experience of many other countries - developing and developed - for its industrialization strategy. Also, it already has some experience of its own to help it to shape industrialization policies leading to the creation of a strong, competitive manufacturing sector that will contribute to overall growth and development.

The principal conclusions of this study are clear. Some developing countries, notably several in East and Southeast Asia, have been able to develop manufacturing industries that have made a major contribution to employment, exports and overall growth. In other countries, including the Philippines, India, Sri Lanka and Pakistan, as well as most countries in Latin America and Africa, import substituting manufacturing, even when allied with incentives for exports of manufactures, has retarded national growth. Moreover, once countries have followed an uneconomic import substituting path, they have found it very costly in social and economic terms to remedy the situation. The political upheavals common in Latin America are closely linked to the import substituting strategies those countries have followed. The international competitiveness of every new manufacturing plant introduced into a relatively young economy such as Papua New Guinea should therefore be evaluated in terms of the long term effects it will have on the national growth potential.

The second conclusion that emerges clearly from the experience of other countries is that incentives to manufacturing and the promotion of manufacturing industries cannot offset basic deficiencies in a country's economic structure and its policies. The following conditions are necessary for the establishment of manufacturing industry:

- (1) The market for manufactures must be large enough to make production economic: where a domestic market does not fulfill this condition, this means that part or all of manufacturing output has to be exported.

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become available on an adequate scale for export processing. With some 85 per cent of the population totally or partially dependent on subsistence agriculture, the disposable cash income that can be spent on manufactured goods is very small. If the price of such manufactured goods as canned meat, flour, sugar, clothing, footwear, nails, roofing iron and pots and pans are raised by the need to provide incentives to local producers, the market will shrink below its present potential. Most of the investment goods required by the Papua New Guinea economy are capital and scale intensive, and could therefore only be produced in Papua New Guinea at much higher cost than they can be imported. To produce them locally would burden the industries that would use them. Raising rural cash incomes thus remains essential to the expansion of the domestic market for manufacturing. But given current high population growth rates, progress in rural areas cannot be taken for granted. It will require a major public infrastructure and policy effort in the subsistence and smallholder sectors if real standards of living are not to decline in the next 10 years or so. Producing manufactured goods at prices higher than those at which they can be imported would lower real rural incomes and thus worsen the distribution of income within Papua New Guinea.

Improvement of village agriculture is also closely linked to manufacturing for export processing. Opportunities in tropical fruit and vegetable processing cannot be taken up in Papua New Guinea while producers cannot even supply local markets adequately. Raw materials of adequate quality are not available in sufficient quantities to make manufacturing for export possible. Fisheries, likewise, have to be expanded before an adequate supply exists for the domestic market let alone for fish processing for export production. Changes in the forestry sector are needed, including adequate supplies of competitively priced timber, if entrepreneurs are to be able to take up timber processing opportunities.

Reducing market fragmentation is essential to industrialization. Current trends unfortunately point in the opposite direction. Provincial Governments are using public moneys to promote local manufacturing endeavours, often at the cost of the national interest. Infrastructural investment in the creation of a national low cost transportation framework is lagging badly behind requirements. Investment in this area would at this point not only make a major economic contribution but immediately increase employment opportunities without exacerbating urban problems.

Economic Stability

The importance of economic stability to the growth of manufacturing places a high value on the sound monetary and conservative fiscal policies that have enabled relatively low inflation and steady exchange rates to be maintained since independence in Papua New Guinea. However, because of the importance of minerals in Papua New Guinea's total exports, particularly as Ok Tedi comes into production, of Australian and other aid inflows, and of growing protectionism, an upward pressure on the value of the Kina has prevailed since independence. A high Kina value makes it difficult for local producers to compete with imports, and makes exports uncompetitive. Monetary and fiscal policies will continue to demand attention if Papua New Guinea is to avoid the disastrous economic fluctuations that have plagued so many developing countries, and if the Kina's high value is not to hamper economic activities other than mining.

Social Stability and Employment in Manufacturing

Social stability and the rule of law are just as essential to manufacturing investment and production as economic stability. Lawlessness has high costs which discourage investment, particularly for export. If not contained now it could worsen as increased population pressure in both rural and urban areas increases the gap between the growth of the workforce and cash income earning opportunities and if income distribution continues to worsen. Import substituting manufacturing cannot provide a significant number of additional jobs for the Papua New Guinea economy. Each additional job in manufacturing currently requires an investment of some K30,000. This means that an addition of 10,000 jobs a year (or a quarter of the new places likely to be needed annually in the workforce for the rest of the 1980s) would require an annual investment of some K300 million in manufacturing. In recent years average annual investment in manufacturing has not even reached K30 million.

Policies for Industrialization

A number of economy wide policies impinge directly on manufacturing. Their impact is far more important than incentives that are manufacturing specific, and manufacturing specific incentives cannot offset their negative effects.

Land Availability

The difficulties of obtaining land for lease or purchase present a serious obstacle for manufacturers establishing or expanding plants. The lack of land for housing, in addition, makes it necessary for employers to house key workers, increasing manufacturing costs. Several suggestions, ranging from policies that would free up land for lease to the provision of industrial estates for manufacturing, have been made. The leasing approach would be greatly preferable because it would be much more economical. The development of industrial estates usually requires large injections of public investment for which there are much higher priorities for Papua New Guinea from the point of view of manufacturing alone, let alone for overall economic development. The experience of other developing countries indicates that industrial estates take a long time to establish and have long cost recovery periods.

The effectiveness of land leasing arrangements would depend on national regulations and administrative action at the provincial and local government level. Effectiveness would require a fundamental change in attitude and practice at all levels of government. However, as long as land remains a major bottleneck to going into business, investment in manufacturing will necessarily proceed slowly and haltingly, and costs will be unnecessarily high.

Labour

The high cost of labour is a major impediment to the growth of manufacturing in Papua New Guinea. It has the following components which all require policy attention and action:

- (1) Basic wage rates are out of line with current levels of productivity and with the number of people seeking work. People are willing to work for lower rates than those prescribed in awards to contribute to family incomes, but are prevented from doing so by the law. This is a particularly serious problem for young and inexperienced workers.

- (2) Penalty rates for overtime, week-end work, and so on are out of line with Papua New Guinea's level of development and with labour demand and supply conditions. This not only affects manufacturing but raises the cost of other goods and services, and by stifling employment opportunities markedly reduces the income available for the purchase of manufactured goods.
- (3) 'Fringe' benefits, such as the various types of leave available, are out of line with Papua New Guinea's level of productivity and per capita income. Long service leave (unique to Australia, New Zealand, white South Africa and Papua New Guinea) and longer annual holidays than those of most industrial countries are typical of the high costs of such benefits.
- (4) Piece work and bonuses which would stimulate productivity to bring it into line with wage rates, thus maintaining earnings, are discouraged if not made impossible by current regulations. In many repetitive process industries piece rates would help to train workers, enable the best among them to earn more than they now earn, and at the same time make manufacturing competitive, enabling firms to expand. This would encourage new investors.

High labour costs make it difficult for Papua New Guinea manufacturing industry to compete with imports or to begin manufacturing for exports. Firms must introduce as much labour-saving machinery as possible to be competitive. This cuts employment creation and thus further erodes the small domestic market. In contradiction to the scarcity of capital in the economy, Papua New Guinea's manufacturing is highly capital intensive and the capital in place is idle more than two-thirds of the time.

The institutional framework for wage setting - a colonial heritage - is clearly unsuitable to Papua New Guinea's needs. Those seeking jobs and consumers are not represented when wages are set. A major institutional change in wage setting is thus a prerequisite to take-off in manufacturing. Interim measures to reduce

wages for young workers regardless of sex or marital status, to reduce penalty rates and fringe benefits, and to encourage piece work and bonus schemes, are urgently needed to prevent further replacement of workers by machines.

Skills and Education

Low productivity is the result of inadequate and inappropriate educational standards, poor motivation (which is linked to the latter) and inadequacies of management which in some firms exacerbate the problems any country with an inexperienced industrial workforce faces. Educational standards in community schools are not adequate for industrial work. A vocational school system at the high school level that could provide appropriate educational background is lacking. Existing high school education fails to prepare students for factory or other work. The manufacturing sector is too small for an apprenticeship system which in any case represents another inappropriate colonial inheritance. The skills required by factory workers are not being acquired, with resulting low productivity, particularly in maintenance and blue collar level supervisory positions. As a short term measure accelerated full time technical training, planned in detail in collaboration with existing businesses to ensure appropriate content, could be instituted as an alternative to building further high schools, and in part as an alternative to academic high school streams within existing high schools.

At tertiary levels education and training problems are even greater. The Papua New Guinea tertiary institutions do not provide professional training that is comparable to that of universities in Asia, Australia or New Zealand, notably in fields such as economics, accounting and engineering. They fail to provide students with the education appropriate for modern industrial society, and graduate them with false illusions about the capabilities that they have acquired. Despite a pressing need, there is no effective education for business (or public) administration. The educational situation is seriously hampering the effectiveness of the localization program. The Papua New Guinea tertiary education system requires a drastic overhaul if it is to serve the purposes for which the funds to it are committed.

Public Utility and Service Costs

Manufacturing is handicapped by the inefficient and high cost of service industries. Electric power is variable, interruptions are frequent, and the cost per kilowatt hour appears to be much higher than it is internationally. Transportation services are liable to interruption and freights are high. The causes of poor service and high cost are the same as in manufacturing: low productivity, because of inadequate technical skills and management, is combined with unrealistically high wage rates and fringe benefits. Where the services concerned are public or private monopolies, inefficiency reigns unchecked. Overmanning is a problem. 'Economic charges' are taken to mean passing on the costs of highly inefficient operations to the manufacturer (and other consumers). While a more realistic approach to the wage structure, penalty rates and fringe benefits could lower costs substantially in some of the service industries, it would not be likely to do so in the monopolistic ones. Other measures, introducing competitive pricing, will be needed.

Incentives for Manufacturing

The costliest mistakes in industrialization have been made by countries that have failed to recognize that their basic economic policies were inimical to the growth of manufacturing industries, so that instead of correcting basic policy problems, they sought to overcome them by giving incentives to manufacturing industries. In many cases the incentives were large enough to give a stimulus to investment in manufacturing for a period, but at very high long term costs to the whole economy. In some countries they did not even achieve a temporary boost. Given Papua New Guinea's growth difficulties during the past decade and a likely rapid population growth during the next, an import substitution approach could lead to the same unfortunate outcomes that have been experienced in such Latin American countries as Argentina and that are now becoming a source of serious difficulties in Africa.

Protection: Tariffs, Import Restrictions and Subsidies

Protection is the most sought after incentive by manufacturers. Tariffs and import restrictions provide protection from competition abroad, and in a small market that generally means against all competition. Two or three producers can easily come to a modus vivendi. Profits are guaranteed no matter how inefficient

production may be. The existence of protection, initially perhaps at modest levels, leads to 'rent seeking'¹ by existing and potential entrepreneurs who soon recognize that there is more to be gained from further protection than by the hard work of being competitive. The costs are borne by the consumers either directly, or by purchases of goods which include protected inputs and are accordingly highly priced. The costs of protection are also borne by those who fail to obtain employment or income because prices are too high for the market to grow domestically and because exports, not only in manufacturing, become uneconomic. The whole country therefore suffers.

The impact of the limited protection already granted in Papua New Guinea, for example, on sugar and stock feed, is already having a negative effect on overall growth. Downstream industries have been hurt. Some small firms have gone out of business partly offsetting the employment gains in the newly created industries. The poorest consumers are the most affected. Protection is thus highly regressive.

Modest protection on a limited range of goods in which Papua New Guinea could develop a high degree of competitiveness might be considered to have benefits that would exceed the costs. But such protection would not lead to substantial import saving because the bulk of raw materials and capital and some management would have to be imported. It would lead to the escalation of protection in the domestic market to the extent that the initially protected goods, were inputs into other goods. The high costs of protected goods, and the overall effects of protection would have to be offset by drawbacks for exports and further incentives to exporters in the form of subsidies. Even relatively developed countries with high education levels have found such systems difficult to administer. In India, for example, export incentives have failed to offset protection despite concentrated endeavours to do so. Export growth has been harmed very considerably.

1. "Rent seeking" implies behaviour designed to extract the maximum returns from existing or potential plant, not by efficient utilization of such assets, but by both exploiting existing monopoly power and inducing government to implement a policy regime which limits competition and increases barriers to entry of future competitors.

Subsidies provide a preferable form of protection to manufacturing to tariffs from a social point of view. Subsidies do not raise prices to consumers and so avoid the various distortions that tariffs create. If a product is worth protecting it should be assisted through the subsidies to avoid the undesirable effect on domestic market size and on exports, obviate the need for export subsidies, and avoid the regressive effects on income distribution.

Tax Holiday

Tax holidays are only effective if a manufacturing enterprise makes a profit during the early years of its investment. This is not generally the case for a firm investing in even moderately complex production unless, of course, it has excessive protection. Accelerated depreciation is somewhat more helpful, and could be made even more so by an additional allowance for shift work which can increase the use of labour vis-a-vis capital. That is, a firm working two shifts or more could depreciate its capital more rapidly than if it works one shift only. Such incentives, however, cannot be regarded as major encouragements to investment in manufacturing.

Incentives for Exports and Export Prospects

It is now understood that if manufacturing is protected in the domestic market, or if it is uncompetitive because of other problems such as unduly high wages or utility costs, offsetting incentives are required to encourage exports. A small economy such as Papua New Guinea can only subsidise exports by charging marginal prices in export markets in exceptional circumstances. Beer production with a large domestic market is at present a unique case. If domestic production is protected by tariffs, exporters will require offsetting drawbacks on imported inputs where these are subject to tariffs. If import restrictions are used (for example on sugar) these will have to be lifted to enable low cost and high quality inputs to be imported. The alternative is a distorted cost structure and possibly poor quality local manufactures.

To offset high costs resulting from unduly high wage rates and high utility costs and the general cost raising effects of protection, more wide ranging implicit or explicit subsidies for exports are often recommended. Tax holidays on profits earned in exports are commonly suggested. But these are also not of value unless

exporters are actually making a profit (in which case they do not need them). Additional subsidies, for example, grants in proportion to value added in export production, are sometimes recommended. Subsidies for exports are also a charge on public revenue, and they are paid to foreigners. Papua New Guinea is rich in natural resources that are readily marketable, and for processed exports it has privileged access to industrial country markets. It is advantageously located next to the most rapidly growing market in the world in East and Southeast Asia. Soundly based export industries will not need subsidies.

Long Run Outlook for Manufacturing

In the short term, because of its relatively low level of overall development, a rapid growth of manufacturing in Papua New Guinea would be very costly. The conditions for a soundly based manufacturing sector that would be competitive internationally and thus contribute to national income growth are not yet present either in domestic market size or in labour productivity.

Steady growth in areas where genuine import replacing or export opportunities exist is, however, possible. Provided that policy changes are carried out in critical areas to improve labour productivity and bring the wage structure into line with it, to improve infrastructure, particularly transport, to raise the levels of education and training, to improve access to land, and to move toward realistic exchange rates, the longer term outlook is very hopeful. While Papua New Guinea will not have a large enough domestic market to exploit the economics of specialization and scale even if the economy grows rapidly, it is situated in close proximity to very large markets in Southeast Asia which are growing more rapidly than those of any other region in the world. Papua New Guinea also enjoys privileged market access to the small markets of Australasia and to the very large markets of North America, Japan and Northern Europe. An export strategy based on raw material processing is therefore highly promising if the present obstacles to efficient manufacturing can be overcome.

CHAPTER 1
GROWTH AND DEVELOPMENT IN PAPUA NEW GUINEA

Economic Overview

A country's industrialization options depend on its physical features, its level of development and its growth and development experience and potential. Each country's industrialization path is therefore unique.

Papua New Guinea, with a population of some 3.2 million people is a relatively small country, but so are the majority of developing countries: of the 150 or so developing countries more than 90 have a population of less than 5 million inhabitants. The industrialization problems that Papua New Guinea faces have thus already been experienced or are now being faced by a large number of developing countries.

An analysis of the economic performance of small countries suggests that growth does not depend on the size of an economy whether the latter is measured by population or national income. The 1-5 million population grouping includes the two most rapidly growing countries in the world - Hong Kong and Singapore - and some of the slowest growing ones.¹ The differences observed in economic performance largely arise from differences in the economic policies that the various countries have adopted. Papua New Guinea's growth was about average for the 1-5 million group of countries during 1965-73 (6.7 per cent for 1960-70), but fell markedly below the 3.5 per cent average annual rate of growth for the group in 1970-82 with an average annual growth rate of about 2 per cent (Table 1.2).² Current official population growth estimates (about 2.3 per cent per annum)³ are about the same, suggesting no increase in per capita income in the 1970s.

Papua New Guinea is classified as a 'lower middle income country' in international development terminology. Its per capita G D P gave it a position almost half way up the per capita income spectrum which ranges from countries such as Bhutan

and Kampuchea at extreme poverty levels to those such as Switzerland with a per capita income of some US\$17,000 and the United Arab Emirates with a per capita income of \$24,000.⁴ But Papua New Guinea's GDP figures include the income

Table 1.1
G D P Growth Rates Classified by Population Size
Developing Countries 1965-73 - 1973- 82

Population	Total number of countries	Countries for which data available	Average annual G D P growth per cent	
			1965-73	1973-82
Less than 1 million	60	21	6.9	6.2
1-5 million	34	30	6.5	3.5
Total 5 million or less	94	51	6.6	4.7
More than 5 million	59	58	6.8	5.9

Source: B. Blazic Metzner and H. Hughes Growth Experience of Small Economies, in B. Jalan ed., Problems and Practices in Small Economies, London 1982, p.89.

Table 1.2
A Comparison of Papua New Guinea's G D P Growth Rates
with those of other Developing Countries.

	G D P Average Annual Growth Rates Per Cent	
	1960-70	1970-82
Papua New Guinea	6.7	2.0
Low Income Countries		
Excl. China & India	4.5	3.4
Total	4.5	4.5
Middle Income Countries		
Low Group	4.9	5.3
Total	6.0	5.4
ASEAN Countries		
Indonesia	3.9	7.7
Thailand	8.4	7.1
Philippines	5.1	6.0
Malaysia	6.5	7.7
Singapore	8.8	8.5

Source: The World Bank, World Development Report 1984, Washington, D.C.

earned by the approximately 13,000 highly paid expatriates working in the country, mineral earnings and the substantial aid inflows. Whilst they reflect the resources available to the economy, they do not give an accurate indication of per capita cash incomes of the majority of Papua New Guineans. Some 85 per cent of the population is still to a significant degree in the subsistence sector.⁵ Though they may be enjoying 'primitive affluence' particularly in nutrition terms and in the enjoyment of leisure they have a very low cash income. Papua New Guinea's early level of development is also borne out by physical indicators of living standards (Table 1.3). Papua New Guinea falls below the average for low income countries for most indicators. Income distribution among the national population is highly skewed toward urban dwellers who represent less than 15 per cent of the population.

Papua New Guinea's total GDP (US\$2.35 billion in 1982) is one of the smallest among countries with a population of more than 1 million. Singapore with a population of 2.5 million has a total GDP of US\$14.65 billion.⁶ Only about 12 countries with a population of more than 1 million have a lower total GDP than Papua New Guinea. For most of these, as for Papua New Guinea, the inclusion of subsistence goods in national income estimates means that actual disposable cash income on which industrialization prospects for the domestic market must be based is considerably lower than GDP figures imply.

Papua New Guinea is thus a very small economy in all senses. It is, moreover, highly fragmented physically. The mountainous nature of the mainland and the relatively high costs of inter-island compared to land communications have resulted in the growth of a relatively large number of urban centres that are isolated from each other because adequate transportation networks have not yet been developed. The lack of a road between Port Moresby and Lae is a particular problem. In the longer run this will provide a much better balanced economy and society than the geographical concentration of early developments in countries like the Philippines or Thailand. With appropriate locational policies the social costs of crowding and pollution can be avoided. Two of the world's highest income countries - Switzerland and Denmark - are, respectively, mountainous and island countries, with widely decentralized economic and social activities. In the short run, however, population dispersion and the high transport costs it involves prevent the locational advantages of 'agglomeration' from developing, and so delay industrialization possibilities.

Table 1.3
Social indicators of development (1980-82)

	Papua New Guinea	Low income countries excluding China and India	Total	Lower middle income countries	Middle income countries
Life expectancy at birth (1982)	53	51	59	56	60
Population per Physician	13,590	15,931	5,772	7,765	5,414
Nurse	1,590	9,716	4,841	2,462	1,886
Adult literacy (1980) per cent of adult population	32	40	52	59	65
School enrolments as percentage of relevant age groups					
Primary:					
Total	65	72	94	100	100
Male	73	84	100	100	100
Female	58	58	81	91	95

Source: World Bank, World Development Reports, Washington, DC. 1982, 1984

The establishment of 19 provincial governments has further fragmented the economy by dispersing and duplicating decision making. Provincial centres have been strengthened by government employment, but provincial political decision-makers inevitably take a provincial rather than a national oriented point of view of economic development. Several provinces are seeking to adopt provincial industrial strategies, vying with each other to establish new manufacturing enterprises that compete with each other because individual provincial markets are uneconomically small.

These difficulties do not mean that Papua New Guinea should forego industrial development. It is well endowed with natural resources for industry, both in its cheap power potential and raw material potential. The agricultural land to population ratio is favourable despite the steepness of much of the land and the thinness of tropical soils although this advantage is being eroded in some areas by rapid population growth. Forestry and fishery resources are very considerable. The known mineral endowment of copper and gold is high, and an even greater mineral potential that includes petroleum and natural gas, seems almost certain to exist.

Population pressure is making the development of industrial and service activities essential. The current population growth is officially estimated to be about 2.3 per cent but could be close to 3 per cent. If the experience of other developing countries is followed, this could rise substantially with social change and rising standards of living, putting pressure on land availability, at least in traditional usage, unless a family planning program is instituted. Even at current rates of population growth some 40,000 young people are estimated to be entering the economy annually, and already they can not be absorbed in the villages.

Problems for Manufacturing

The principal problems of the economy are short run and date back to the colonial period. Papua New Guinea was almost entirely undeveloped until the mid-1960s when Australian Governments belatedly began to pay attention to the education of Papua New Guinea nationals and to invest in the physical infrastructure needed

for development. But these efforts were 'too little and too late'. When Papua New Guinea became independent it lacked administrative, management, professional and skilled and experienced labour at all levels. In terms of industrial skills Papua New Guinea was one of the poorest countries in the world.⁷

Australian colonial rule also left other major obstacles to development mainly as a result of well meant policies which sought to give Papua New Guineans the amenities enjoyed by Australians. Thus Papua New Guinea development, particularly during the acceleration of the 1960s and early 1970s, followed Australian policies, administrative practices and standards without adaptation to levels of technology and income appropriate to local education and work experience of the mass of the population and the size of the domestic market. Infrastructural planning and investment, housing policies, and secondary and tertiary education policies all followed Australian suburban patterns rather than being tailored to Papua New Guinea needs. The organization of the army, the judiciary and police, the public service, industrial relations and all other modernization instruments were based on Australian precedents which were not only inappropriate for Papua New Guinea but had in several instances outrun their useful life in Australia. Against this background, and in contrast to the experience of many other countries at Papua New Guinea's level of development, Papua New Guinea's take-over of the management of the economy by national democratically elected governments must be regarded as one of the great successes of development. The first decade of independence has, moreover, laid a sound macro-economic basis for future development by maintaining social, political and economic stability. Establishing confidence in the kina has been a major achievement. The Papua New Guinea economy thus has a strong base for further development and accelerated growth.

Minerals

The development of the Bougainville and Ok Tedi gold and copper deposits provide a strong export base for the Papua New Guinea economy, and make substantial contributions to public revenues. Construction work on Ok Tedi did much to offset the effects of the worldwide 1981-82 recession by providing employment opportunities. However, as is well known, the exploitation of minerals on a scale

that is large in relation to the rest of the economy has costs as well as benefits. A high share of minerals in exports results in wide fluctuations in export earnings. While a resource tax that reflects international price fluctuations enables a country to maximize the economic rents that it can extract from mineral development for the public purse, it increases the amplitude of the effect of price fluctuations in the economy. When world mineral prices are high, the large rent elements accruing to the economy distort domestic prices. Resources are drawn to the mineral sector, wages are pushed up, and this exerts pressure on wages in the rest of the economy. The fluctuations in prices are reflected in the resources available to government, exaggerating cyclical ups and downs that follow from world cycles. Mineral rents also exert an upward pressure on the rate of exchange, making it difficult for local manufacturers (and others) to compete with imports at home and with other competitors in export markets.

The Role of Aid

Aid flows have provided Papua new Guinea with a predictable, albeit declining, component of total resources that is now about 30 per cent of budget expenditures and more than 50 per cent of the value of merchandise imports. It has been proposed by the Jackson Committee that aid flows from Australia should continue to decline at a moderate rate of about 3 per cent per annum,⁸ thus continuing to make a marked contribution to national income and the capacity to import. Other sources of aid that could offset this decline are available to Papua New Guinea in the short run. Aid flows, however, also introduce a rent element into the economy. In Papua New Guinea's case this rent component has been much higher than the rent from minerals. It has exerted similar pressures to those exerted by mineral rents. Resources were drawn to the rent producing sector, that is, to government activities. The complexity of government departments, created in the Australian image during the colonial period, was extended further as the aid rents flowed into the economy. But complex structures of government being established required relatively large numbers of expatriates and led to co-ordination difficulties that were causes of considerable delays in decision making. As capital and skilled and professional labour resources were attracted to the public sector, less were available for private enterprises activities. Wages, building on colonial precedents, continued to rise, raising the costs of government

further and exerting an even more serious upward pressure on wages throughout the economy than mining did. Finally, aid rents, like minerals rents, put an upward pressure on the value of the kina with the deleterious effects on import substitution and export competitiveness already noted.

Mineral and Aid Rents

The negative pressures exerted by mineral and aid rents do not, of course, negate the value of mining revenues and aid flows to the Papua New Guinea economy. The effects of these rents, however, have to be recognized and evaluated so that appropriate policy measures can be taken to offset their distorting impact on the economy. Without such offsetting policy measures economic development in general, and industrialization in particular, will falter, the way it has in other developing and developed countries. Peru, Chile, Zaire and Zambia are examples of mineral rich developing countries that have failed to take account of the distorting effects of minerals on their economies and have thus grown slowly. The United Kingdom and Australia are industrial countries in similar situations. Countries such as Tanzania and Sri Lanka have not been able to industrialize or grow rapidly despite massive aid receipts. Such outcomes are not inevitable. Malaysia has greatly benefited from its mineral rents, and aid was crucial to the rapid development of Korea and Taiwan. Papua New Guinea can thus choose development oriented policies that will stimulate industrialization and development.

Agricultural Development

The lack of information about output in the subsistence economy that accounts for the bulk of agricultural production makes it impossible to evaluate trends in this large sector. The fragmented evidence available, for example on rural nutrition, suggests that the absence of men from the villages and their work on cash crops has reduced the amount of labour available for such traditional male tasks as forest clearing and fence building, forcing a longer use of gardens between fallowing. It is not clear whether this has meant that village food production has not been able to keep up with population growth in some densely populated areas, or whether more conservationist agricultural production practices are offsetting the more intensive use of land than was customary in the past. Data on all of those variances are scarce. The output of smallholder coffee and cocoa has risen

steadily, expanding cash incomes in rural areas, but there has been an offsetting trend in plantations which lagged in the 1960s and particularly in the 1970s. Low and fluctuating tropical beverage prices at the turn of the 1980s slowed income growth, not only directly, but because, in contrast to many other countries lacking 'primitive affluence', Papua New Guinean producers reacted to lower prices by reducing rather than increasing output. There has been little expansion of other non-traditional crops. The difficulties of expanding the supply of vegetables for the Port Moresby market are well known.

Forestry and Fishing

The negative effects of the high mineral and aid rent flows have been strongly felt in the slow development of forestry and fishing industries. Though Papua New Guinea is rich in both these resources, timber and fish production have not always been able to satisfy domestic demand. Export growth, particularly of processed products, has been very limited. The primary problem in processing has been the lack of adequate raw material supplies.

Infrastructure

The lack of social and physical infrastructure, representing the absence of past capital investment, is one of the principal characteristics of underdevelopment. Papua New Guinea, typically of most developing countries, is thus chronically short of infrastructure facilities of all types. The coverage of schools and other educational institutions is inadequate in number and quality. Health care is still minimal. The physical infrastructure necessary for economic growth - telecommunications, roads, ports, power and urban facilities - are all inadequate. Papua New Guinea's terrain makes the cost of the physical infrastructure high outside the principal urban areas, and infrastructural investment outlays have been eroded by very high construction costs. The utilization of the infrastructure that exists is further limited by the shortness of the working week and the high costs of overtime, weekend and shift work, all most inappropriately copied from Australia during the colonial period. Vital infrastructural services are thus either lacking, or they are not being used most of the time. Despite its high value to the economy, equipment in such Papua New Guinean installations as ports is typically idle more than two-thirds of the time.

Economic Policy

Papua New Guinea has successfully maintained sound monetary and fiscal policies through the budget process.⁹ Until recently trade policy has been liberal, together with the macro-economic policies contributing to price stability and maintenance of the value of the kina. In a world of rapid inflation (particularly marked in Australia, that is in Papua New Guinea's principal trading partner), a shift from unduly low to very high real interest rates, the shocks caused by the two 1970s increases in petroleum prices, and the major recession of 1981-82, Papua New Guinea's macro-economic policies have been remarkably successful. But while good macro-economic policies are necessary to growth, and economies collapse without a strong macro-economic framework, they are not sufficient for growth. The past decade's macro-economic policy experience has thus laid the foundations of rapid industrialization and growth, but it can not alone achieve these objectives. A small, decentralized economy such as Papua New Guinea's must also focus on infrastructural development, build up cash incomes through agricultural development to create a domestic market, and develop skills and productivity before industrial growth can take place, or it will be a burden rather than an asset. This will require major changes of policy and administration, and new investment in priority infrastructure areas.

Income Distribution

Papua New Guinea has taken a number of steps since independence to increase the participation of its nationals in the private as well as the public sectors of the economy. The last decade has thus seen considerable income shifts from expatriates to nationals. In this respect income distribution has greatly improved. The effect on the national community as a whole has, however, been perverse. Because of the inappropriate wage structure established during the colonial period, the replacement of expatriates by nationals has contributed to the growth of relatively highly paid national upper middle and middle classes of urban employees and entrepreneurs, but it has limited employment expansion and therefore widened the gap between those in the subsistence and semi-subsistence economy and those in the modern sector. As the share of the population in the subsistence and semi-subsistence sector has not declined appreciably, it seems probable that national income distribution has worsened rather than improved.

The extent to which standards of living have improved for poorer people has depended on growing access to public goods such as schools, health centres and roads, and through privately organized services such as bus runs. Lagging investment and maintenance has resulted in slow infrastructural growth and even in some decline in services. Also not all changes toward 'modernization' have been favourable. Some changes in diets are giving rise to inappropriate nutritional practices as salt and sugar consumption rise with deteriorating rather than improving health. The consumption of cigarettes and alcohol is very high, with the latter leading to very serious social as well as health problems. Unless growth accelerates so that the growing pains of adapting to a cash economy are quickly overcome, the benefits of development could be swamped by the costs.¹⁰

Footnotes

- ¹ When Hong Kong began its growth push in the early 1950s, its population was less than 2 million. Note that its rapid population growth did not result from natural increase but from high immigration, that is, the migration of people of working age with low dependency ratios. For details of comparative growth rates see World Bank, World Development Report, 1984, Washington 1984, pp.218 and 276.
- ² Papua New Guinea's growth rate also compares unfavourably with its geographic developing country neighbours, but this is not surprising as these are the fastest growing countries in the world. It is of much more concern that its growth experience is only average in comparison with the countries of Sub Saharan Africa which have been the slowest growing of the world. See Report of the Committee to Review the Australian Overseas Aid Program (The Jackson Report), Australian Government Publishing Service, Canberra, March 1984.
- ³ Note, however, that demography specialists of the United States Department of Commerce, Bureau of the Census, have estimated Papua New Guinea population growth rates as follows:-

Average Annual Period Growth Rates	
Period	Average Annual Growth Rate Per Cent
1950-55	2.0
1955-60	2.3
1960-65	2.6
1965-70	2.8
1970-75	2.6
1975-80	2.7
1980-85	2.8

Source: U.S. Bureau of the Census, World Population 1983 - Recent Demographic Estimates for the Countries and regions of the World, Washington, DC., 1983.

- ⁴ World Development Report, op. cit.
- ⁵ Estimates of urban to rural and cash to subsistence ratios vary considerably (with differences in definitions and because data are poor) from about 20 to 80 per cent to 12 to 88 per cent and from 25 to 75 per cent to 15 to 85 per cent respectively. The figures used throughout this study are 15 per cent urban, and 85 per cent at least in part subsistence economy participants.
- ⁶ World Development Report, op. cit.

- 7 Louis Walinsky, an independent commentator on the Papua New Guinea economy, writing in the mid 1960s for the World Bank was highly critical of Australian colonial policies then current. World Bank.
- 8 'Jackson Report' op. cit., pp.7 and 158-164.
- 9 R. Garnaut and P. Baxter, Exchange Rate and Macro Economic Policy in Independent Papua New Guinea, Government of Papua New Guinea, February 1983.
- 10 The highly influential Faber Report (a Report on Development Strategies for Papua New Guinea prepared by a mission from the Overseas Development Group, University of East Anglia for the IBRD acting as an Executive Agency for the United Nations Development Programme, February 1983) concluded that 'Maximization of the growth of Papua New Guinea's domestic product has not, of itself, been set as a long term objective', not realizing that without growth there could be no improvement in living standards.

CHAPTER 2
INDUSTRIALIZATION AND DEVELOPMENT

Industrialization has been widely seen not only as a key to economic growth, but also as the means of achieving the social objectives of modernization and political independence. In broad terms, industrialization is associated with the introduction of modern technologies and skills throughout the economy to raise productivity that would enable developing countries to catch up with the living standards and political power of industrial countries. Industrialization has thus been a central objective of development of countries emerging from colonial dependence.¹

In some countries, industrialization strategies have been markedly successful, fulfilling the promise of rapid rises in productivity, output and overall economic growth, contributing significantly to employment creation, introducing new skills and technologies, and breaking balance of payments constraints. These countries, mostly located in East Asia, have been able to compress the 200 years and more of industrialization experienced by the Northern American, Western European and Australian countries into the span of a generation, emerging as semi-industrial, or 'newly industrializing', middle income countries in the 1970s. For the majority of industrializing countries, however, industrial growth has only come in spurts and these have often been followed by balance of payments crises, job creation has been disappointing, and income has become less equitably distributed than it was in the colonial period. As in overall growth, the differences in performance do not result from differences in location, levels of development or structural characteristics, but rather, reflect the policies adopted by the various countries. Industrialization strategies, and the policies used to implement them, are thus the key to the fulfilment of expectations engendered by the promises of industrialization.

The Definition of Industry and Industrialization Concepts

Industry is defined narrowly as consisting of manufacturing, or broadly to include construction, the provision of public utilities such as power, gas and water supply, plus manufacturing. The term is sometimes used broadly to mean 'development' but that is a misnomer, reducing the term's analytical utility as well as departing from common usage. Manufacturing encompasses all mineral and agricultural processing, the production of products used directly by consumers (consumer goods) and inputs into further production (producer goods). Producer goods can be further subdivided into 'intermediate' products (such as cement or steel) used to make other products and capital goods or machinery. All these definitions are general and overlapping. Primary processing, for example, may lead to 'intermediate' industries. In a given motor vehicle - a car may be a durable consumer good if used by a family for pleasure or a capital goods input into production if used by a factory. The divisions between manufacturing and distribution are arbitrary. A factory's sales force may be classified either as a 'secondary'; or 'tertiary' activity. The statistical classifications used to collect data and describe various industrial activities are necessarily somewhat arbitrary. International conventions have been adopted in the International Standard Industrial Classification (ISIC) for production data and the Standard International Trade Classification (SITC) for trade data to order the data and enable international comparisons to be made, but they too rely on convention as much as on logic.² The Customs nomenclature introduces a third commonly used classification system. It is used by all major countries except Canada and the United States.

The production chains leading from one form of processing of manufacturing to another, or linkages, are commonly used as descriptive terms. Thus, the production processes leading from the mining of iron ore, coal and limestone to the production of structural steel, wire and nails are often described as forward linkages, while those leading in the other direction (from nails to steel and iron ore) are called backward linkages. Such classifications, however, only have analytical significance if joining the successive processing steps rather than undertaking them separately results in a less costly process. For example, an integrated steel plant saves on the cost of fuel and transportation and creates economies of scale which enable by-products to be processed more efficiently than they could be in individual plants. That is, steel does not have to be cooled

and then reheated in an integrated steel plant the way it would have to be, involving additional fuel costs, if a rolling mill were to be established separately from blast furnaces and steel making plants. There is otherwise no intrinsic or special value in 'forward' or 'backward' linkages. Backward or forward movement along processing chains or 'industrial deepening' is thus often less efficient than movement into other industrial activities or industrial 'widening'. And it is the individual and collective efficiency of industrial processes not their relationship to each other that determines the success or otherwise of an industrialization strategy.³

Efficiency Issues in Industrialization

Any country can produce any manufactured goods it wishes, but the costs of production and hence the resources (labour, capital, land, technology, raw materials, etc.) that will be used and the prices that have to be charged will depend on the efficiency with which the products are made, that is, how appropriately and economically the resource inputs are combined and used. The actual costs will be determined by the design of the plant, how advantageously the equipment was purchased, how cost effectively the plant is constructed, how well production and sales are managed, and how much capital, labour and raw materials cost. The scale of production will be a critical factor because machinery has to be amortized over time, and this can only be done cost effectively if the scale of production is large enough to enable equipment to be used effectively.

Industrial efficiency has several aspects, and a number of measures are accordingly used. Firstly, engineering efficiency measures whether a plant is performing according to design specification, that is, whether it is producing the volumes it was designed to produce in a given time or its 'rated' output. Secondly, from the point of view of the private returns to an enterprise, efficiency can be measured by that firm's profitability. For the particular firm that is the 'bottom line'. Without adequate return on investment (usually shareholders') funds it can not operate. But if the prices of any of the inputs that go into production are distorted either by public intervention (for example by taxes or tariffs) or by monopolistic practices, profits will not indicate the social efficiency of the manufacturing process, that is, its cost to the economy. This is the third, and from the point of view of national economic growth and development, the most

important measure of efficiency. The cost of importing the same product or its 'border' price (net of import taxes) provides a measure of efficiency from a social point of view.⁴ This is true even if the imported product is 'dumped', that is, sold below the real cost of production in the exporting country unless that dumping is only temporary so that prices will be raised above the world market price when the market is captured by dumping (see Chapter 6 below for a further discussion of marginal pricing and dumping).

Efficiency is generally low in a new plant as production begins. The plant has to be 'run in'. Labour, technical staff and management are initially inexperienced. However 'learning by doing' takes place as a plant is 'run-in'. In the initial stages it usually perform better from week to week and month to month. Production levels promised by the equipment suppliers - engineering efficiency - will be reached for each shift, week and month worked. Private profitability will improve. Increasing economies of scale are likely to be reached as output grows in volume. That is, labour and machines will be able to become more specialized, and the various specialized tasks will be fitted together better. For each individual plant and firm the unit cost of production will fall over time, and profits will improve. Management will learn to improve the design and range of its products and how to buy more appropriate equipment and cheaper raw materials to fit the changing product mix. The start up period is generally slow as various bugs are ironed out, and even then, firms' experiences vary. The best firms continue to grow in efficiency and volume, some reach a 'steady state', and some decline. Such outcomes only partly result from chance factors in the firm's management, and in market characteristics. A country's economic policies have a critical bearing on the efficiency and growth of firms. Protection against external and internal competition will retard and even prevent a push for maximum efficiency within firms while exposure to internal and external competition will foster it.

Efficiency also has economy-wide dimensions. If there is only one firm in a given line of business, for example grain milling, timber processing, or engineering production, common service activities such as packaging, advertising, importing raw materials and exporting finished products will not be available. Each firm will have to undertake such activities itself, and it will not be able to do so as efficiently as firms that specialize in these areas. The external economies of

scale that develop as manufacturing 'widens' and deepens will take time to emerge. The importance of external economies of scale that are specific to an industry branch (for example timber processing) makes specialization a very important factor in the efficiency of the industrial development process. This is not an important issue for a large country where industry-branch-specific economies tend to emerge over time. But if small countries such as Papua New Guinea are to achieve efficient industrialization, economies within industry branches are important. This means that rather than fostering a pattern of industrialization that leads to the establishment of one or two plants in each industry branch (a printing plant, a flour mill, a soft drink factory) with the consequent lack of industry-branch-specific external economies, a small country has to adopt policies that will foster industry branches (such as clothing manufacture or timber processing) that will lead to external as well as internal economies.

The allocation of resources to the manufacturing, and more broadly, to the industrial sector, is another major factor in efficiency. If the prices for the final products of these sectors are distorted by being raised above world market prices, too many of the nation's resources of capital, labour, management and raw materials will flow to these sectors. Foreign capital will be attracted to a protected manufacturing sector, but it will become a burden on the economy because the protected firms will not be able to export to generate the income to service foreign capital. They will even undermine the capacity of other export sectors as is indicated below. Without the pressure of external competition, 'export-inefficiency' will develop in production and distribution. The industrial sector might flourish for a time, and firms might prosper, but with every new development the economy loses some efficiency. Industrial development then takes place at the expense of the consumers who have to pay more for each product than they would if such products were imported. This has economy-wide effects. Consumers can afford to buy fewer manufactured goods than if they were lower priced, and this soon puts an end to industrial widening. Industrial inputs into exports (as well as those that go to consumers and hence raise the cost of living) rise in cost and this reduces a country's capacity to export. The reverse situation can also be true. If manufacturing is taxed excessively either directly or by the high cost of public inputs, or if wage rates are too high in relation to productivity, too few resources will flow into manufacturing and a country will lose a potential source of growth (whether such bases against manufacturing can be offset by industrialization incentives, or whether they must be tackled directly is discussed below in Chapter 6).

Import Substitution and Export Orientation

It was widely believed in the 1950s and 1960s that the best way to stimulate industrial development was through import substitution. It was argued further that developing countries could not produce manufactures competitively with industrial countries because (a) they were inexperienced and (b) industrial countries would prevent them from competing by 'dumping' industrial goods in their markets, and that they therefore had to protect their 'infant' industries by tariffs and import restrictions.⁵ Almost every developing economy, including Korea and Taiwan, the Southeast Asian and South Asian countries, the Latin American and Caribbean countries and those of the Middle and East Africa initially followed this industrialization strategy. At first they achieved some apparent success. All countries, even very small ones that are close to other producers have some 'natural' protection. This occurs through transport costs (it is more cost efficient to produce bricks near building sites than to carry them long distances) and through cultural differences (such as different dietary habits and languages). Some manufacturing of a service type (such as baking, laundries and drycleaning, printing) thus becomes established with the growing monetization of economies in almost all countries. But the pace of such manufacturing expansion tends to be slow, and developing countries were impatient to industrialize. In the 1950s and 1960s they therefore sought to encourage manufacturing by border and internal protection: that is, governments provided firms prepared to begin manufacturing with high import tariffs, they imposed import restrictions, they gave entrepreneurs tax holidays to encourage them to invest, and in many cases limited entry into manufacturing by introducing production licensing to assure investors of profitability. The initial effect was a manufacturing boom as entrepreneurs sought the high profits these incentives made possible. Foreign firms flocked into the protected markets of large countries as their import markets were cut off, and because high profits were to be made. In some countries public funds were invested in manufacturing to prevent the exploitation of these highly profitable conditions by private enterprise, and particularly by foreign firms. This generally reduced the pace of industrialization because public managers were inexperienced in industrial production.

This manufacturing impetus, however, ran into difficulties, particularly in medium sized and small countries. Protection fostered inefficiency. As there was room for only one or a small group of producers in an industry, monopolistic practices raised costs. In some countries governments encouraged several producers to enter, often placing one in each regional market, fragmenting production. The monopolistic groups then formed a strong clamour for protection and other incentives, particularly if the government sought to 'deepen' the industrial structure by 'backward' linkages.

As the growth impetus created by the addition of new firms slowed, other difficulties appeared.⁶ The countries ran into balance of payments difficulties as more and more imported inputs were needed for manufacturing while resources were taken away from exports and the cost of producing for export rose. Before domestic manufacturing began, it was always possible to reduce the import of luxury and semi-luxury goods in times of balance of payments stringency, and wait out low international prices and other problems. But once luxuries, such as packaged foods, were produced domestically, cutting their output down meant putting people out of work. The foreign capital used to start manufacturing had to be serviced. The exchange rate of the national currency became overvalued as protection rose. The economy became less flexible and harder to manage. Growth stalled. This was true, for example, of Republic of Korea and Taiwan during their import substitution phases up to the end of the 1950's. As a result they failed to grow in this period despite very high inputs of United States military and civilian aid. In Latin America and South Asia protectionist industrialization policies led to frequent budgetary and balance of payments crises. The International Monetary Fund had to be called in to prescribe unpalatable restorative measures the countries could not take themselves for political reasons, and political upheavals frequently followed.

The most disappointing aspect of import substituting industrialization has been the lack of direct and indirect employment. In general, the rate of increase in manufacturing employment was less than half the increase in the growth of value added and output.⁵

By the end of the 1950s, a number of the economies that had followed the import substitution route changed their industrialization strategy toward export orientation. This change of strategy was so costly in political terms that it often required authoritarian measures to overcome the opposition to change by vested interests of entrepreneurs and factory workers in keeping protected manufacturing going, albeit at the cost of the nation as a whole. The Republic of Korea, Taiwan and later other economies such as Argentina and Brazil that wished to turn to export oriented manufacturing, had to devalue sharply to be able to change their policies, with consequent increases in domestic costs of living. Stable price levels became difficult to maintain, and with inflation, countries had to continue to devalue with an ensuing redistribution of income away from lower income groups. When Chile reduced protection without devaluation in the late 1970s, widespread unemployment followed.

Countries that could not reduce protective tariffs immediately because vested interests in their favour were too strong had to offset them by export incentives. When the inefficiency in exports that resulted from export incentives was added to the inefficiency of import substituting industries arising from protection, even tightly administered economies such as Korea and Taiwan found difficulty in determining which industries were genuinely efficient from a social point of view. Although the superiority of low protection was widely accepted from the early 1960s, it took the East Asian economies some 20 years to overcome the entrenched vested interests' opposition to the reduction of protection. Their task was made easier by turning away from protection relatively early, before it had a pervasive grip on the economy and harmed agricultural development. Limited protection and strong agricultural growth facilitated the shift to export oriented industrial growth.

In such countries as Argentina, Brazil, India, Mexico, Pakistan and the Philippines the move to export oriented manufacturing was much more difficult, and, as the early 1980s showed, it has not yet been accomplished.

Hong Kong was fortunate in having had experience as an export oriented manufacturing entrepot before World War II. It thus took advantage of natural protection and fostered industrialization for export from the late 1940s. Singapore had almost no protection to dismantle when it turned toward an export oriented strategy in 1965. These two small economies had faster industrial growth and greater employment creation, and were thus able to raise living standards faster than other developing countries. Other small countries, such as Malta and Mauritius, followed similar strategies with great success. All these small countries were able to offset their small size and a lack of natural resources by appropriate industrialization strategies to become the fastest growing countries in the world. Other Southeast Asian countries that have had successful industrial growth, notably Malaysia and Thailand, had much lower levels of protection than most developing countries in the late 1960s when they turned toward an export orientation in manufacturing. They are, however, still having problems with such sectors as motor vehicle and 'white goods' assembly.

Attempts to industrialize through import substitution not only distort a country's comparative advantage in the short run, but also destroy its ability to build comparative advantage in the long run. Offsetting import substitution incentives by export oriented incentives may suffice to establish exporting activities for which a country clearly has an advantage in raw materials or low wages, but it will only lead to the exploitation of dynamic comparative advantage if a developing country is exceptionally well endowed with skilled labour or entrepreneurs. The Republic of Korea was able to develop competitive steel and shipbuilding industries despite the confusion of its incentive system. However, in the early 1980s, as Taiwan liberalized its economy it outperformed Korea by a considerable margin. Hong Kong and Singapore which were not burdened by import substitution and export incentives were able to continue to grow extremely well despite their small size and complete lack of raw materials and the rents accruing to them.

Capital Versus Labour Intensity and Employment

Increasing employment and raising skills are important industrialization objectives. The import substituting industrialization strategies have not achieved these objectives. This is the result of several factors. Providing protection for

goods which have been imported generally means protecting sophisticated products that have been imported to satisfy small middle and upper middle income demand. Import substituting strategies thus tend to have a product mix that is inherently capital intensive. Secondly, industrialization incentives are usually so structured that they are biased in favour of capital, and incentives therefore usually encourage the substitution of capital for labour. Thirdly, in developing countries labour for manufacturing is often overpriced in relation to its skill, and this also leads to the substitution of capital for labour.

Capital Intensive Product Mixes

The service oriented industries that tend to emerge in the shelter of 'natural' protection tend to be labour intensive. This is true of laundries, motor vehicle repair shops and small clothing, joinery, printing and similar plants. Some of these industries can be expanded for export and such export activities as electronic and watch assembly are also very labour intensive. In contrast, 'intermediate' manufacturing activities such as grain milling and cement production tend to be relatively capital intensive even if carried out on a small scale. The range of technologies that will lead to competitive production is more limited than in the intrinsically labour intensive industries. Such relatively labour intensive industries as engineering require a high level of skill. The only developing countries that have been able to expand industrial employment rapidly at early stages of industrialization have been those that have pursued export oriented industrialization.

Incentives' Bias Toward Capital Intensity

Most developing countries lower the cost of capital in relation to labour in various ways. Some industrial incentives take the form of interest subsidies which not only artificially reduce the cost of capital to a manufacturer but also create costs to the whole economy by 'repressing' the financial system. Tax holidays linked to the size of capital investment rather than to the size of employment lower the cost of capital. A system of protection that places tariffs or import restrictions on final manufactured goods but allows capital goods (machinery) and raw materials into a country with low or no duties and restrictions, also lowers the cost of capital in relative terms. All such measures encourage entrepreneurs to increase their profitability by a greater use of capital than would be undertaken in an economy that does not have such distortions.

High Labour Costs and Capital Substitution for Labour

The main reasons why managers and entrepreneurs substitute capital for workers lie in high labour costs. These arise from a number of sources. Some are the inevitable concomitant of underdevelopment. At low levels of development, with limited education facilities and before 'learning by doing' becomes effective, labour and management skills, and hence productivity, are low. This is not a serious problem if labour remuneration is in line with skills. Where wages and salaries reflect productivity even very under-developed countries can compete internationally very effectively. But some developing countries inherited inappropriately high labour costs from colonial regimes by assuming the high wages paid to the expatriates during the colonial period were appropriate, rather than representing the fruits of colonial exploitation and high loadings for expatriate workers. In fact colonial wages have sometimes been raised by well intentioned but premature attempts to raise living standards through adopting fringe benefits levels from high income, fully industrialized countries. Direct wage costs thus typically tend to be only about a third to a half of total labour costs: the rest are accounted for by penalty rates for overtime, week-end, shift work, maternity allowances, a relatively short working week by international standards, sick leave and annual leave, long service and retirement entitlements, a large number of public holidays, housing allowances and the provision of transportation to and from work. The effect of combining such high labour cost with low productivity is to make it profitable to replace workers by machines wherever this is possible, and modern technology is constantly increasing the possibilities. Thus, in countries with inappropriate capital and labour policies, labour tends to be replaced by capital even in such intrinsically low skill and labour intensive activities as clothing manufacture.

In addition to using more capital equipment than is socially desirable, such equipment is not well utilized. For example, single shift operations tend to prevail in developing countries with inappropriate labour policies. This is because shift work loadings have been copied from industrial countries with a strong preference for daytime work. It is interesting that such preferences have or are being broken down in many high income countries to enable capital to be used more effectively. In low income countries with high unemployment and no social security the sacrifice of working afternoon and night shifts is relatively low in

comparison to being able to earn a cash income.⁸ Eliminating shift work penalties (and making streets safe at night) would make it possible to increase the utilization of capital beyond the 25 per cent or so that it is utilized now. Conceptually, a country that moves from a one-shift to a three-shift system can treble its employment without additional capital investment. More realistically, given security problems, changes in labour remuneration policies could lead to a doubling of employment. Not surprisingly, in competitive economies factories typically do work around the clock.

The effect of policy distortions on industrial employment can be summed up by calculating capital cost of placing an additional worker in the labour force (marginal capital labour ratio). In intrinsically labour intensive industries such as clothing, food processing and electronic assembly in countries with appropriate capital and labour policies, the cost of placing an additional worker in the workforce starts at US\$2,000 to US\$3,000. That is, a clothing factory employing a hundred workers would require an investment of about US\$200,000 to US\$300,000. The cost of investment per worker rises to about US\$20,000 to US\$30,000 for intermediate products, and rounds off at US\$100,000 and upwards for such capital intensive activities as petroleum refining and mineral processing. The investment to employment ratio is thus determined both by the product mix and capital and labour policies. A labour intensive, employment creating industry mix is only possible if the trade, capital and labour policies are all appropriate.

Industrial Ownership and Control

Most developing countries are concerned not only to stimulate manufacturing, but also to ensure that a high proportion is owned and controlled by nationals. But developing countries are capital short countries, and entrepreneurial risk capital is in particularly short supply. They also lack technological expertise in a broad sense. Private direct foreign investment is the main vehicle of technological transfer and an important source of risk capital in manufacturing, both among industrial and developing countries, providing an investment 'package' that also includes management skills and access to international markets. Most developing countries have thus traditionally been somewhat schizophrenic about their attitudes to direct foreign investment (or 'transnationals'). They simultaneously wish to attract it and yet want to control and sometimes even severely limit it or reject it altogether.

A considerable body of experience in dealing with foreign investment has been accumulated, and a voluminous literature examining every aspect of direct foreign investment in developing countries based on this experience enables conclusions about the main dimensions of the costs and benefits of direct foreign investment to a developing country to be drawn.⁹ Transnationals - whether owned by the nationals of industrial countries or by those of other developing countries - are essentially profit maximizing firms. Their particular behavioural characteristics vary somewhat with their parent country's business practices and policies, but essentially whether a developing country benefits from their presence and the extent to which benefits (if any) exceed costs depends on the host developing country's domestic policies that establish 'the rules of the game' within which transnationals have to operate.

Transnational firms will be eager to enter manufacturing in a country in two sets of contrasting circumstances: if a country offers high profits from highly protected import substitution, particularly with a large population and hence actual or potential markets; or if a country offers a resource based (raw materials and/or labour) profitable export base. In a highly protected small country many transnationals will contribute less than they will in the long run cost the country. In the latter case, they can be an important vehicle of industrialization. The extent to which transnationals will transfer and adapt technology to local circumstances, train local staff and employ labour rather than capital, will be related to these basic circumstances, largely depending on domestic policies and price signals. If it is efficient to employ local staff, and the transnational firm is operating in a competitive environment, it will take the measures necessary to train and appoint locals. Transnational firms of standing are sufficiently concerned with their public image to be very concerned with being 'good citizens' in host countries. This is not always the case with small entrepreneurs, but the latter may be capable of more labour intensive operations. The re-investment of profits similarly depends on economic opportunities. A country can defend itself against unscrupulous foreign firms that wish to exploit quite easily by not allowing them to make monopoly profits which inevitably lead to high costs for the host country. A competitive environment will not only avoid such problems, but stimulate the formation of national firms some

of which will eventually become 'transnationals themselves'. This has been the case in such small countries as Switzerland, Sweden and the Netherlands which have been happy to see foreign firms operating in their countries, but where important transnationals have emerged among local firms. Similar trends are emerging in Hong Kong and Singapore. Such highly protected countries as Australia and New Zealand have, in contrast, had to rely heavily on foreign firms in manufacturing but have failed to establish transnationals of their own on a significant scale.

Equity Issues

Industrialization policies are only part of the determinants of poverty alleviation and income distribution in an economy, but they play an important role. Import substituting and capital intensive industrialization tends to worsen income distribution by increasing returns of capital and hence its use, failing to encourage employment creation, taking resources away from agriculture and raising the cost of living and the cost of imports. Implicit incentives such as tariffs, as well as explicit ones such as interest rate subsidies, have to be borne by the community and have a regressive impact on import substitution. Competitive, outward oriented and labour intensive industrialization can improve the standards of living of lower income groups dramatically by increasing employment opportunities and accelerate rising living standards by its positive contribution to growth.

Footnotes

- 1 See Helen Hughes, 'Achievements and Objectives of Industrialization', in John Cody, Helen Hughes and David Wall, Policies for Industrial Progress in Developing Countries, Oxford University Press, London 1980.
- 2 B. Balassa and H. Hughes, 'Statistical Indicators of Levels of Industrial Development', World Bank, Economics Department Working Paper No. 15, May 1969.
- 3 David Wall, 'Industrial Processing of Natural Resources', World Bank Commodity Working Paper No. 4, April 1979.
- 4 I.M.D. Little and J.S. Mirlees, Project Appraisal and Planning for Developing Countries, London, Heinemann Educational Books, 1974.
- 5 Raul Prebisch, 'Commercial Policy in the Underdeveloped Countries', American Economic Review, May 1959 and K.N. Ray and A. Sen, 'Alternative Patterns of Growth under Conditions of Stagnant Export Earnings', Oxford Economic Papers, February 1961.
- 6 I. Little, T. Scitovsky and M. Scott, Industry and Trade in Some Developing Countries: A comparative Study, London 1970.
- 7 D. Morawetz, 'Employment Implications of Industrialization, A Survey', Economic Journal, September 1974.
- 8 Gordon Winston, 'Capital Utilization in Economic Development', Economic Journal, March 1971 and R. Bautista, H. Hughes and D. Morawetz, and F. Thoumi, Capital Utilization in Manufacturing in Developing Countries: A Case Study of Colombia, Israel, Malaysia and Philippines, Oxford University Press, 1982.
- 9 R. Vernon, Sovereignty at Bay, Basic Books, New York, 1971 and Storm Over Multinationals: The Real Issues, Harvard University Press, Cambridge 1977.

CHAPTER 3
MANUFACTURING IN PAPUA NEW GUINEA

Historical Evolution

Pre World War II colonial development in Papua New Guinea was largely confined to gold mining, a very small plantation sector and some timber extraction. There was no impetus to manufacturing. Policy had scarcely changed by the 1950s, but as the number of expatriates rose, a market for small scale service oriented manufacturing activities such as bakeries and repair workshops, protected by the 'natural' protection of perishability and freight costs, grew. Some drink bottling and food packaging began to take place. Small repair plants serviced vehicles, boats and machinery operating on plantations. Production was chiefly by and for expatriates and the activities they dominated, that is, it was essentially import substituting. A little export oriented processing began with copra crushing, coconut oil extraction and passionfruit pulp preparation. Timber was sawn and plywood was produced for domestic consumption and export. All managerial and clerical, and most skilled manual jobs, down to such jobs as truck driving, were in the hands of expatriates who had to be compensated for living abroad. High labour costs thus put a brake on the expansion of manufacturing. The introduction of a Pioneer Industries Scheme in 1965 to provide incentives to foreign investors to manufacture for export had no appreciable impact.

Investment, employment and production nevertheless grew in the 1950s and 1960s in the manufacturing industries that had natural protection, for the number of expatriates was growing, peaking at nearly 55,000 in the early 1970s (Table 3.1) when Australian government support was high and investment began at Bougainville.

Table 3.1
Total Number of Expatriate Residents
in Papua New Guinea (30th June)

1950	13,000
1960	23,000
1971	54,600
1982	32,544
1983*	30,214

Source: Chris Mackay, Private Sector Localization and Economic Development in Papua New Guinea, Institute of National Affairs, Discussion Paper No. 12, p. 7 Port Moresby 1983.

* 1983 figures from 'Non Citizen Population Estimates' Papua New Guinea National Statistical Office, Abstract of Statistics June Quarter 1983.

The cash component of the indigenous economy was also expanding under the stimulus of government activities, the movement to grow coffee in the Highlands, the opening of the Bougainville area and increased plantation exports. The range of import substituting manufacturing was broadened within such categories as food and beverage processing, and in new plants supporting the construction industry and such activities as printing (Table 3.2). Reflecting the low level of activity at the beginning of the period, manufacturing growth was rapid. However, on the eve of independence manufacturing still only represented 5 per cent of GDP, and the coverage of industry was correspondingly limited with few national or small local Chinese entrepreneurs. The bulk of investment was by Australian businesses active in Papua New Guinea in trade, by subsidiaries of Australian manufacturing firms, or the Australian subsidiaries of transnationals operating in Australia.

The change from the Australian Standard Industrial Classification to the International Standard Industrial Classification in the late 1970s makes it impossible to evaluate manufacturing growth trends accurately during the 1970s, but it is clear that coverage and the volume of production continued to expand. Investment in manufacturing did not grow as rapidly as in other sectors, notably in agriculture, forestry and fishing, mining and tertiary industries, but it increased substantially (Table 3.3). By the beginning of the 1980s manufacturing accounted

for 10 per cent of G D P. A handful of national entrepreneurs and some expatriates had begun manufacturing on a small scale, but manufacturing plants continued to be owned predominantly by Australian firms. Earnings of nationals, however, grew. There was a strong move to replace expatriates by national staff (Table 3.4) and earnings increased sharply with the strengthening of the trend toward Australian labour conditions and industrial relations introduced during the 1960s.

Table 3.2
Secondary Industries (1960-61 to 1980)

	1960-61	1970-71	1980
Number of Factories			
- Industrial	83	359	236
- Food	36	117	154
- Timber	64	155	118
- Other	26	98	268
<u>Total</u>	209	729	776
Persons Employed			
- Nationals	3,818	12,988	22,452
- Other	1,066	2,556	3,093
<u>Total</u>	4,884	15,539	25,545
		K million	
Wages	3.6	19.2	91.9
Value of Production	8.2	49.2	216.6
at 1975 prices	-	-	155.9

Source: Papua New Guinea, National Statistical office, Secondary Industries, 1960-61, 1970-71, 1980, Port Moresby.

Table 3.3

Private Capital Expenditure by Industry Group

1974-75 to 1982

	Manufacturing	Agriculture Hunting, Forestry and Fishing	Mining	Other	Total
	Kmillion				
1974-75	15.2	10.8	29.0	23.3	78.3
1975-76	20.7	11.4	23.1	25.0	81.2
1976-77	19.2	9.8	39.1	42.0	110.1
1978	26.3	11.4	32.5	73.1	143.3
1979	17.5	17.5	34.6	80.4	161.1
1980	27.7	30.9	34.2	127.7	220.5
1981	29.2	32.0	69.9	128.0	259.1
1982	25.0	29.0	247.0	122.0	423.0
Growth	64.5%	168.5%	751.7%	423.6%	440.2%

Source: National Planning Office, The National Public Expenditure Plan 1983-1986, Waigani, November 1982.
National Statistical Office, Summary of Statistics 1979, Port Moresby, August 1982.

Table 3.4
Composition of Factory Workers 1960-61 to 1980

	Number of Factory Workers			Percentage Change	
	1960-61 Number	1970-71	1980	1960-61 to 1970-71 Per Cent	1970-71 to 1980 Per Cent
Factory Workers					
Males - citizens	3,786	12,620	15,647	233.3	24.0
- non-citizens	951	2,193	1,216	130.6	-44.6
Females - citizens	32	368	507	1,050.0	37.8
- non-citizens	115	358	14	211.3	-96.1
Total - citizens	3,818	12,988	16,154	240.2	24.4
- non-citizens	1,066	2,551	1,230	139.3	-51.8
Total	4,884	15,539	17,384	285.0	11.9

Source: Papua New Guinea, National Statistical Office, Secondary Industries, 1960-61, 1970-71, 1980, Port Moresby.

The stable framework engendered by conservative macro-economic policies gave entrepreneurs confidence, though the relatively high value of the Kina made manufactured imports relatively cheap and manufactured exports costly, thus reducing the level of 'natural' protection.

An industrialization policy was put in place. The Investment Corporation of Papua New Guinea had been formed in 1972 to hold shares in large foreign enterprises on behalf of the nation until individual nationals and national companies could take them over. A Development Bank was established with the assistance of the World Bank and the Asian Development Bank to stimulate and assist small national entrepreneurs. A five year tax holiday was granted to national owners of industry. In 1974 the Pioneer Industries Scheme was replaced by a National Investment and Development Authority (NIDA) to stimulate foreign investment. It was intended that foreign investment should be largely channelled to export industries. A large number of other activities were accordingly reserved for nationals. Manufacturing continued to expand slowly, because the basic difficulties facing manufacturers were more important than the stimulus provided by incentives.

Market Limitations

The most important limitation continued to be the small size, slow growth, and fragmentation of the market. By the beginning of the 1980s the market consisted of some 30,000 expatriates and perhaps 100,000 national middle and upper income earners. Another 500,000 or so people were partly in the cash economy, albeit at low levels of income. The total cash market was thus still very small. Even with high freight costs from world suppliers to protect them for most industrial activities, it did not provide adequate economies of scale for economic production for most manufacturing activities.

The spread of manufacturing by area indicates the degree to which the small market was fragmented geographically (Table 3.5). Port Moresby with the government sector, and Lae with its road access to the Highlands, were the principal manufacturing centres with about 30 per cent of national manufacturing output in each centre. Many of the plants in the two cities were duplicative rather than complementary because of the absence of a road between the two cities, reducing plant economies of scale and increasing costs.

Table 3.5
The Distribution of Manufacturing by Region
1969-70 to 1979

	1969/70		Year Ended 30 June 1976		Year Ended 31 Dec 1979		Growth 1969/70 to 1979	
	Factories	Employment	Factories	Employment	Factories	Employment	Factories %	Employment %
<u>Southern Coastal</u>								
Western	8	27	10	105	9	115	12.5	288.9
Gulf	5	154	6	128	7	159	20.0	3.2
Central	182	4,003	192	5,483	180	6,609	-1.1	65.1
Milne Bay	21	237	21	174	16	157	-23.8	-33.8
Northern	11	125	13	145	15	360	36.4	188.0
Total	227	4,546	242	6,035	227	7,400	0.0	62.8
<u>Highlands</u>								
Southern	10	105	18	225	20	384	100.0	265.7
Enga			9	52	8	110	..	..
Western	59	727	45	1,045	56	1,468	-5.1	101.9
Chimbu	6	122	11	151	10	210	66.7	72.1
Eastern	42	700	54	1,021	60	1,855	42.9	165.0
Total	97	1,654	137	2,524	154	4,027	58.8	143.5
<u>Northern Coastal</u>								
Morobe	123	3,407	139	4,533	136	5,439	10.5	59.6
Madang	42	1,011	49	1,229	40	1,332	-4.8	31.8
East Sepik	29	237	34	412	30	575	3.4	142.6
West Sepik	5	51	12	121	9	77	80.0	51.0
Total	199	4,706	234	6,295	215	7,423	8.0	57.7
<u>Islands</u>								
Manus	8	43	9	79	7	64	-12.5	48.8
New Island	15	158	12	250	11	73	-26.7	-53.8
East New Britain	96	2,293	78	1,630	75	1,790	-21.9	-21.9
West New Britain	4	240	8	265	14	645	250.0	168.8
North Solomons	..	..	..	..	42	2,324	..	..
Bougainville	19	295	39	1,150	..	..	..	..
Total	142	3,029	146	3,374	149	4,896	4.9	61.6
TOTAL	665	13,935	759	18,228	745	23,746	12.0	70.4

Source: Papua New Guinea, National Statistical Office, Summary of Statistics 1979, p.69, Port Moresby.

Internal Freight and other Communication Costs

The dispersion of the population has been exacerbated by the high cost of internal compared to external communications. This is again largely related to economies of scale. Freight rates between Lae and Port Moresby are relatively higher than is justified by comparative distances between Australian ports and Port Moresby or Lae, thus eroding much of the competitive advantage that even efficient local producers might otherwise have. Freights, reflecting economies of scale, must be expected to favour long hauls such as those to Hong Kong. The 'natural' differences in costs have been increased by Papua New Guinea policies. Investment in basic transportation, notably in a road between Port Moresby and Lae that would unify the mainland market, has not taken place. Road transportation costs have been raised by poor road maintenance and a high incidence of theft leading to high maintenance, security and insurance costs. Air transportation has not improved as rapidly as had been expected. It is relatively costly and unreliable. This makes the transportation of perishable goods difficult. Shipping costs are high because traffic is not dense enough and the use of port facilities is limited to a few hours a day by overtime and other wage loadings. The hours worked are typical of and appropriate to a very high income country rather than being suitable for a developing country.

Labour Costs

Papua New Guinea's real labour costs in manufacturing and in inputs into manufacturing are comparable to those of the higher income industrial countries such as Australia. They reflect two separate factors: high levels of remuneration (including high fringe benefits) and low productivity.

Wage Rates

The expatriates who dominated the supply of skilled labour until the 1970s were highly paid to compensate them for living abroad, and these high rates of pay came to be reflected throughout the remunerations structure as nationals became employed in manufacturing. The adoption of the essentials of the Australian basic wage and arbitration structure has introduced all the rigidities of those systems into Papua New Guinea wages and salaries.

Wage rates rose steeply after independence to the late 1970s when they stabilized. They even eased somewhat with the introduction of limited indexation in 1982. (Table 3.6). In 1983 basic weekly wages for unskilled workers were about 3 times the Philippine level. Table 3.7 illustrates Papua New Guinea wage rates compared with a selection of rates from other countries in the region.

Table 3.6
Wage Trends 1975-1982

	Urban Minimum Wage Costs	Agricultural Minimum Wage Costs
1975	100	100
1976	105	106
1977	110	115
1978	115	123
1979	120	132
1980	135	146
1981	155	157
1982 (June)	161	163

Source: Garnaut, R and Baxter P., Exchange Rate and Macro-Economic Policy in Independent Papua New Guinea, Government of Papua New Guinea, February 1983.

Table 3.7
Wages 1980

	Manufacturing	Non-Agricult. Activities	Mining	Agriculture
	US Dollars			
Papua New Guinea	326.90	376.36	259.06	324.33
Singapore	208.30	223.00	368.80	
Korea	241.40	289.75	334.55	424.10
Australia	852.30	821.40	1203.60	
New Zealand	877.90	857.30	1066.10	

Source: International Labour Office, Yearbook of Labour Statistics, Tables 16,17,18 and 20, Geneva 1983.

For any plant with more than 25 employees general employment awards in addition to high basic wages provide:

- a) Special loadings are paid for 'dirty' work and so on.

- b) Penalty rates for overtime over 37 to 42 hours a week (based on a 7 hour working day with 1 hour for lunch), plus 2 to 2.5 times basic pay for week-ends and public holidays.

- c) Leave pay for sick leave, compassionate leave (plus leave without pay), 3 weeks' annual leave after 1 year's work, paid pro rata after 3 months' employment, and paid public holidays.

- d) Long service leave of six months after 15 years paid pro rata after 3 years' work.

- e) Severance pay in case of redundancy.

In practice it is extremely difficult to dismiss a worker, no matter how incompetent, to vary hours, work shifts or otherwise conduct a business on rational lines. Piece work of any type is so difficult to introduce that most managers think it is not legal. This makes efficient operating in industries such as clothing impossible. It penalizes good workers by limiting their earnings.

Many entrepreneurs have to house their supervisory and skilled staff, many have to provide transportation for their workers, and some have to provide transport for all workers. For example this is written specifically into the waterside workers' award. Papua New Guinea towns have been laid out like Australian cities, on the assumption that each family owns at least one car. Urban transportation costs are very high.

Weekly wages thus frequently represent only about 50 to 60 per cent of labour cost. The other 40 to 50 per cent are accounted for by loadings, leave pays and fringe benefits.

Labour costs are raised by low productivity. This is in part the result of inadequate management, the lack of appropriate training for young workers and the absence of on-the-job training; but in part it also reflects a lack of education, experience and motivation on the workers' part. The shortcomings of formal education are not offset by part time training facilities and productivity awareness campaigns such as countries like the Republic of Korea and Singapore conduct. In some cases the premature replacement of expatriates by nationals has led to reduced productivity. But replacing expatriates by nationals is an important aspect of development. It should therefore be taken into account in industrial planning. Low productivity can not be allowed to cripple manufacturing.

Public Utility Costs

Utilities, notably power, are unreliable, so that manufacturers, particularly if uniform and continuous power is necessary, have to provide their own backup generating plant. As power is a scale intensive industry, this not only raises direct costs to individual plants, but is also inefficient from a social point of view. The real cost of power to manufacturers rose by some 60 per cent in the early 1980s when power prices were brought into line with costs to make power generation financially viable. It is argued by manufacturers that public utilities are badly managed and over manned with resulting high charges to consumers. It does not seem to be possible to obtain cost of production data for the power sector. It is also not clear why power supplies are so unreliable and whether the power supply will become more reliable and internationally competitive in the future. Many factories also rely on their own water and waste disposal. High labour costs are as prevalent as in manufacturing.

Construction Costs

The cost of construction of plants and housing is as high as, or higher than, it is in Australia which has one of the highest construction costs among the industrial countries. Labour costs appear to be a principal cause of high costs.

Land Costs

Land for factory sites is difficult to obtain because alienated land is limited and communal land ownership is not keyed to modern industrial conditions. Negotiations over traditional land are inevitably protracted and costly. Neither the national nor the provincial governments are in practice able to play a significant role in the process, although some progress is promised in this matter. The lack of available urban land also leads to housing problems and creates an upward push on labour costs as indicated while lowering the workers' living standards.

High Cost of Government

Papua New Guinea has inherited a maze of building, production and other regulations from the colonial Australian administration. These add substantially to the costs of entry into manufacturing and the everyday conduct of business. Many of these regulations are related to health or environmental conditions. Some inherited regulations are now seen to be inappropriate for Australia, yet they persist in Papua New Guinea. While basic health regulations are necessary in any economy, Papua New Guinea could greatly facilitate its conduct of business by shaking off the many unnecessary regulations that still are vestiges of colonial rule.

The Papua New Guinea government structure, again as a heritage of colonial policies, follows the complexities of the Australian public service, which is widely regarded as being in urgent need of reform. The 19 provincial governments duplicate many of the national functions, just as states duplicate the functions of the federal government in Australia. With many government officials in addition lacking experience, co-ordination is difficult and decision making is complicated and delayed with ensuing costs to manufacturers.

Education

The experience of the fastest growing industrial countries indicates that education plays a key role in industrialization. In a relatively underdeveloped country such as Papua New Guinea the deficiencies of the education sector inevitably cause serious problems.

The quality and supply of primary education is limited, and vocational and technical schools are only beginning to be developed. Entrants into the workforce thus lack the ability to handle tools, to concentrate for a whole working day, and often even to attend work regularly. Workers often find it difficult to assume supervisory functions. As educational standards improve these 'growing pains' will no doubt be overcome, but attention to these problems is necessary.

The difficulties being experienced by the tertiary educational institutions which train the professional and managerial staff for industry are more difficult to understand. At present, students are not being trained in professions such as engineering and accounting to standards that would be generally acceptable in neighbouring Southeast Asian countries or in Australia and New Zealand. The failure of graduates to pass professional examinations is a clear indication of the problem. A strengthening of professional teaching and student performance in the tertiary institutions would thus contribute markedly to increasing productivity.

Growing Protection

In the late 1970s the essentially free trade regime began to be abandoned as protection began to be granted to favoured agricultural and manufacturing producers to encourage import substitution. The use of the tariff was extended for revenue purposes by a 3.5 per cent surcharge, a rise from the previous generally 10 per cent levy for commonly imported articles to 17.5 per cent, and by luxury consumption taxes of up to 80 per cent. Some of the tariffs on inputs began to burden local producers and were accordingly removed when the producers affected protested. Other producers obtained complete prohibition of competing imports. Within a very short period a low uniform tariff that did not disturb resource allocation has thus become transformed by highly variable rates (Table 3.8) and has led to major distortions and costs in the economy with little gain in value added (at international prices) and in employment.

Table 3.8 Papua New Guinea Import Duties

	Goods in		Inputs to		House-hold Items	Goods in		Inputs to		House-hold Items
	Sanitary & Religious	Ornaments, Smoking, & Luxuries	competition with local production	local production		Sanitary & Religious	Ornaments, Smoking, & Luxuries	competition with local production	local production	
Dairy Products										
09 Coffee Tea & Spices			30,45,5	free	free			free		10-20
10 Cereals			free	free	free			free		10-20
11 Prod. of milling			free	free	free			free		15
12 Oil seeds			free	free	free			free		15
16 prepared meat, fish & crust.			80	2	2			15		10
17 Sugar & confectionary			85t-K9,67t	10	10			17.5		10,17.5
22 beverages, spirits & vinegar			39	2	2			17.5		10
27 Mineral fuels - cars										
- H/H kero.										
- aviation(far & bit free)										
28 Chemicals(hydrogen Peroxide 17.5)			10-17.5	free	free			free		10
39 Artificial resins			17.5	free	10			17.5		10
40 Rubber - raw & unvulcanised			15-17.5	free	free			17.5		10
- Articles of unhardened			15	free	free			17.5		10
- textiles, gaskets			15-17.5	free	free			17.5		10
- tyres(aircraft free)			15	free	free			17.5		10
44 wood - raw, sawn & plywood			15-17.5	free	free			17.5		10
- charcoal & for tools										
- cigarettes										
47 Paper making cases			65,80	20	20			free		20
48 Paper 7 paper pulp										
- Kraft										
- Newsprint										
- cig., coloured & dec.			20	10	10			free		5 - 10
- Corrugated(parchment free)			10c/500	free	free			free		10
- Other			free	free	free			free		
49 Printed Books			free	free	free			free		
except - transfers, calendars			20	free	free			free		
except - cards, other			45	free	free			free		
51manmade fibres(cont.)										
53 Wool & animal hair										
55 Cotton										
56 Manmade fibre (discont.)										
50,61 Knitted & other clothes										
- blankets										
62 other textiles - travelling rugs										
- linen & other										
- sacks										
- tarpaulins, sails etc										
64 footwear (exc. thongs 12.5)										
68 Stone, plaster & cement										
- except - panels, prefab, cement pipes & other			17.5	17.5	free			free		17.5
69 ceramics - refactory, lab & other										
- tableware			80	free	free			free		10
- statues										
- remainder										
73 Iron & steel										
- except - prefab chains & needles			10	10	free			free		10
- barbed wire										
- vehicle springs, stoves & other dom.			17.5	17.5	free			free		10-17.5
74 Copper & articles										
except - wire, springs & chains			17.5	17.5	free			free		10
- cooking domestic										
80 Tin (other 17.5)										
82 Tools etc of base metal										
84 Bolders & machines										
Internalcomb. engine for cars										
Outboard marine 35-45 h.p. & parts										
Other outboard										
45										
Pumps										
Refrig., dishwasher, elect w.m. & dryers										
Lawn mower, air conditioners										
W.M. non electric										
2										
Sprayers, knitting machines										
Sewing machine (needles 17.5)										
Office equipment										
Vending mach., bearings										
85 Electrical Goods										
Motors										
Electro Magnet, batteries, acc. (parts free)										
Domestic appliances										
- except coffee grinders & percolators										
80										
fans										
Heaters(exc. water, space & soil free)										
Microphones(guitar amp. free)										
Radio remote control(TV studio app. free)										
80										
Aerials										
Lamps (infra-red free)										
Microcircuits (other cathode free)										
50										
Insulation										
86 Railway & tramway vehicles										
87 Motor Vehicles										
Passenger										
Utility & trucks										
Panel vans, motor bikes(exc. small 15)										
Lorries										
70-110										
Baby carriages & parts										
Trailers(exc. for tractors free)										
88 Aircraft										
89 Ships (exc. Yauchts 20, other 17.5)										
7.5										
94 Furniture										
except - medical, beds										
10										
95 Carvings										
96 Brooms & brushes - H/H										
- Paint, further assembly										
- tooth & toilet										
97 Toys - electronic, cards, amms, machines										
- roundabouts, swings, etc.										
80										
98 Miscellaneous manufactured articles										
Buttons, dummies, vacuum flasks										
Pens, pencils, combs										
Lighters & pipes										
80										
Scent										
80										

SOURCE: Papua New Guinea Customs
 Import/Export Duty Tariff as of 31 May 1984.

Capital Intensity

The effect of high labour costs is reflected in the highly capital intensive character of Papua New Guinea manufacturing. Manufacturing is capital intensive in two respects. The types of activities in which investment has taken place, notably in building materials and metal fabrication, are intrinsically capital intensive. Given the products selected for import substitution, plants tend to be capital intensive. For example, the biscuit manufacturing plants use highly capital intensive techniques. The clothing firms want to replace steam irons by pressing machines. The strong tendency of manufacturers to replace workers by machines is not unusual in countries with distorted wage (or capital prices) and low labour productivity. Entrepreneurs follow the price signals that the policy makers set, making for high incremental capital to labour ratios. Thus in Papua New Guinea it appears to cost on average some K30,000 to employ an additional worker in the manufacturing workforce. Creating 10,000 jobs (a quarter of the 40,000 places in the work force that will need to be found in the 1980s) in manufacturing would require an annual investment of K300 million in manufacturing. This is 10 times the highest actual investment level achieved in the past and quite out of proportion with investment in the rest of the economy.

Output per worker has been growing rapidly as a result of rising capital intensity as several commentators have noted. But this cannot be equated either with increasing labour productivity or favourable factor utilization.

Capital Utilization

In underdeveloped countries such as Papua New Guinea capital is scarce. High volumes of fixed capital have to be provided for infrastructure and for productive capacities. The Papua New Guinea Government has tried to reflect this scarcity by realistic interest rates that have been an important component of its macro-economic policies. But the high cost of work outside the basic 37 to 42 hour week has undermined this endeavour. Most of the capital equipment in Papua New Guinea - in the form of wharves, roads, buildings, machinery and manufacturing plant - is idle most of the time because the penalty rates that have to be paid for overtime, week-end and shift work make it unprofitable to use capital in a socially optimal way. When a manufacturer determines the volume of output required by

the market, equipment is bought on a one-shift basis. When the market grows, instead of working two shifts and thus saving on the cost of capital and doubling employment, more machines are usually bought and labour costs are reduced (thus increasing output per unit of labour instead of per unit of capital).

Again Australian norms have been adopted, often where they are least appropriate. Table 3.9 shows average hours worked in a number of countries. Australia and New Zealand are seen to have much lower averages than the countries of East and Southeast Asia. Yet it is the Australian example which has been adopted in Papua New Guinea.

Table 3.9
Average Hours Worked Per Week, 1980

	Manufacturing	Non-Agricultural Activities	Mining
Singapore	48.6	48.6	50.1
Korea	53.1	42.0	42.0
Philippines	46.0	48.1 (1978)	-
Australia	38.0	35.0	35.7
New Zealand	39.6	38.9	41.8

Source: International Labour Office, Yearbook of Labour Statistics, Tables 11, 12 and 13, Geneva 1983.

A New Institutional Framework

Towards the end of 1982 the importance of manufacturing was recognized by the appointment of a Minister for Industrial Development and the establishment of a Department of Industrial Development under him. This combined a number of functions previously spread over the ministries of Labour and Commerce. NIDA was not abolished, but was to continue with its statutory approval functions, with its investment promotions task transferred to the new ministry. The new Department was, thus, to become a new "one stop" unit to encourage both small scale national investment and large scale foreign investment and to assist in its implementation. Responsibility would in practice, however, have to be divided with the 19 provincial governments which had begun to seek major investors independently through direct foreign contacts.

CHAPTER 4
PROSPECTS FOR FURTHER IMPORT SUBSTITUTION

Numerous candidates for import substitution have been considered during the past decade including the manufacture of ball point pens, nuts and bolts, radios, irons, wet and dry cell batteries, ceramics, extruded plastic containers, glasswares, tin utensils, hand tools, bandages, tyres and other rubber products, expansion of clothing, spinning, weaving, motor vehicle components and assembly, tractors, solar heaters, engineering and metal fabrication, leather shoes, furniture, nets and ropes, meat and fish canning, alcohols and vinegars, essential oils, integrated shipbuilding and repairs, activated carbon, steel rolling and many other industries.

Feasibility studies have been carried out for a number of these. The staff of the National Investment and Development Authority and of the Department of Industrial Development have investigated some of the possibilities directly and consultants have been engaged to examine other possibilities of production. The practical results have, however, been limited.

The principal reason for the failure of entrepreneurs to embark on further import substitution clearly lies in the small volume of goods imported compared to the minimum scale of economic production for the productions in question. Imports into Papua New Guinea total about K750 million a year (Table 4.1). About K150 million consists of oil imports, and another K140 million is made up of food and live animals. The other imports are made up of a large range of manufactured goods. The market is so small that on any realistic assessment the volumes that would have to be exported to make production runs possible at competitive cost would have to be very large indeed. Exports could not be subsidised by domestic consumers. They are too few with the exception of beer already noted. The domestic quality demanded would usually be different from export quality. And exports would, of course, only be possible at competitive prices, that is, if the present high manufacturing costs could be reduced.

The following examples of industrial production indicates why import substitution for the domestic market would not be economic for most of the products identified.

Table 4.1
Papua New Guinea - Imports 1981 and 1982

	1981	1982
	K'000	
Total Imports	738,137	751,667
Machinery & transport equipment	215,157	230,393
Mineral fuels, lubricants and related materials	158,002	146,093
Food and live animals	136,397	138,692
Manufactured goods classified chiefly by material	105,071	118,928
Miscellaneous manufactured articles	54,477	53,873

Source: Papua New Guinea National Statistical Office, Abstract of Statistics - December 1983.

Import Substitution Policies

Meat Processing:

Papua New Guinea has some smallgoods production (accounting for about 10 per cent of total meat consumption), two large chicken processing plants, located at Lae and Port Moresby and several smaller ones in the Highlands, North Solomons and Madang. About 8,000 tonnes of canned meat, about 6,000 tonnes of it being beef with cereal, are imported annually. There is also some import of mutton flaps considered of low quality nutritionally for the bottom of the market.

There is also a fresh beef market with some 20,000 head of beef slaughtered annually supplying about half of the domestic market. About 18,500 head come from large scale commercial enterprises and some 2,000 from missions, plantations and smallholders. The traditional source of meat (apart from hunting) consists of pigs.

Fresh meat is preferred by most consumers to canned meat, but fresh meat is costlier per kilogram in Papua New Guinea than imported frozen meat and much costlier than meat-and-cereal mixes. A key problem here is that local demand, except in the larger towns, is for the cheaper cuts, so local production has to be supplemented by imports so as to satisfy the total local market for fresh meat. Meat canning for the local market would be very costly for a number of reasons.

1. Except for speciality and luxury products, meat canning has to be part of an integrated operation to be internationally competitive in terms of production costs. Efficient operations either own herds or are located so as to have access to large scale meat markets. They include abattoirs of a high standard.
2. Efficient producers make a wide range of products to be able to use all parts of the animal, or they are able to market such products as offal nearby. In Papua New Guinea, a problem might be finding sufficient markets for unused premium cuts.
3. Can production is an essential component of economies of scale in meat processing, and it is therefore frequently included in the processing enterprise. Can production and use in meat canning is subject to minimum economies of scale. A state-of-the-art plant has a minimum engineering capacity of some 15,000 to 17,000 cans a day. At 85 per cent annual operating capacity this means an output of 4 million cans a year, compared to the present total imports of all types of meat of about 3 million cans a year. Assuming that total

demand will rise to about 4 million cans of meat a year within say 5 years, and that this demand would be fairly uniform, domestic meat canning would still be costly to national consumers and society as a whole, and would thus reduce potential growth because the other conditions for meat canning, namely meat production on an adequate scale, would not be available. Value added in Papua New Guinea would be low, particularly as cuts of the appropriate type will probably be mainly imported in the early stages.

The high social cost of introducing meat canning on the basis of imported meat for a limited market to force import substitution has been demonstrated in other developing countries, for example in Thailand in the 1960s. Such cases went ahead because while there were high social costs, there were high private profits for the manufacturers. Manufacturers were able to produce on a cost plus basis, by demanding and receiving considerable import protection. Tariffs were usually reinforced by import restrictions. Because the total market was initially small, only one firm was given the right to operate. This eliminated the internal competition that fostered efficiency in larger countries and limited consumers' choices, but it assured the selected firm's profit. The privileged firm moved from having a share of the market under competitive conditions to a monopoly of the market.

Fish Canning and Freezing:

Papua New Guinea consumes fresh fish, imports canned fish and exports frozen fish. Protein deficiencies among low income groups, particularly in rural areas, are thought to be quite high, and could be mitigated by higher fish consumption. The prospects for fish canning thus seem promising for the domestic and for an export market, and have been talked about for at least a decade. Why then has the establishment of fish canning proved so difficult?

Raw material, small domestic market size and high labour costs are all contributing factors. The small size of the catch for export has to be handled by freezing. It is not large enough for canning. The domestic market for canned fish is limited in relation to the economies of scale in canning already discussed, and consists of a variety of fish and can sizes.

Internationally competitive canned fish production is generally estimated to require runs of at least 6 million cans a year. The Australian canning industry consists of small plants with production ranging from 9 million to 20 million cans, or 4,500 and 10,000 tonnes of fish a year respectively, and plants are not operating at full capacity. Low capacity utilization is made possible by the old age of most plants. They have been fully depreciated. Internal competition keeps down inefficiency, and yet the Australian industry needs protection to be able to compete with imports.

The world market for canned fish is large, though frozen and frozen processed fish products increasingly compete for the market. The international market is highly competitive in all stages from fishing, through processing and marketing. Economies of scale are significant at all stages. Papua New Guinea's fishing industry is currently small scale, both in terms of boat size and total catch. Annual catches per boat are 1,000 to 2,000 tonnes, whereas in Japan they are of the order of 20,000 tonnes a boat.

The cost of production is critically affected by can closing machine economies as in meat canning. Canning is also relatively labour intensive, so that wages and productivity are important cost factors. With present supply and demand levels and productivity, Papua New Guinea could not compete with other producers. This is the basic reason for a lack of serious interest in fish canning.

Given economies of scale and the variety of fish demanded, marketing has to have a wide coverage to be economic. There is insufficient demand in Australia to take a large supply under the privileged PATCRA access rules where Papua New Guinea producers would only have to compete with Australian producers. For canning for a wider market Papua New Guinea would have to compete with other Pacific and many other nations, some of which offer a much more competitive base. Freezing requires much smaller economies of scale, and hence enables smaller producers to become established as has been the case in Papua New Guinea.

Other Food and Beverage Processing Industries:

The inability to reach even moderate economies of scale in the domestic market limits the production of processed foods to packaged goods that do not spoil easily. The economies of bottling are favourable to small scales of production if bottles can be easily collected or re-used. A large uniform volume of demand such as that for beer makes the use of cans economic. Papua New Guinea has a high per capita demand for beer, and has been able to start developing exports on the basis of highly profitable production for the domestic market.

Clothing and Textiles:

The Papua New Guinea market for clothing is small, reflecting the low role of cash in the economy. Demand is mainly satisfied by low cost imports of simple garments - shirts, shorts, blouses, lap-lap cloth - from nearby Asian countries. A portion of the market is supplied by low cost secondhand clothing from Australia. Any attempt to reduce or eliminate this sector of the market by import controls or prohibitions would lower the standard of living of the poorest people in the community.

An expansion of clothing production for the domestic market will have to wait on the growth of the market and a reduction of real labour costs. This will bring minimum economies of scale for production of standard items such as underwear, shirts and overalls. Work clothing is at present only produced because it is assisted by government preferences.

Prospects for textiles depend on the expansion of domestic markets and on wage and productivity trends. Although some choice of technology is available for weaving, both spinning and finishing are highly capital intensive and would have to produce primarily for export for the foreseeable future. With current labour costs this is not possible.

White Goods: (Washing Machines, Refrigerators, etc.)

A recent report on the consumer durable 'white goods' industry in Australia emphasises that efficiency of production depends significantly on economies of scale, the utilization of capacity and the continuous introduction of new production techniques.

Estimates of optimum production runs for units such as refrigerators and cookers range from 250,000 to 500,000 units a year. Below such volumes economies of scale are not achieved. This means that the Australian industry with a range of sales from almost 100,000 dishwashers to more than 500,000 refrigerators a year, each with several producers, is uneconomic by world standards and requires protection. With increasing technological complexity and automation, economies of scale are increasing to the point where one million units a year will be required for efficient operation. The larger plants in the USA, such as General Electric and Whirlpool, produce nearly 2 million units a year and are still achieving economies of scale. Specialized component suppliers operate on an even larger scale. Because of high capital intensity capital utilization is a critical factor. Experience suggests that a second shift can increase efficiency by 8 to 15 per cent, and a third shift can add another 18.5 per cent. This, of course, precludes shift penalty rates. A small country such as Papua New Guinea could not compete with such firms in international markets. It would have to confine itself to local consumption. At foreseeable levels of demand this would impose very heavy costs on consumers as the experience of developing countries which followed this industrialization route prematurely illustrates.

A number of developing countries began to produce white goods for the domestic market prematurely in an attempt to 'save foreign exchange' by import substitution and create employment. In some very large countries such as Brazil (with a population of 125 million), the policy succeeded after some 20 years of trial and error, because the domestic market was very large enabling several domestic firms to achieve economies of scale and yet become efficient through competition. As incomes grew, countries such as Korea (with a population of 40 million) became economic producers matching the quality and price of international competition. Others, however, still find these industries costly to the economy. They require high protection, drawing capital, labour and other resources from more economic activities. They are costly for consumers who have to pay higher prices for poor quality goods. They thus worsen income distribution in a country. In Malaysia, the Philippines, Thailand and India white goods are among the most protected and least efficient goods produced.

Motor Vehicles and Components:

The introduction of motor vehicle manufacturing usually begins with the assembly of completely knocked down (CKD) components, gradually involves the local production of components and finally proceeds to the production of capital intensive components such as engine blocks.

Minimum assembly scale that enables a motor car to be assembled from CKD with only 20 per cent more cost than if it were fully imported starts with an output of at least 25,000 to 400,000. In a fully manufactured car, economies of scale of some 600,000 units of one model are required for international competitiveness. Component manufacture has similar ranges of economies of scale. Countries which have ignored these economic realities have done so at great cost. Not only such developing countries as the Philippines, Malaysia and Thailand, but such industrial countries as Australia have found it difficult to rationalize the motor vehicle industry once an inefficient base has been established. The international market for motor vehicles, and components/spare parts is too competitive to enable relatively inefficient producers to compete.

In Papua New Guinea new motor vehicle registration in 1982 totalled 8,154, with two-thirds being trucks and buses.

Table 4.2
New Motor Vehicle Registrations, 1980-82

	1980	1981	1982 ^(a)
<u>All vehicles</u>	<u>13,305</u>	<u>11,152</u>	<u>8,154</u>
Motor cars	2,635	1,810	1,492
Station wagons	1,104	1,139	642
<u>Commercial motor vehicles</u>			
<u>total</u>	<u>8,200</u>	<u>6,866</u>	<u>4,947</u>
Light open	4,849	4,221	2,958
Light closed	201	224	234
Trucks	2,039	1,568	1,134
Other truck types	7	7	53
Buses	1,104	846	568
Motor bikes	820	923	604
Tractors (registered for road use)	546	414	469

(a) Preliminary

Source: Papua New Guinea, National Statistical Office, Abstract of Statistics, June 1983, p.3

The assembly and production of motor cycles is similarly capital intensive and therefore subject to economies of scale. Runs of 10,000 upwards of CKD components are necessary for assembly that allows costs to be kept within 20 per cent of international prices.

Cement:

There is some choice of techniques in the production of cement, but the more labour intensive techniques merely mitigate and do not offset the high costs of small units.

Internationally competitive plants generally start at 200,000 tonnes per annum, assuming that raw material supplies are favourably situated and that a plant can be worked around the clock. The present Papua New Guinea market is growing, but is still less than 100,000 tonnes (compared to the Australian market of 5 million tonnes). The market is highly sensitive to major construction projects such as the current construction phase of the Ok Tedi project. It is typically fragmented, with no single area taking more than about 30,000 tonnes. A cement plant based on imported clinker would also require large scale operations to justify production since the value added in local production is low.

Structural Steel and Other Building Construction Products:

Proposals for the expansion of building and construction materials, including a proposal for re-rolling structural steel, have found their way into evaluation considerations. With existing plants such as those making wire, nails and fastenings producing at high cost because of the small scale market and relatively high labour costs, it is not surprising that entrepreneurs have not been forthcoming to enter into new production in activities which are essentially capital and technology intensive and hence large scale. Structural steel, for example, is subject to severe price fluctuations in steel and scrap. New producers are faced with competition from small, old depreciated plants and large, capital intensive, integrated steel plants. World capacity exceeds demand by a considerable margin. Construction already burdens Papua New Guinea with high production costs. The premature production of intermediate inputs would mean that these costs would rise further with very little gain in employment.

Industrial Components and Capital Goods:

Dry and wet cell batteries production is relatively labour intensive and can therefore be started at relatively early stages of industrial development if labour costs are not too high. Demand is relatively high in underdeveloped countries with inadequate power supplies. Production could be undertaken in Papua New Guinea as soon as an entrepreneur is willing to do so without a tariff or other form of permanent protection.

As demand grows many other products will become viable on a relatively small scale if entrepreneurship and skills are available, and if labour costs are competitive. Plastic and metal containers, hardware of various types, agricultural and other hand tools are examples.

Capital Intensity

The capital intensive nature of the majority of the industries being proposed for import substitution suggests that the estimates of the current marginal capital labour ratio are conservative. For consumer durable industries, cement plants, and for metal and mechanical industries, a sum of K30,000 to place a worker in the workforce is not likely to be an average but a minimum figure. The K300 million it would cost to place 10,000 workers in the workforce is thus likely to be a conservative estimate.

Papua New Guinea entrepreneurs clearly do not have sums of this order of magnitude to invest. The bulk of investment would have to come from abroad. National ownership of around 50 per cent would not be a realistic objective. Service on such capital sums would have to be paid abroad even if some of the profits on the capital invested were to be reinvested in Papua New Guinea. This would add to the burden placed on exports by the official debt (from public and private sources), raising the total debt service ratio substantially. But the industries in which such capital would be invested could not compete in exports, they could not therefore share in the debt servicing burden which would have to be borne by mineral and agricultural (including fishery and timber) products. The primary product (and manufacturing) export potential would, however, be reduced by the high costs and resource misallocation of uneconomic import substitution industries discussed.

Conclusions

The difficulties experienced by industries already in operation, the high prices they have imposed on the rest of the economy through high tariffs or import restrictions, and the poor prospects for further capital and scale intensive import substitution confirm that an import substitution strategy would create high costs for the Papua New Guinea economy. Not only would costs to consumers rise, worsening conditions for the poor, but as the direct and indirect costs gave rise to production problems in export industries, the growth of the economy would be undermined. In practice (as indicated below in Chapter 6), high import substitution costs cannot be offset by export incentives. Agricultural exports would be most affected, worsening the distribution of income. The tendency of urban dwellers to become better off at the expense of rural peoples, already discernible, would be increased. The slow growth unequal income path of poorly performing developing countries would thus be repeated. An alternative strategy fostering the growth of infrastructure and agricultural development for employment and income growth would lead to ample industrial opportunities within a decade, without the need for high protection.

CHAPTER 5
PROSPECTS FOR EXPORTS OF MANUFACTURES

Typically for a small country, Papua New Guinea has much better market prospects abroad than at home. This would be true even with rapid national population growth. If population were to double to some 6 million, and then to double again to some 12 million people, Papua New Guinea would remain a very small country, heavily dependent on trade if it seeks high living standards based on high productivity. A low population growth will enable higher living standards to be achieved in a much shorter time than would be possible with a high population growth, for the latter would make high demands on investment for health and education allowing little investment for production. Papua New Guinea will thus have to choose its industrialization strategy carefully to exploit the advantages of specialization and economies of scale if it is to follow successful countries such as Korea rather than the unsuccessful ones. The disadvantages of a small domestic market are in fact offset for a small country that manufactures for international markets because in such large markets it will be too small to affect prices. It can thus produce to capacity without having to lower its prices.

The Pacific Islands Market

Papua New Guinea naturally looks first to its neighbours for market expansion. But the islands of the South Pacific, though in some cases geographically fairly close, and often regarded as being a natural extension of the domestic market because of their cultural affinities, unfortunately do not offer sizeable marketing opportunities. The total Pacific market consists of some 1.5 million people who are scattered over a huge ocean area. Even if this market also grows so that it doubles in size to some 3 million people, it will still be very small and very scattered. Individual firms, it is true, are finding some export opportunities, for example in the Solomons, and this will continue to be the case. However, this experience should not be unduly extrapolated. Many of the islands can be more conveniently served from New Zealand, Australia and even the United States and Hong Kong than from Papua New Guinea. The Pacific Islands are, moreover, similarly endowed to Papua New Guinea and have many of the same advantages in production. Their economies are therefore largely competitive rather than complementary.

Australia and New Zealand

Australia and New Zealand are also relatively close geographically. Papua New Guinea has a special association with Australia, reflected in the Papua New Guinea-Australia Trade and Commercial Relations Agreement (PATCRA) which gives Papua New Guinea free access to most markets in Australia. Through its membership of the South Pacific Regional Trade and Economic Agreement (SPARTECA), Papua New Guinea also has privileged access to the New Zealand market.

But Australia and New Zealand, particularly the latter, are again small markets by world standards, though large in relation to Papua New Guinea's current firms. For some resource or labour intensive products there is considerable export potential if Papua New Guinea can compete effectively in terms of price and quality with Australia and New Zealand. However, these countries' resources are in many respects also competitive rather than complementary to Papua New Guinea. Hardwood timbers and their products are cases in point, and so are tropical fruit and vegetables, flowers and similar products. Papua New Guinea access to the Australian market under PATCRA is thus limited for plywood although its quota for 1983/84 was set at 12,000 m³, a large share of Papua New Guinea's output. Normal, that is low, developing country preferential tariffs are charged on 'sensitive' goods, notably some food products, clothing, textiles, footwear and furniture. In addition, there are quotas on clothing and passionfruit. Barramundi has been excluded from time to time because of excessive mercury levels. Crocodile skins are barred because Australia has a total ban on imports of such products from whatever sources as it regards crocodiles as an endangered species. Avocadoes are banned because they cannot be inspected for virus diseases. In the case of barramundi and avocadoes, the Australian government has offered Papua New Guinea whatever assistance is required to develop the skills necessary to eradicate the problem.

Northern America, Europe and Japan

Papua New Guinea has further large markets with privileged access for its goods in the United States, Canada, Europe and Japan for a wide range of manufactured goods. These countries have very large markets indeed, commercial institutions

that can handle long distance trade, and in some cases provide assistance through aid channels to develop trade with small underdeveloped countries such as Papua New Guinea. The European Economic Community provides such assistance through its links with the African, Caribbean and Pacific states and some member countries, notably Germany and the Netherlands, in addition have special country to country programs to help potential exporters such as Papua New Guinea.

A relatively small country such as Papua New Guinea could find riches in these very large markets.

Trade Creation and Trade Diversion

Some of the markets now available in Australia, New Zealand, Northern America, Europe and Japan represent 'trade diversion' rather than 'trade creation' that expands world trade. That is, Papua New Guinea's privileged access is at the expense of other, mainly other developing, countries. Trade diversion means that instead of being exposed to competition from the lowest cost producers in the world, Papua New Guinea is only exposed competitively to local relatively high cost producers in the industrial countries.

For example, in selling clothing in Australia, Papua New Guinean firms can purchase raw materials (cloth, zippers, buttons, etc.) in the world's cheapest markets and it does not have to meet the competition of Chinese, Hong Kong, Korean and other highly competitive producers, but only that of high cost Australian producers. Similar conditions apply in the other industrial countries. Papua New Guinea thus has an opportunity to gain market access while it is 'learning by doing'. However, it cannot expect such privileges to last indefinitely. The value of such privileged access is, however, directly proportional to the illiberality of the importing country. Privileged access is valuable in Australia and New Zealand because these are relatively highly protected markets. As these countries liberalize in their own economic interest as they are now seeking to do, the value of the PATCRA and SPARTECA arrangements will diminish. Special arrangements with other industrial countries are also likely to diminish because they are against these countries' own and world trade interest. Papua New Guinea would thus be well advised to focus on these potential markets quickly while its privileges exist.

ASEAN Countries and Other Asian Markets

Papua New Guinea is extremely fortunate in being located next to countries that are members of the Association of South East Asian Nations, that is, that form the second most rapidly growing group of countries in the world. ASEAN has a population of more than 250 million people. This is a very large market with per capita incomes already ranging from admittedly low levels of some \$US500 in Indonesia to a relatively high \$US5,000 in Singapore. Hong Kong, Taiwan and Korea form an even more rapidly growing group of some 80 million people with higher per capita incomes. Trade among the countries in East and Southeast Asia is growing as their needs for raw materials expand and as they liberalize trade in manufactures to increase intra-industry trade. Singapore and Hong Kong already provide almost wholly free access to markets which are large in terms of Papua New Guinea's export capacity, Taiwan has substantially liberalized its markets and Korea is now doing so.

Market Access and Supply Constraints

A review of the export markets available to Papua New Guinea suggests that its market opportunities are very considerable though they are not predominantly in the Pacific or Australia and New Zealand. The reason why Papua New Guinea's exports of manufactures have not expanded rapidly in the past and are not expanding now appears to lie in supply constraints rather than in a lack of demand.

Labour Intensive Exports

Given Papua New Guinea's employment problems and its relative shortage of capital, the prime area for export would consist of low skill labour intensive industries such as clothing, footwear, electronic and watch assembly, hand tool manufacture, toys, sporting equipment and so on. A very limited quantity of clothing is in fact being exported, but that is all.

The high cost of labour combined with low productivity is the key critical constraint. The volume of exports of clothing is limited because only plants with less than 25 workers that do not have to pay full fringe benefits for workers are

able to compete effectively. Larger firms only compete in Australia with great difficulty in limited ranges of products, because allowing for differences in productivity and the higher cost of public utilities, housing and so on, costs are not competitive with Australian costs.

The clothing industry's experience suggests that Papua New Guinea will not be able to compete effectively in the labour intensive product exports that could bring it significant employment opportunities unless it brings labour remuneration into line with productivity. This would require a thorough reworking of the remuneration and industrial organization structure inherited from the colonial period.

In contrast to the very high marginal investment labour ratios in import substitution (estimated at some K30,000 in Chapter 3 above) the cost of placing a worker in a labour intensive industry for export is only about K3,000 to K5,000. To achieve employment of 10,000 workers in labour intensive exports would therefore only require an investment of some K30 million.

Primary Product Processing

As indicated in Chapter 4 with respect to import substitution, as incomes grow opportunities for further import substitution will develop naturally, and this will also apply to further primary processing for the domestic market in coffee, vegetable oils, fish and other products. If these industries are developed efficiently, without the protection that will give rise to inefficiency, but under competitive conditions that will encourage 'learning by doing', these processing industries will be able to market a significant part of their production abroad, following, for example, the example of fish freezing. However, if they are developed prematurely, or with inappropriate technologies, the achievement of exports would require selling abroad below the domestic cost of production with a high danger of subsidy costs retaliation. For a small country like Papua New Guinea this is not a feasible strategy.

Good industrial raw material processing opportunities exist in areas not yet crowded by low cost producers. Examples of such products are high quality individually packaged tropical fruits and flowers such as orchids and ferns for high income markets such as Japan and Northern America. Some of these products could later lead to further processing in the form of frozen fruit juices and so on.

The supply constraints are again considerable. The same labour cost productivity problems apply as in traditional labour intensive manufacturing industries already discussed. In addition, the severe obstacles facing 'industrial' agriculture would have to be overcome. These would not only include a transformation of traditional agriculture more far reaching than that required to introduce smallholder crops for local markets, but also greatly improved safer, faster and lower cost internal transportation conditions.

Rubber Tyre Processing

Papua New Guinea is a small rubber producer and an even smaller rubber consumer. Natural rubber, moreover, is mainly used for heavy aviation, tractor and similar tyres, whereas ordinary motor vehicle tyres are more economically made from synthetic rubber.

Economic motor vehicle tyre production in low wage countries using labour intensive techniques with highly productive labour and management begins at about 1,250 tyres a day or 400,000 units a year. This would equip or re-equip nearly 100,000 cars a year. Internationally traded tyres are produced in much larger units with more capital intensive techniques starting with a production of 10,000 units a day, or about 3.5 million units a year. A number of developing countries began producing tyres for the domestic market, but only when the domestic market for motor cars grew to quite a large size. The costs were generally high. Only a handful of these plants have become internationally competitive. Rubber processing has played a very minor role in this process. Establishing an efficient manufacturing location for one of the principal transnational corporations that dominate tyre production world wide has been far more important, and this has required a productive management and labour force and low labour costs. Malaysia, for example, has been able to become a major tyre producer on this basis.

Soluble coffee

Papua New Guinea is a somewhat more significant producer of coffee than of rubber, but its domestic demand is small, only about 200 tonnes a year.

Coffee can be exported in green form, vacuum packed, roasted and/or ground, and in 'instant' form. The producer wishing to export directly to foreign markets has to take all the marketing risks and bear all expenses, unless this is undertaken by major distributors in consumer countries. The freight advantage is in favour of bulk shipment of green beans, and this is how most coffee is shipped, though large scale Latin American producers ship vacuum packed roasted beans as well as ground and soluble coffee. The minimum practical output of instant coffee is some 1,500 tonnes of coffee bean input for 500 tonnes per annum of instant coffee. The Arabica coffees grown in the Highlands are preferred for direct consumption, with the lower quality Robustas grown around Lae generally used for instant coffee. For large scale instant coffee exports supply would be a problem. The instant coffee market is also highly competitive so that market access and sales expenditure have to be borne in mind in considering processing.

Vegetable Oil Processing

The economics of oil processing are highly dependent on the technology used, and this in turn depends on local skills and wage rates. Some countries, notably the Philippines, were able to build up labour intensive coconut oil processing for domestic consumption and exports and on this basis to move into oil product manufacture. Palm oil processing has similarly developed in Malaysia, both for the domestic and export market. Expansion of this industry is a possibility if costs can be kept down to world levels as output and domestic consumption rise.

Timber Processing

Tropical hardwoods and the products based on them are among the very few tropical primary products that have consistently risen in value in relation to other primary commodities and manufactured goods since World War II. Demand has been increasing strongly as incomes have grown in industrial and other countries,

while the supply has become smaller as tropical forests have been felled and replanting has lagged behind felling. Access has become more difficult and hence costlier as the easily accessed forests have been felled. These trends have encouraged many tropical countries with timber resources to begin exporting timber. The long term prospects are nevertheless good.

Papua New Guinea has large forest resources. Although its forests typically consist of dispersed stands of numerous species, it is a relatively small timber exporter, and it exports most of its production in the form of logs (Tables 5.1 and 5.2) avoiding the high labour and other costs that would be incurred in processing. Processing is currently limited to sawmilling and the production of building timbers largely for local construction, limited plywood manufacture for the domestic and Australian markets, and chip production for pulp. A very successful chopstick producing factory burnt down and it has not been revived. It was always a very marginal operation with Chinese competition having the advantage both in labour and transport costs. There is some manufacture of furniture of wide ranging quality for the local market and an attempt to export to Australia is being made on a small scale.

The lack of growth in timber and timber processing is the result of many factors. A fundamental problem is the lack of a forestry policy. Present logging operations are high cost as a result of unresolved land ownership, resource tax, replanting dispersed species and infrastructure problems. Small scale production leads to lack of marketing economies for Papua New Guinea timber which is therefore poorly priced in international markets. The lack of external economies leads to waste. Examples of exotic species being chipped for pulp have been noted. The other high costs of manufacturing characteristic of Papua New Guinea are increased by remote locations which do not, however, lead to a lowering of labour costs. Under present circumstances the expansion of logging and processing is unprofitable and probably socially uneconomic. In practical terms, logging is the only option.

Table S.1

Timber Exports, 1979

Country	Logs	Sawwood	Plywood	Logs	Sawwood	Plywood	Annual Growth Rate 1961-79		
	'000m ³	'000m ³	'000m ³	%	%	%			
Papua New Guinea	445	36	6	30.1	14.0	-2.5			
Indonesia	19,407	1,321	116	31.6	28.7	186.6 ^a			
Malaysia	16,084	2,856	432	9.7	9.0	31.4			
Philippines	1,248	914	406	-6.6	8.6	9.5			

^a Annual percentage growth rate, 1975-79.

Source: F.A.O., Yearbook of Forest Products, Rome, various issues;
F.A.O., Yearbook of Forest Products Standard Tapes, Rome, 1961-79.

Table 5.2
Production of Timber, Non-Coniferous

	Sawlogs and Veneer		Sawnwood	
	1969-71	1980	1969-71	1980
	'000m ³		'000m ³	
Papua New Guinea	471	1,093	79	113
Malaysia	18,018	31,469	2,939	5,147
Indonesia	10,468	21,200	1,662	3,400
Thailand	2,797	2,428	1,219	1,214
Australia	7,105	5,621	2,460	1,952

Source: Food and Agricultural Organisation, Monthly Bulletin of Statistics, February 1982, Rome.

Timber processing, however, shows the greatest promise for a major export oriented manufacturing activity for Papua New Guinea.

- . It is resource based.
- . It would satisfy domestic needs and cater to a growing world market with prospects for price appreciation in relation to other commodities.
- . It would be import substituting as well as foreign exchange earning.
- . It is labour intensive and would contribute to employment growth.
- . Internal and external economies of scale could be achieved within the foreseeable future.

The promotion of the timber industry would, however, require policy and administrative reform in the following areas:

- . Forestry development policy, including the settlement of land related issues, infrastructure development, a settlement of resource tax issues, and national/provincial government agreement on the specifics and administration of such policies.

- . Social and physical infrastructure development, including main road and port development and the training of skilled workers and the guaranteeing of security in forestry areas.
- . An appropriate wage and salary policy.
- . Clear guidelines on foreign investment.

An integrated timber processing industry could then be established on a substantial scale without incentives to process timber and market it for a long term sustained yield. Direct and indirect employment and balance of payments benefits would follow. Without such changes of policy, however, even very considerable incentives that would tend to erode the benefits to the economy would not be likely to draw national or foreign investors. Even with such policy changes, the mixed nature of most of Papua New Guinea's timber stands would still imply costly development.

CHAPTER 6
PROMOTING MANUFACTURING:
THE COSTS AND BENEFITS OF INCENTIVES

Sound macro economic policies - monetary, financial and fiscal - that result in stable economic conditions and reflect real resource costs for goods and services and factors of production are critical to industrial development. In a well run economy macro economic policies will scarcely be noticed, but inflation, overvaluation of the rate of exchange and the inability to borrow for working capital, which are typical of inappropriate macro economic policies, result in great difficulties for entrepreneurs. The micro economic policies that determine the other principal prices in the economy - trade, labour and education - are equally important for manufacturing industries. But attempts to offset weaknesses in the basic policies by industry and even product specific incentives can lead often to slow growth. Like inappropriate policies, incentives used to stimulate manufacturing lead to unintended and unanticipated 'by-product' effects that result in gross distortions and inefficiencies. They often lead to corruption. Overall the absence of an appropriate macro and micro economic policy framework slows down national income growth below the 7 per cent or so a year that developing countries have the right to expect.

The basic difference between guiding an economy through price signals - that is appropriate interest, exchange and wage rates - and ensuring that market forces reflect international conditions, and using incentives to stimulate particular activities, is that general price signals do not require detailed administration whereas incentives do. Price signals thus avoid the employment of large numbers of public servants and the errors of judgement that are an inevitable accompaniment of administrative rule. Incentives introduce an element of 'moral hazard', that is manufacturers are tempted to take risks they would not otherwise take because they know the government will pay for their mistakes. Once manufacturers are aware that they are available, they would be less than human if they did not exploit them. Incentives give rise to monopolistic benefits or 'rents'. For example, the possession of an import quota or a government contract is a source of profit. Entrepreneurs become 'rent seekers' and rent seeking takes manufacturers from the factory floor and sales office to the ante rooms of ministers where they seek such privileges as tax holidays,

subsidies and tariffs. The cost of the ensuing profits falls heavily on consumers and other producers. The distribution of income worsens. It is a 'dead weight' on the economy. The economic leaders of countries as successful as Taiwan and Korea consider that they would have had faster, more efficient and more equitable growth if they had not initially chosen the incentive route to development, but moved immediately to price signal regimes. In Korea the incentive structure has led to costly structural mistakes, for example in uneconomic investments in the heavy engineering industry. In Japan it is often argued that direct government intervention by regulation has led to as many problems as it has solved.

Papua New Guinea is in an extremely favourable position in relation to other industrializing countries because it has maintained a sound macro economic framework since independence. Until the late 1970s it also had a very open trading regime. It would seem wise to build on this base by improving those micro economic policies that, largely as a result of the country's colonial heritage, are not in keeping with development needs. This would mean reforms on the lines indicated in Chapter 3, particularly in relation to infrastructural investment, education, manpower and wage policies and personal and property safety. This would also be the least cost way of stimulating industrial growth. The use of incentives in contrast needs careful analysis, instrument by instrument, to ensure that their use is not counterproductive. Each incentive has to satisfy the following criteria if its benefits are to outweigh its costs:

- . The cost of incentives to manufacturing both in terms of the subsidy made available or income foregone, the cost to consumers or other producers, negative balance of payments effects and administrative costs, should be smaller than the benefits created by the industry stimulated by such an incentive.

- . An incentive should be stable and simple to administer so that it does not increase the uncertainty that entrepreneurs face and so that it cannot be misused for the private profit of the administrators or

manufacturers. Incentives should not lend themselves to loose interpretation. They should not lead to delays in decision making and implementation. However, they should not be so rigid that they create impossible situations for entrepreneurs.

- Incentives should be designed to attack a problem as directly as possible. For example, a high wage cost is best offset by a wage subsidy, not by tariff protection. The intent and their administration should be as transparent as possible so that views of consumers and others affected by them may be clearly heard.

- The costs and benefits of alternative incentives should be carefully evaluated.

- The 'moral hazard' introduced by the presence of incentives should be minimized.

Protectionist Import Substitution Measures

In seeking incentives, manufacturers' first preference is normally for 'border' protection, that is, they want tariffs or import restrictions, and preferably both to protect them from the competition of imported goods. Protecting the national market against imports encourages national and foreign entrepreneurs to take the risks entailed in investment in manufacturing. However, protectionist measures raise the cost and often reduce the choice of manufactured products available to consumers. It is argued, however that:

- (a) Entrepreneurs would not be forthcoming without the guarantee protection brings.

- (b) It is worth protecting 'infant' industries to help them while they build up their efficiency and economies of scale. The protection granted is only temporary and will be lifted as soon as the 'infant' industry gains experience and grows up.

- (c) The costs of protection are worth the benefits in terms of employment creation, the training of nationals at various levels of expertise, the transfer of technology and so on.
- (d) Protection is needed to offset inappropriate macro economic and other policies which raise production costs.

There is clearly merit in all these arguments, but there are also counter-arguments. Policy has to strike a balance that is appropriate for a country at a time - that is for Papua New Guinea in the mid-1980s.

- (a) Entrepreneurs have begun manufacturing in many countries, and have done so in Papua New Guinea, without protection when they have seen profitable opportunities in a market. Papua New Guinea enjoys 'natural' protection for some products.
- (b) Putting entrepreneurs on notice of the availability of protection encourages them to seek it even if they don't need it. They would not be entrepreneurial if they did not seek it. Formal statements of the availability of protection are not necessary for such 'rent seeking'. As soon as one or two entrepreneurs receive protection, others will seek it. This has already happened in Papua New Guinea.
- (c) The direct and indirect costs and benefits of protection must be measured very carefully to ensure that the costs do not exceed the benefits in the long as well as in the short run to avoid the mistakes made by other countries that have allowed protection for a small but privileged manufacturing sector to cripple their entire economic growth.
- (d) Protectionist measures need to have reviews built into them so that protected 'infant' industries do not turn into 'protected' senile industries as has happened in Australia with clothing, textiles, footwear and motor vehicles.

- (e) Protection can only partially mitigate some of the costs imposed on manufacturing the inappropriate national macro and micro economic policies and can only do so in the short run. In the long run, by its general effects on the economy, it will worsen the situation through its unintended by-product distorting effects and strengthen the political force of the vested interests it encourages.

If it is decided to give 'border' protection to 'infant' industries, several instruments are available.

Tariff Protection

Most developing countries use tariffs as a form of tax and even a low tariff (custom duty) gives some protection to producers. Even with a uniform tariff the effective rate of protection will vary from product to product, because the local value added in each product which the tariff protects will vary from product to product as will the ratios of inputs such as raw materials and machinery used on which tariffs also have to be paid. This will be even more so with differential nominal tariffs. In practice it turns out to be very difficult to construct a tariff so as to give enough but not too much protection, and the difficulties increase as the number of goods protected increases, and particularly as protection moves from final use 'consumer' to 'input' producer goods. Protection on raw materials and products that are inputs for other industries quickly escalates the costs of production. Manufacturers seek tariffs that are 'tailor-made' to their needs, but such tariffs create problems for the economy as a whole, raising the costs of production for some producers but not for others. To avoid the heavy costs of tailor-made tariffs, the following rules should be followed:

- (a) A tariff should be as uniform as possible, taking account of the economy's needs for revenues as well as incentives for manufacturing. (Low tariffs are often better revenue tariffs than high tariffs because they do not discourage consumption.) A uniform tariff is less distorting than a tailor-made tariff.

- (b) Tariffs should take the 'ad valorem' form so that they do not need revision with price changes and so that they are 'transparent'; that is, so that their impact is easy to calculate.
- (c) All tariffs should be matched by equivalent domestic taxes. This is particularly important for excise and other tariffs on luxury items such as alcoholic beverages.
- (d) Specific tariff protection must be limited if it is to be effective. If most manufacturing receives protection, then the effective protection for each activity is diminished, although the distortions imposed on the economy become very serious.
- (e) Tariff decisions should be based on a careful evaluation of the costs and benefits of protecting a manufacturing activity, and they should be subject to open hearings to enable various producers and consumers who would be affected by tariff changes to be heard. Countries that have lacked an open advisory tariff structure leaving tariff making to bureaucratic processes have run into serious tariff structure difficulties that have required costly remedies.

Tariff protection has two important merits. Firstly, particularly if it is 'ad valorem' in form, it is transparent. The extra costs imposed are readily visible, although the real value of the protection they grant is only evident when effective protection has been calculated. Secondly, consumers have a choice of imported products, providing they are willing to pay the higher price. This is not the case with import restrictions.

Import Restrictions

Manufacturers like import restrictions because they exclude price and quality competition. On the positive side, by reserving the entire domestic market to the protected producers, import restrictions give the maximum economies of scale that are available in the economy to those producing locally. This can be

effective in a very large market where intensive competition among local producers can substitute for external competition. This has been the case to some degree in Japan, Brazil and Korea, though not in most other countries including India and the Philippines.

However, in small countries such a process cannot take place because internal competition is restricted to one or two producers. Some countries have attempted to use price controls to limit prices in these circumstances, but these have not been generally effective.

Partial import restrictions, limiting imports by quota, have been an even more unsuccessful form of protection. The import quota, by giving privileged access to imports, provides more opportunities for profit than manufacturing. Some countries publicly auction such quotas to at least appropriate the profits to public revenues, but this is difficult in a small economy.

Quantitative import restrictions are very opaque. The costs of protection to consumers are not known. They have the further disadvantage of being very difficult to remove once they are adopted. They are thus inefficient and should be avoided.

Subsidies for Import Substitution

The most efficient way of protecting industries that avoids the difficulties and distortions of tariffs and import restrictions is by direct subsidy. The only costs incurred are to the budget, they are accurately known, and there is no cost to consumers and other producers. The budget appropriation process ensures that the cost effectiveness of the subsidies is considered in relation to other government expenditures and policies. Uncertainty can be avoided by forward commitments, in principle, for 3 to 5 years, but the budgeting process also ensures that protection will not be granted indefinitely regardless of the industry's performance.

Against subsidies it is argued that the cost of tariffs and import restrictions, by being hidden, is not felt by those who pay this tax equivalent. Such amounts might be difficult to raise as a tax. This is no doubt true, but the sums involved are nevertheless taxes, and on consumption goods such as flour and sugar they are highly regressive taxes, worsening income distribution. Subsidies can, of course, only be used if the case for protection is strong and well established. Otherwise they cannot stand the scrutiny of budget discussions. A case for subsidies might be persuasive, for example, to offset the high cost of labour by tying subsidies to employment creation. This has the further merit of indicating the cost of protection per worker employed.

Protection Against Dumping

Strictly speaking exports are 'dumped' when action is taken to prevent another exporter or a local manufacturer from capturing a market. Such action generally consists of a sharp reduction of prices, but such a reduction is essentially temporary. The objective is to exercise monopoly power by raising prices when the local producers and/or other importers have been frightened away. But prices of imports are often low because costs of production are cheaper abroad or because products for exports are marginally priced. The imports of UPVC plastic pipes (Tariff Board case 1981) and poultry eggs (1982) were examples. A country can often benefit from such low import prices if they are effective long run 'border' prices. While countries naturally want to protect themselves against 'dumping' by taking appropriate action, particularly if local production is being disrupted, protection against long term low prices is the same as protection against other competition. A country is giving up real resources by adopting protectionist measures against such goods.

Export Incentives

Export incentives fall into three groups: those necessary to offset the costs of protection, those required to offset high costs of production resulting from other inappropriate policies, and those offered to entrepreneurs so that they will take the risk of investing in 'infant' export industries.

It is clearly necessary to offset the extra costs imposed on manufacturers by protection if they are to compete internationally and doing so is not an 'incentive' to exports. Some of the costs to exporters such as those of tariffs on imports are direct. They can be offset by exempting exporters from such payments, or reimbursing them later by returning their money through 'drawbacks'. Revenue tariffs and value added taxes on domestic production are commonly treated the same way. Exemptions are usually preferred to drawbacks because they are more direct, involve less paper work, and are hence quicker and less costly.

The high costs of inputs and wages that result from protection are more difficult to offset. The only effective way to do so is by cash subsidy to value added in exports. This, however, runs into the subsidy cost problems already discussed. A variety of instruments has therefore been used to offset the general costs of protection. These include premiums in the domestic market through high prices so that domestic consumers of a particular product subsidise its export. This is not equitable, and in a small country, impracticable. 'Wastage' allowances that permit producers to avoid payments of import duties on part of the raw materials or components for their domestic production are common, have a similar effect, but are also only viable if there is a large domestic market. They are, moreover, bureaucratically complex. Alternative instruments such as tax holidays are therefore frequently used. These are discussed below.

Offsetting the high costs of inappropriate policies elsewhere in the economy presents similar difficulties. High domestic prices, tax holidays and infrastructure subsidies, all discussed below, are therefore frequently introduced.

'Infant' export industry 'protection', or incentives to stimulate entrepreneurs to take risk are usually less effective than those that grant protection in the domestic market. The risks in production for export cannot be eliminated or even substantially reduced. The number of producers and consumers in international markets is normally large, and profitability depends on competitiveness. And entrepreneurs will only enter export production on a substantial scale if convinced that there is a strong possibility of success.

In sum, 'offsetting import substitution protection by export incentives' is a glib response to the very complex problems created by protection for the domestic market. It has only been practised successfully by countries with a strong comparative advantage in highly productive and relatively low cost labour, a strong entrepreneurial base, the 'right' exchange rate and other domestic prices, a relatively large domestic market in which exporters can absorb some of the export costs, and a sophisticated administrative system. Taiwan and Korea have been the notable successes. In most developing countries where such conditions did not prevail, the attempts to offset protection for import substitution by export incentives has failed miserably. The Latin American countries are notable examples. Mexico is the only major exception because it was able to establish 'border' industries manufacturing for exports. Chile, Argentina and Uruguay finally opted for high cost drastic reductions of protection to escape the high costs of protection. The inability of export incentives to offset the high costs of import substituting protection is a major reason for Brazil's severe problems, and for India's extremely poor performance. In marked contrast countries like Malaysia and Thailand that had appropriate macro and micro economic policies, with only modest effective protection for import substitution, have been able to make steady progress in manufacturing for export.

Government Purchase Preferences

Governments frequently favour their entrepreneurs by giving them preferences in government purchasing. This is the equivalent of a cash subsidy. The extra cost due to lower prices or lower quality is paid out of the national budget. The costs and benefits vary with producers according to the price premium that is acceptable.

Tax Incentives

Although taxes have a different impact on national and foreign investors, all entrepreneurs have to be treated equally for reasons of equity and for practical purposes, to avoid corrupt practices. A developing country's corporate tax and personal income taxes should therefore normally be at the same level as capital exporting countries. Otherwise, unless double tax agreements (or the capital exporting country's unilateral regulations) specify 'tax sparing', a lower tax level in a developing country will benefit the tax collections of the capital exporting

country. Tax 'sparing' allows a company to claim taxes saved in another country as if they had been paid when the company remitted profits to the home country. Japan writes such provisions into its double tax agreements, and countries such as Australia and Germany make such allowances. The United States does not do so.

The emphasis in corporate and individual tax collections should be on stability and simplicity. A multiplicity of taxes merely serve to irritate large firms and income earners and confuse the small ones, while frequent changes in taxes increase the risks that entrepreneurs face and thus discourage entrepreneurship.

Tax Holidays for Import Substitution

Tax holidays began to be advocated by the International Chamber of Commerce in the early 1950s for foreign investors on the assumption that such investors would not venture into developing countries. This, of course, has not been the case. Foreign investors have flocked to developing countries whenever profitable primary processing, domestic market or export base opportunities beckoned. Tax holidays then unfortunately become a means of competition for foreign investment because of inappropriate domestic policies. They have also been used to attempt to offset the high costs imposed on exporters by protectionist and other inappropriate policies. They have not, however, been successful in increasing entry either by national or foreign entrepreneurs for several reasons.

Most manufacturing enterprises take time to become profitable. With carry-forward-loss provisions it takes 5 years or so for a firm to have taxes to pay, so that short term holidays do not have a great deal of value. However, even longer term tax holidays are usually not sufficient to encourage entrepreneurs who would otherwise not enter into manufacturing to invest. Serious entrepreneurs need to see profits already. They are accustomed to paying taxes on them. Thus while entrepreneurs naturally take advantage of tax holidays if they are available, tax holidays are by and large redundant. That is, serious investors invest without them. If special tax 'sparing' conditions do not exist, moreover, it is not the foreign firm that benefits, but its parent country tax collections. Tax holidays also encourage transfer pricing at other than arms' length among a transnational's

branches to minimize tax. With tax 'sparing' this may mean loading profitability in a developing country, at least until the tax holidays run out. From the host country's Treasury's point of view this is largely a throw away incentive.

The structuring of tax depreciation, carry forward of loss, and similar conditions tend to be more important than tax holidays per se. For example, given the high capital intensity of manufacturing in Papua New Guinea, double and treble depreciation for corresponding two and three shift scheduling could lead to substantial reductions in capital employment ratios if combined with the elimination of shift work penalty rates.

Tax Holidays for Exports

Tax holidays for exports form a somewhat special incentive category, even on a permanent basis if they permit manufactures to compete effectively internationally where they could not otherwise do so. If the industry is not subsidized in any other way and contributes substantially to employment, foregoing all or some of the tax that a country could collect may be a worthwhile form of encouragement to exporters.

Incentives and Disincentives for Private Direct Foreign Investment

Foreign investors, being highly experienced in business, are mainly concerned with the opportunities for profitable operations. They thus either require reasonable consumption horizons in domestic markets or a profitable base for exports. Such firms will begin import substituting manufacturing if a country's incentive structure indicates that they would otherwise lose their market share to others, but they do not need additional incentives. They do need guarantees against arbitrary nationalization without compensation and assurance that they will be able to repatriate capital and dividends. Papua New Guinea not only offers such guarantees formally, but even more importantly, informally by its healthy mineral export performance.

Infrastructural Incentives

Some developing countries seek to offset limited infrastructural facilities by industrial estates. These have the merit of reducing infrastructure costs for the country by concentrating water, sewerage, power and access road requirements into one area. Land ownership (or long term lease) difficulties can be overcome more easily than in scattered areas. If they are well located, close to areas where small scale and informal business activities can flourish, and close to serviced sites on which workers can build their own housing so that their transportation costs are reduced, they can be quite effectively cost reducing. But areas with most of these characteristics already exist in or near some Papua New Guinea urban centres and more can be done to consolidate them so that industrial estates are unnecessary in most cases.

Industrial estate development has been successful in some developing countries, notably in Malaysia, Singapore, Hong Kong and Tonga where the United Kingdom's experience in this area was adapted to developing country conditions. But despite pre-conditions which seemed to point to the desirability of industrial estates in other countries, most have failed. The costs of public development have been much higher than those of private developers. The estates have often been poorly located, particularly with respect to communal and informal activities.

Although governments are generally urged to recover full costs from public utilities, where this would mean high input costs by international standards, public utility subsidies are sometimes urged, particularly for exports. They may be necessary for international competitiveness and preferable to other less direct forms of subsidy. The best policy, however, is to identify the reasons for high costs in utility production, and eliminate them.

Export Processing Zones

Export processing zones have also been very successful in a few countries and failed in most others. The reasons for such differences are well established. There are three main reasons for isolating production for export in an export zone. The first is connected with the sort of infrastructure costs that influence the creation of industrial estates. If a country can guarantee that the power,

telephone and other facilities will work for exporters as for other manufacturers, that workers will be able to get to their place of employment, and so on, export zones are unnecessary.

A second and more important reason is concerned with overcoming high costs due to protection and other distorting policies. These can be offset by avoiding customs payments, subsidising power and other public utility rates to bring them down to international levels and so on. Special conditions can be made for workers in export zones: lower than normal learners' wages can be introduced, special training facilities can be provided and penalty rates for overtime and shift work can be suspended.

A third reason for export zones is to make the establishment of an enterprise easy culturally for foreign investors. Japanese firms for example, seem to prefer a structured environment in which they can conduct their negotiations in Japanese. Services for exporters can be concentrated in one office, reducing the effort a local or foreign firm needs to make to complete bureaucratic formalities.

Export zones, however, have costs as well as benefits. There is a major danger of smuggling duty free goods into the domestic market. This either undermines producers or importers for the local market or leads to fresh regulations and paper work that negates the purpose of the export zone. Integration with the national economy by using local machine shops to manufacture spare parts of components, by developing local packaging and so on tends to be reduced to a minimum.

Export zones thus tend to be economic where the local economy is so constrained by protection that tariff exemptions and drawbacks are not practicable, or if a large number of firms wish to enter export activities on the basis of imported raw materials or components rather than being based on local raw materials.

The Incentive Mix

While all incentives have some costs since any subsidy must somehow be paid for, individually these can be measured against the benefits. In many developing countries, however, several incentives are used simultaneously to encourage manufacturing under the impression that the more incentives the better. The opposite is likely to be the case. Firstly, unless the gap between an 'infant' industry's cost of production and international prices is modest, production should not be undertaken at all. If protection is modest, a barrage of incentives is not necessary. Some countries have unfortunately deployed a barrage of incentives which have all had distorting, and often contradictory effects, and thus been costly to the economy indirectly as well as directly, but that have had little positive effect on investment because they are redundant.

One of the frequent cumulative distorting effects of incentives to industrial development is to favour the substitution of capital for labour. This is inherent in many economies in which labour remuneration is higher than productivity. If capital is then further favoured by a tariff structure that allows capital goods in free while protecting final products, and tax holidays that are tied to investment amounts rather than employment increments, the distorting effects are increased.

Promoting Manufacturing and Exports

Governments of countries such as Papua New Guinea that for historical reasons lack a cadre of national experienced entrepreneurs have to play a role in stimulating industrial development in its initial stages to make sure that economic opportunities are not foregone, particularly in exports. Promotional activities should try to ensure that:

- an appropriate mix of national and foreign investment is maintained in manufacturing;
- national entrepreneurs are assisted to find opportunities and partners;
and
- entrepreneurs can get into business quickly and efficiently.

Such objectives presuppose four functions. The first requires a factual base that must be developed in close collaboration with other statistical sources. The second is a long term indicative planning function that links potential manufacturing production with infrastructural and broad policy needs. The third consists of facilitating the start up process. The fourth is needed for contact with international and national organizations working to expand the developing countries' manufacturing and exports.

An Information Base

Basic information about existing industries has to be available in terms of investment, employment, output and so on. This work is generally done by a central statistical office. Such information can be readily complemented by international data that will enable the performance of existing and planning industries to be evaluated. For a small country like Papua New Guinea that can readily use international statistical resources this should not use much staff time.

Analytical Capacity

Two types of industrial analysis are required. Industrial perspectives have to be co-ordinated with overall policy and infrastructure planning for budgeting purposes and longer term overall indicative planning. Where specific incentives are proposed for manufacturing purposes their costs and benefits have to be evaluated in a sufficiently robust way to stand up to public scrutiny. Industrial policy must be validated in relation to all other policies. These functions should not involve many staff members in a small country.

Assisting Entrepreneurs

The complexities of bureaucratic regulations in developing countries may require that a 'one stop shop' be established to assist local and foreign entrepreneurs to obtain various clearances necessary where such procedures cannot be simplified. Unfortunately, in practice such attempts have not helped very much, but on the contrary, tended to add one more procedure to many others, and increased the numbers of officials employed unnecessarily.

International Contacts

The multiplicity of international and national organizations that seek to help developing countries has increased bureaucratic demands on developing countries, often with little positive result. Such organizations need to co-ordinate their activities with each other much better than they now do to avoid wasting the developing countries' scarce resource of skilled manpower. The developing countries also need to protect themselves against the many demands of such organizations by making their own judgements about their actual positive contributions to industrialization and growth.

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