1992 TDRI Year-End Conference on
Thailand's Economic Structure: Towards Balanced Development?

Exports, Structural Change and Thailand's Rapid Growth

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The 1992 Year-End Conference

THAILAND'S ECONOMIC STRUCTURE: TOWARDS BALANCED DEVELOPMENT?

Background Report

Exports, Structural Change and Thailand's Rapid Growth

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1. INTRODUCTION

Many of the elements of Thailand's remarkable economic transformation in recent years are quite widely known. The principal feature has been a shift from agriculture to industry and manufacturing as the driving force of economic growth. A major hypothesis in this regard is that a significant part of this successful growth of the manufacturing sector has been fuelled by very high levels of foreign and domestic investment, and especially by the extremely rapid growth of exports.

The purpose of this paper is to provide an overview of some of the patterns of recent Thai economic growth, and especially the performance of the manufacturing sector and manufactured exports. The main reason for doing so is to provide a context for the various sectoral studies being done in connection with the 1992 TDRI Year End Conference, *Thailand's Economic Structure: Towards Balanced Development?* TDRI's most recent attempt to examine Thailand's growth in the context of its position in the global economy was a series of studies for the 1989 Year End Conference, *Thailand in the International Economic Community*, together

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with a follow up monograph on Thailand's export led growth.[1] These studies were undertaken soon after the beginning of the recent boom period, and were based on data up to the end of 1987 or 1988 at the latest. Currently available data almost doubles the number of years of evidence on the most recent growth experience. The accumulation of this more recent data, together with the benefits of several additional years to reflect on and react to the implications of recent performance make such an update appropriate at this time.

2. AN OVERVIEW OF RECENT PERFORMANCE AND STRUCTURAL CHANGE

For some time now, Thailand has had one of the world's fastest growing economies. For the two decades prior to 1979, it experienced growth which averaged 7 to 8 percent per annum. In the second half of the 1980s, Thailand's annual growth rate averaged 9.9 percent. This remarkable performance has spanned a period of considerable international turbulence which has included major shocks to world commodity prices, significant realignments of the world's currencies, and bouts of international inflation, stagflation and recession. The Thai economy has adapted to these events and has been able to continue the process of rapid growth. Internal shocks, including recent tragic political events, have also had to be faced. And yet, despite the obvious difficulties created by the external environment and domestic political events, growth for 1992 will still exceed 7 percent.

Recent growth has been anything but balanced. In 1965 agriculture accounted for 32 percent of national output and over 80 percent of the labor force. By 1990 these shares had fallen to 12 percent and less than 70 percent respectively. At the same time the share of industry in national output rose from 23 to 39 percent, and its share of employment rose from 5 to 6 percent. The manufacturing sector alone, which accounted for only 14 percent of national output in 1965, now accounts for 26 percent. The share of output arising in the service sector has risen slightly from 45 to 48 percent over this period. The share of services in employment,

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[1] *Narongchai Akrasanee, David Dapice and Frank Flatters, Thailand's Export-Led Growth: Retrospect and Prospects Bangkok: TDRI Policy Study No. 3, 1991.*

however, has risen from 13 to almost 25 percent.[2]

An examination of the decade of the 1980s shows an acceleration of this process of rapid structural change. During the first half of the 1980s, from 1980 to 1984, manufacturing's share in GNP grew to exceed that of agriculture for the first time in Thailand's economic history. While agriculture's share fell from 23.2 to 18 percent of GDP, the share of manufacturing grew from 21.3 to 22.4 percent. From 1985 until 1990 the process accelerated even more, with manufacturing's share rising to 26.1 percent and that of agriculture falling to 12.4 percent. In other words, by 1990 the share of agriculture in GDP, which had exceeded that of manufacturing at the beginning of the decade, was less than half of it by the end.

While this general pattern of change has been quite consistent over the decade, the forces driving it have altered considerably. The decline of agriculture in the first half of the decade was due, in part, to the end of extensive agricultural growth. This arose from the end of the opening up of new land through deforestation. It was also caused, in part, by a decline in the agricultural terms of trade. Manufacturing growth over this period was due mostly to protection-induced growth of import-substitution industries. In the second half of the decade, the lack of new agricultural land continued to contribute to the relative decline of this sector, which has occurred in spite of an improvement in agriculture's terms of trade. Thus, the most rapid decline in the share of agriculture occurred at a time of improving agricultural prices. Furthermore, in the latter half of the decade, the orientation of the manufacturing sector shifted significantly away from import substitution activities towards those focusing on exports.

The structural shift from agriculture to industry and manufacturing has provided many benefits to the people of Thailand. By the beginning of the 1980s, opportunities for further extensive agricultural development had virtually disappeared. Frontier lands had become increasingly inhospitable to traditional agricultural uses. Agricultural development in these areas

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[2] *Output data comes from World Bank, World Development Report, 1992, and data on employment shares comes from UNDP, Human Development Report, 1992.*

was causing serious land deterioration. Forest degradation resulting from the opening of frontier areas was imposing rapidly increasing costs on the Thai population. This culminated in the tragic floods and landslides in southern Thailand in 1989, and the subsequent decision to ban logging throughout the Kingdom.

While intensification of agriculture continues to offer opportunities for further development of that sector, the potential for employment and income growth through that sector are severely limited. Continued reliance on agriculture on the relative scale to which Thailand had become accustomed would have led to some combination of further environmental degradation and declining, or at least stagnant, income and employment growth for Thai workers. It was necessary, by the beginning of the last decade, to find another source of dynamic growth possibilities. The industrial and manufacturing sectors have clearly begun to play that role.

Industrial growth brings with it a new set of policy concerns. The role of the education system in enabling workers and entrepreneurs to adapt to and gain from the new opportunities becomes especially important.[3] Timely provision and management of urban infrastructure is essential to the sustainability of the urbanization process that accompanies industrialization. New environmental issues arising from rapid industrialization also have to be dealt with.[4] The emergence of new social structures requires attention to the provision of basic social services through the public sector that previously might have been internalized within extended family networks in rural areas. The dimensions and consequences of urban poverty differ in significant ways from those of rural poverty.

A large part of the story of the enormous structural changes in the Thai economy over

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[3] *See TDRI's 1991 Year-End Conference papers on Educational Options for Thailand for a review of many of these issues.*

[4] *See TDRI's 1990 Year-End Conference papers on Industrializing Thailand and its Impact on the Environment for analysis and an overview of many of these issues.*

the last couple of decades, therefore, concerns the shift from agriculture to industry. This aspect of the changing balance of economic forces has certainly flavored much of the popular discussion of recent economic growth in Thailand. A closer look at the data, however, reveals that the combined shares of these two sectors in GDP has actually fallen from 44.5 percent at the beginning of the decade to 38.5 percent by the end. The share of non-agriculture, non-manufacturing output in GDP has risen by 6 percentage points, which is more than the increase in the share of manufacturing over the period. By this measure, the fall in the share of agriculture is "explained" at least as much by the growth of non-manufacturing output as by that of manufacturing.

Almost all of the rise in the output shares of non-agriculture, non-manufacturing activities has been the result of increases in two relatively small components -- construction, and banking, insurance and real estate. The construction sector has always been somewhat cyclical, with its share varying between 3.8 and 5.8 percent over most of the past two decades. Before 1988 there were only two years in which its share exceeded 5.3 percent. The recent growth boom, however, has seen an explosion in the growth of this sector, with its share rising to 7.2 percent of GDP in 1990. The other principal growth sector in non-agriculture, non-manufacturing output has been banking, insurance and real estate. In 1980 its share reached an unprecedented high of 3 percent of GDP. By 1984, this share had risen to 3.5 percent, and by 1990 it had reached 6.1 percent, more than double its share at the beginning of the decade. Continued GNP growth is likely to mean further increases in the share of services relative to agriculture and manufacturing.

The recent growth experience, therefore, could be described just as easily as a boom in construction and financial services as one in manufacturing. The reason that it is generally referred to as a manufacturing boom is that the growth of manufacturing is viewed as more "autonomous" and "causal." The growth of construction and financial services activities, on the other hand, is seen as being caused, in large part, by the restructuring of the economy away from traditional agriculture and towards more urbanized and more commercialized manufacturing

activities. The investment requirements of rapid urbanization and industrialization create a burst of construction activity, which tends to be related as much to the rate of growth as to the level of manufacturing output. The process of commercialization of economic activity that accompanies industrialization creates a similar need for rapid growth in the provision of a broad range of financial services. Very rapid growth can also lead to short term bubbles in both construction and financial services which generate a certain amount of autonomous speculative growth in these activities. Thus, although the manufacturing sector might be playing the lead role, to view the recent burst of "hyper growth" simply as a manufacturing boom is to miss some of the important sectoral interactions that have been taking place as part of the current restructuring of the Thai economy. This might be particularly important in examining some of the broader implications of the recent economic boom.

3. GROWTH OF MANUFACTURING

Over the entire period from 1970 to 1990, the manufacturing sector grew at a real annual average rate of 8.2 percent, more than double that of agriculture (4.0 percent). In the decade from 1970 to 1979 the real annual rate of growth of manufacturing was 10.4 percent. The first half of the 1980s showed a dramatic slow down of this rate to only 5.7 percent. The second half of the most recent decade saw an unprecedented boom in manufacturing, with the annual growth rate averaging 13.3 percent. The 1970-79 period is often characterized as the era of import substitution led growth, while the second half of the 1980s is generally portrayed as the beginning of the period of rapid export led growth.

Table 1 provides a disaggregated view of the performance of the manufacturing sector over the 1970-90 period, with output shown in real (1972) Baht on an annual basis. Growth rates over various sub-periods are shown in Table 2. One thing that stands out in these tables is the breadth of the strong economic performance across different manufacturing subsectors in the 1970s and the second half of the 1980s. However, a closer look at Table 2 shows some significant differences in growth patterns in the "import substitution" period of the 1970s and

Table 1: Real Manufacturing Value Added, 1970-1990 (Millions of Baht - 1972 Prices)

		1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
1	Food	4113	4626	4701	5159	5706	6399	7575	8482	8884	9586	9176	10458	11844	11437	12954	13380	14573	15052	17143	19382	19969
2	Beverages	2921	2216	2564	3133	4011	3618	4414	5449	6130	7304	6347	6540	7069	8179	9146	8621	8609	9363	11301	12478	14467
3	Tobacco & Snuff	2119	2228	2330	2701	2797	3117	3415	3256	3312	3762	4263	4527	3722	4011	4021	4022	4090	4332	4659	5107	5288
4	Textiles	2237	3066	3692	4530	4686	5386	6207	7154	8110	8889	9408	9878	10062	10521	11133	11473	13132	14478	16575	18352	20498
5	Wearing apparel except footwear	2282	2429	2730	3511	3614	3954	4148	4407	4952	5315	5895	6419	6697	7209	7773	8260	9301	11284	13545	15383	17542
6	Leather, leather products and footwear	621	686	730	628	743	964	944	1007	1054	1001	1167	1372	1595	1878	1861	1904	2173	2969	3471	4205	4871
7	Wood and wood products	1012	1110	1135	1198	1331	1405	1586	1664	1418	1607	1382	1134	1089	1189	1294	1218	1320	1426	1351	1202	968
8	Furniture and fixtures	480	537	497	456	493	497	580	689	942	678	825	858	795	851	975	991	1136	1255	1466	1562	1701
9	Paper and paper products	348	394	460	458	538	408	536	639	818	1105	181	1181	1176	1249	1325	1367	1407	1672	1867	2013	2192
10	Printing, publishing and allied industries	345	407	473	531	531	625	688	805	933	966	1042	1115	1230	1411	1460	1480	1570	1558	1550	1713	1816
11	Chemicals and chemical products	896	1026	1191	1316	1266	1398	1553	1810	2174	2423	2717	2906	2921	3121	3606	3808	4040	4616	5196	5669	6338
12	Petroleum refining and petroleum products	1408	2053	2676	2887	2835	3076	3443	3768	3563	3762	3367	3527	3748	4017	3736	3908	4326	4527	4687	5251	5743
13	Rubber & plastic products	652	709	806	977	1021	1088	1213	1435	1528	1728	1816	1748	1590	1963	1918	2021	2263	2671	3238	3695	4130
14	Non-metallic mineral products	1003	1090	1278	1438	1523	1554	1735	2077	2203	2269	2357	2558	2558	2833	3354	3315	3513	4145	4903	6152	7183
15	Basic metal industries	678	698	758	773	717	665	783	920	1011	1144	1180	1040	945	898	972	1427	1443	1471	1560	1572	1644
16	Fabricated products	769	841	869	955	883	904	1042	1050	1091	1173	1202	1321	1271	1394	1471	1488	1639	1912	2212	2638	2987
17	Machinery	774	834	870	904	1048	1245	1304	1546	1745	1881	2174	2825	3148	3531	3551	2994	3265	3743	4334	6110	7358
18	Electrical machinery and supplies	481	472	526	660	685	794	927	1225	1552	1690	1901	1890	1921	2395	2709	2415	2822	3376	3994	4736	5644
19	Transport equipment	1379	1694	2262	3015	3033	2509	3446	4888	5121	4850	5054	4765	4194	4799	4755	3175	4249	5321	8125	9725	12246
20	Other manufacturing industries	375	533	763	1008	1016	1102	1404	1384	1796	2030	2530	3007	3248	3887	3948	4196	5392	7118	8287	10315	13458
	Total Value Added	24893	27649	31311	36238	38477	40708	46943	53655	58337	63163	63984	69069	70823	76773	81962	81463	90263	102289	119464	137260	156043

Source: TDRI Macroeconomic Program.

the "export boom" period of the last half of the 1980s. Suppose subsectors are classified as "strong" or "weak" according to whether their growth rates were above or below the average rate for all manufacturing during the subperiod in question.

Table 2: Growth of Real Manufacturing Value Added (Annual Rates – Percent)

		1985-90	1980-90	1970-90	1980-84	1970-79
1	Food	8.5	7.4	7.7	7.8	9.9
2	Beverages	11.1	7.6	8.4	9.5	12.2
3	Tobacco & Snuff	6.0	2.2	4.0	-2.4	6.3
4	Textiles	11.5	7.9	9.4	4.0	14.3
5	Wearing apparel except footwear	15.6	11.0	9.4	6.7	9.4
6	Leather, leather products and footwear	19.5	13.7	9.8	12.5	6.3
7	Wood and wood products	-4.2	-0.5	-0.1	-0.8	5.3
8	Furniture and fixtures	10.9	8.0	6.4	3.3	5.7
9	Paper and paper products	10.1	15.1	9.3	40.4	.10.5
10	Printing, publishing and allied industries	3.7	5.0	8.2	9.1	11.3
11	Chemicals and chemical products	10.5	8.7	9.5	6.4	10.2
12	Petroleum refining and petroleum products	7.3	4.8	4.5	3.4	9.1
13	Rubber & plastic products	15.0	9.1	8.1	2.3	10.8
14	Non-metallic mineral products	16.3	10.8	8.6	8.1	9.3
15	Basic metal industries	2.9	5.6	4.5	-5.3	5.0
16	Fabricated products	14.5	8.8	5.9	4.6	4.2
17	Machinery	18.6	9.2	10.7	12.0	10.5
18	Electrical machinery and supplies	17.0	10.9	12.2	9.5	15.2
19	Transport equipment	27.6	8.5	7.2	-1.1	14.0
20	Other manufacturing industries	22.6	16.0	15.7	11.5	16.8
	Total Value Added	13.3	8.6	8.2	6.0	10.4

Source: Calculated from Table 1.

Note: Growth rates calculated by log-linear regression, based on data in Table 1.

Then, in the 1970s, 9 of the 20 manufacturing sectors were "strong" by this definition, and in the second half of the 1980s, there were also 9. Only 5 sectors -- rubber and plastic products, machinery, electrical machinery, transport equipment, and other manufacturing industries -- were "strong" throughout both of these subperiods. Four subsectors -- beverages, textiles, paper products, and printing -- that were above average performers in the 1970s were below average in the second half of the 1980s, and four -- apparel, leather products and footwear, non-metallic mineral products, and fabricated products -- that were below average in the 1970s became above average performers in the latter period.

On average, growth rates in manufacturing were considerably higher in the latter half of the 1980s than in the 1970s (13.3 percent compared with 10.4 percent). The variance of growth rates across sectors was also greater. Despite the higher average growth in the later period, 7 of the 20 subsectors in Table 2 -- food, beverages, tobacco, textiles, wood products, paper products, printing, and basic metal industries -- had lower growth rates then than in the earlier period. All of the nine "strong" sectors in the late 1980s, including those that were also strong in the 1970s, had higher growth rates in the second of these subperiods. Four of the "strong" subsectors from the 1970s -- beverages, textiles, paper, and printing -- actually showed *decreased* growth rates in the later 1980s. One sector -- wood products -- showed negative real growth in the second half of the 1980s.

Table 3 focuses on the performance and relative positions of these 20 manufacturing subsectors over the boom period of the second half of the 1980s. The five fastest growing sectors over this period were transport equipment, other manufacturing industries, leather products and footwear, machinery, and electrical machinery and supplies. Their aggregate share in manufacturing value added rose from 18.1 to 27.8 percent, an increase of over 50 percent. The four slowest growing sectors were wood and wood products, basic metal industries, printing and publishing, and tobacco and snuff. Their combined share of value added fell from 10 to 6.3 percent, a fall of 37 percent. The most recent boom period, once again, has certainly not been "balanced" in any obvious sense. By and large, one gets the impression that the faster growing parts of the manufacturing sector have been the new, fast-growing export industries. This might

Table 3: Sectoral Shares in Manufacturing Value Added -- 1985-90

		1985	1986	1987	1988	1989	1990	Sectoral Growth 1985-90
1	Food	16.4	16.1	14.7	14.3	14.1	12.8	8.5
2	Beverages	10.6	9.5	9.2	9.5	9.1	9.3	11.1
3	Tobacco & Snuff	4.9	4.5	4.2	3.9	3.7	3.4	6.0
4	Textiles	14.1	14.5	14.2	13.9	13.4	13.1	11.5
5	Wearing apparel except footwear	10.1	10.3	11.0	11.3	11.2	11.2	15.6
6	Leather, leather products and footwear	2.3	2.4	2.9	2.9	3.1	3.1	19.5
7	Wood and wood products	1.5	1.5	1.4	1.1	0.9	0.6	-4.2
8	Furniture and fixtures	1.2	1.3	1.2	1.2	1.1	1.1	10.9
9	Paper and paper products	1.7	1.6	1.6	1.6	1.5	1.4	10.1
10	Printing, publishing & allied industries	1.8	1.7	1.5	1.3	1.2	1.2	3.7
11	Chemicals and chemical products	4.7	4.5	4.5	4.3	4.1	4.1	10.5
12	Petroleum refining and petroleum products	4.8	4.8	4.4	3.9	3.8	3.7	7.3
13	Rubber & plastic products	2.5	2.5	2.6	2.7	2.7	2.6	15.0
14	Non-metallic mineral products	4.1	3.9	4.1	4.1	4.5	4.6	16.3
15	Basic metal industries	1.8	1.6	1.4	1.3	1.1	1.1	2.9
16	Fabricated products	1.8	1.8	1.9	1.9	1.9	1.9	14.5
17	Machinery	3.7	3.6	3.7	3.6	4.5	4.7	18.6
18	Electrical machinery and supplies	3.0	3.1	3.3	3.3	3.5	3.6	17.0
19	Transport equipment	3.9	4.7	5.2	6.8	7.1	7.8	27.6
20	Other manufacturing industries	5.2	6.0	7.0	6.9	7.5	8.6	22.6
	Total Value Added	100.0	100.0	100.0	100.0	100.0	100.0	13.3

Source: Based on Tables 1 and 2.

not be uniformly true, however. Transport equipment, for instance, which was the fastest growing manufacturing sector of all over the period, is a traditional import substitution industry in Thailand. Textiles, which has been a rapidly growing export sector, actually had less than average overall growth during the 1980s. To be able to say any more than this, however, requires a more careful examination of export performance and analysis of their contribution to economic growth. This analysis begins in the following section.

4. EXPORT PERFORMANCE

As indicated at the beginning of the paper, a large part of the credit for recent economic performance can be attributed to the rapid growth of manufactured exports. According to World Bank sectoral classifications, manufactured goods made up only 6 percent of Thailand's merchandise exports in 1965; by 1980 their share had risen to 32 percent; and in 1990 they accounted for 64 percent of all merchandise exports. The real annual rate of growth of manufactured exports over the 1980s has been 18 percent; over the past 6 years, their annual growth has averaged 25 percent. According to classifications used by the Bank of Thailand and the Thai Department of Customs, the share of manufactures in total merchandise exports reached 76 percent in 1991.

By contrast, primary exports (including fuels, minerals, and metals), which traditionally have been the mainstay of Thailand's merchandise exports, have fallen from 97 percent of the total in 1965 to only 36 percent in 1990. By 1986 (using the Department of Customs classification scheme) primary exports fell, for the first time ever, to below 50 percent of merchandise exports.

Table 4 provides a more disaggregated view of exports over the 1980s, using sectoral classifications derived from Thailand's 1985 Input-Output Table.[5] Table 5 presents the same data in the form of sectoral shares of total exports. From the latter table we see that only 10 of the 27 sectors ever accounted for as much as 5 percent of total exports at any time in the 1980s. Among these 10 sectors, there has been very great variation in export performance; every one of these sectors experienced a significant change in its share of total exports over the decade. Six sectors -- non-paddy field crops; other agriculture; rice; other food; wood, paper and tires; and energy, mining and related industries -- had their export shares fall

[5] *The particular version of the Table used here is a 27 sector aggregation of the basic 180 sector 1985 Table produced by NESDB See Appendix for a more detailed description of each of the sectors in this aggregation. Export data are from the Thai Department of Customs, and converted from the standard CCCN (pre 1988) and HS (post 1 '87) classifications by TDRI.*

Table 4: Real Gross Exprots, in 1990 Prices (Millions of Baht)

	Sector	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
1	Paddy	70.4	109.2	33.0	0.0	0.0	12.2	0.0	0.0	0.0	0.0	0.0
2	Other Crops	10638.1	12302.1	12402.5	11608.7	13259.2	9962.5	11360.8	4722.3	4967.9	2187.1	2604.5
3	Vegetables & Fruit	664.5	1038.0	1538.2	1257.7	1451.6	2207.1	2003.8	1683.7	1981.5	1622.4	2012.4
4	Other Agriculture	6795.1	7553.8	8084.4	6512.3	8258.5	9376.8	8089.5	7058.6	4514.6	4484.5	4947.0
5	Fish	119.3	104.6	86.7	77.4	84.8	96.2	107.7	152.0	1131.8	897.0	731.8
6	Slaughtering	668.8	796.7	827.2	702.9	722.8	876.4	957.1	742.5	6929.3	7965.3	9513.0
7	Canned Food	13125.6	15758.3	18639.5	19253.5	24124.4	29770.0	41575.9	49893.3	54774.6	63162.2	70488.4
8	Rice	28746.6	35913.5	29633.0	25682.1	33019.6	28500.2	24994.2	26713.2	38481.3	47989.6	27963.8
9	Beverages	144.8	242.9	346.1	328.8	453.0	511.5	345.4	410.3	407.8	514.2	638.9
10	Tobacco	1662.0	2368.3	3359.2	2329.3	2096.3	2005.8	1827.4	1511.0	1196.0	1283.8	1653.2
11	Other Food	30899.2	39478.4	46563.6	31778.4	33358.8	33146.0	39668.5	41973.6	49351.9	61416.0	56692.0
12	Text. & Leath. Prods.	19563.0	21813.0	23310.6	22986.4	31380.3	37213.7	47473.7	71303.9	88205.2	103339.0	115114.4
13	Wood Prods. & Tires	23129.0	19182.5	17194.1	20037.6	22899.3	25403.3	30115.8	42674.3	45033.1	49001.5	49017.9
14	Min. & Chem. Prods.	30297.5	19331.5	16642.3	12258.1	13886.1	16921.1	13433.6	14418.6	19705.4	23020.8	23428.1
15	Mach. & Elect. Prods.	17259.6	18108.6	18642.1	21207.6	23994.9	31075.1	43734.7	63187.2	81548.7	120740.4	162944.1
16	Other Household Goods	2209.3	2448.1	2361.7	2856.0	3873.7	4583.5	6244.6	9878.7	13031.1	16369.8	17451.1
17	Other Industries	2026.2	1706.0	1724.7	2072.8	3201.4	4607.2	5298.6	9034.4	23203.6	20190.6	21892.1
18	Fuel	132.8	35.9	50.6	38.4	523.9	3090.3	2244.3	2569.4	1962.7	2842.4	3450.0
19	Utilities	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4877.5	7934.8	10678.9
20	Construction	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
21	Hotels & Restaurants	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
22	Transport	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
23	Real Estate	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
24	Public Administration	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
25	Education	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
26	Health	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
27	Other Services	30.2	3551.8	2753.0	1688.9	1637.2	1806.5	1865.1	3084.6	3018.4	5374.9	6953.5
	Total	188181.9	201843.3	204192.5	182677.0	218225.5	241165.3	281340.7	351011.6	444322.4	540336.5	588175.1

Source: Customs data converted to I-O clasifications by TDRI.

Table 5: Real Gross Exprots, Percentage Shares by Sector

	Sector	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
1	Paddy	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	Other Crops	5.7	6.1	6.1	6.4	6.1	4.1	4.0	1.3	1.1	0.4	0.4
3	Vegetables & Fruit	0.4	0.5	0.8	0.7	0.7	0.9	0.7	0.5	0.4	0.3	0.3
4	Other Agriculture	3.6	3.7	4.0	3.6	3.8	3.9	2.9	2.0	1.0	0.8	0.8
5	Fish	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.2	0.1
6	Slaughtering	0.4	0.4	0.4	0.4	0.3	0.4	0.3	0.2	1.0	1.5	1.6
7	Canned Food	7.0	7.8	9.1	10.5	11.1	12.3	14.8	14.2	12.3	11.7	12.0
8	Rice	15.3	17.8	14.5	14.1	15.1	11.8	8.9	7.6	8.7	8.9	4.8
9	Beverages	0.1	0.1	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1
10	Tobacco	0.9	1.2	1.6	1.3	1.0	0.8	0.6	0.4	0.3	0.2	0.3
11	Other Food	16.4	19.6	22.8	17.4	15.3	13.7	14.1	12.0	11.1	11.4	9.6
12	Text. & Leath. Prods.	10.4	10.8	11.4	12.6	14.4	15.4	16.9	20.3	19.9	19.1	19.6
13	Wood Prods. & Tires	12.3	9.5	8.4	11.0	10.5	10.5	10.7	12.2	10.1	9.1	8.3
14	Min. & Chem. Prods.	16.1	9.6	8.2	6.7	6.4	7.0	4.8	4.1	4.4	4.3	4.0
15	Mach. & Elect. Prods.	9.2	9.0	9.1	11.6	11.0	12.9	15.5	18.0	18.4	22.3	27.7
16	Other Household Goods	1.2	1.2	1.2	1.6	1.8	1.9	2.2	2.8	2.9	3.0	3.0
17	Other Industries	1.1	0.8	0.8	1.1	1.5	1.9	1.9	2.6	5.2	3.7	3.7
18	Fuel	0.1	0.0	0.0	0.0	0.2	1.3	0.8	0.7	0.4	0.5	0.6
19	Utilities	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	1.5	1.8
20	Construction	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
21	Hotels & Restaurants	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
22	Transport	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
23	Real Estate	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
24	Public Administration	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
25	Education	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
26	Health	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
27	Other Services	0.0	1.8	1.3	0.9	0.8	0.7	0.7	0.9	0.7	1.0	1.2
	Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Calculated from Table 4.

considerably. The other four sectors -- canned foods; cloth and leather products; and appliances -- showed significant increases in their shares.

Another way to look at intersectoral differences in export performance is to estimate the contribution of each sector to the total growth of exports over the period. Table 6 presents some very crude estimates of this sort. The first column of the table shows the absolute change in the real value of exports of each sector over the period, and the second shows the proportion of the change in total exports that is accounted for in this way by each sector. There are several interesting things that emerge from these calculations. First, there are only 6 sectors in which the real value of exports actually fell over the period, and the total decline in exports of all six of these sectors was less than 5 percent of the increase in total exports from Thailand over the period. In other words, if exports in these declining sectors had remained constant over the period, the total growth in Thailand's exports over the 1980s would have been less than 5 percent more than actually occurred. Secondly, three of the sectors alone accounted for about 75 percent of the total increase in exports over the 1980s. In decreasing order of importance, these sectors were machinery and electrical products; cloth and leather products; and canned foods. The most important sector, machinery and electrical products, accounted for over 36 percent of total export growth. These estimates show quite starkly the overwhelming importance of manufacturing exports in Thailand's international market penetration over the past decade.

5. EXPORTS AND ECONOMIC PERFORMANCE: IMPORT INTENSITY OF EXPORTS

In 1990, Thailand's exports were just a shade under 30 percent of total GNP. This relatively large share, together with the rapid growth of exports over recent years, would lead one to conclude that exports have been a major reason for the strength of recent economic performance. Furthermore, the large and rapidly growing share of manufactured goods in total exports must mean that this component of exports has been playing a particularly

Table 6: Contributions to Export Growth 1980-1990

	Sector	Absolute	Share
1	Paddy	-70.4	0.0
2	Other Crops	-8033.6	-2.0
3	Vegetables & Fruit	1348.0	0.3
4	Other Agriculture	-1848.1	-0.5
5	Fish	612.5	0.2
6	Slaughtering	8844.2	2.2
7	Canned Food	57362.8	14.3
8	Rice	-782.8	-0.2
9	Beverages	494.0	0.1
10	Tobacco	-8.7	0.0
11	Other Food	25792.7	6.4
12	Text. & Leath. Prods.	95551.4	23.9
13	Wood Prods. & Tires	25888.9	6.5
14	Min. & Chem. Prods.	-6869.4	-1.7
15	Mach. & Elect. Prods.	145684.4	36.4
16	Other Household Goods	15241.8	3.8
17	Other Industries	19866.0	5.0
18	Fuel	3317.3	0.8
19	Utilities	10678.9	2.7
20	Construction	0.0	0.0
21	Hotels & Restaurants	0.0	0.0
22	Transport	0.0	0.0
23	Real Estate	0.0	0.0
24	Public Administration	0.0	0.0
25	Education	0.0	0.0
26	Health	0.0	0.0
27	Other Services	6923.2	1.7
	Total	399993.3	100.0

Source: Calculated from data in Table 4.

important role. This, in a nutshell, is the basis for the story of the export-led growth miracle in the Thai economy.

Before this story can be accepted at face value, however, the changing structure of exports and of their linkages with the domestic economy must be examined in more detail. Export data are generally reported in gross value terms, whereas, of course, production and GNP data are reported in terms of net value added. Therefore, ratios of exports and GNP, such

as those provided in the previous paragraph, must be interpreted with caution. A more useful comparison would be one between domestic *value added* in export production and GNP.

It is generally felt that agricultural and other primary exports have a much higher domestic value added share per unit of gross output than do industrial and manufacturing exports. Since most of the growth in Thai exports in recent years has been from manufacturing, this would mean that the contribution of exports to GNP, at least on a per dollar of exports basis, has been declining. If the intersectoral differences in value added per unit of exports were sufficiently large, it is conceivable that exports might even be contributing absolutely less to GNP growth now than they did a decade earlier, despite their very rapid growth in the 1980s. The same might also be true of contributions to employment growth, if agriculture and other primary products were sufficiently more labor intensive than rapidly growing manufacturing export sectors.

The remainder of the paper attempts to provide a more informed insight into the contributions of exports to recent economic growth in Thailand. The discussion begins with an examination of the import content of exports from different sectors. The higher the level of imports required per baht of exports in any sector, the smaller is their net contribution to income in the Thai economy, and the smaller is the contribution of export growth in that sector to overall income growth. The following subsection presents a "base case" analysis of intersectoral differentials in the import content of exports.

5.1 Base Case Estimates

In order to examine the import intensities of different sectors, it is necessary to know what share of the inputs needed to produce each sector's outputs is obtained through imports. Ideally, one needs to know not only the import content of direct inputs, but also the import content of inputs into the domestically produced direct inputs, and of the inputs into these inputs, and so on. In other words, one would like to know the complete direct and indirect import

content of each exporting sector. Fortunately Thailand has an Input-Output Table for 1985 which shows, for every input into every output, the amount that comes from domestic production and the amount that comes from imports. This information makes it possible to estimate the total direct and indirect import requirements to produce a baht's worth of additional gross output to meet an increase in final demand for that good.

The structure of output and associated inputs in the Thai economy, as shown by the Input-Output Table, can be depicted as follows. First the relationship between final and intermediate input demands, and gross outputs in each sector of the economy can be depicted as:

$$[X] = [A][X] + [F] \tag{1}$$

where $[X]$ is a vector of gross outputs from each sector, $[A]$ is a matrix of domestic input requirements from each sector required per unit of gross output of each good, and $[F]$ is a vector of final (domestic and export) demands for each sector's output. This equation simply says that total gross domestic output in each sector is the sum of the intermediate demands for that good as an input into production in all sectors and final demand for the good. Relatively simple manipulation of the relationship shown in equation (1) can be used to determine the total change in demand for gross output from any sector resulting from a change in final demand for any good. The total change in demand comprises not only the increase in final demand, but also all the direct and indirect changes in intermediate demands resulting from the adjustments in production required to meet the initial change in final demand. The relationship is as follows:

$$[X] = [I - A]^{-1}[F] \tag{2}$$

where $[I]$ is the identity matrix. Suppose one element of $[F]$, say the ith, were set equal to 100, and all other elements were set at zero. Then, the values of the elements of $[X]$ obtained from this equation would indicate the increases in direct and indirect demands for domestic intermediate inputs required to meet a 100 baht increase in final demand for sector i's output. In particular, if the increase in final demand came from exports, this would show the increased

domestic production required to produce those exports.

To determine the change in demand for imports resulting from any increase in final demand, it is necessary to use the relationship between intermediate imported input needs and gross outputs in each sector. This relationship is given by the following equation where $[X_M]$ is a vector of demands for

$$[X_M] = [M][X] \tag{3}$$

imported intermediate inputs of each good, $[M]$ is a matrix of coefficients showing the amount of imported inputs of each good required per unit of domestic gross output from each sector, and, as before, $[X]$ is a vector of gross domestic outputs in each sector. Equation (3), therefore, can be used to determine the change in demands for imported intermediate inputs resulting from any change in gross domestic outputs.

Finally, equations (2) and (3) can be combined to get an expression which can be used to determine the effects of any change in final demand on imports of intermediate inputs:

$$[X_M] = [M][I - A]^{-1}[F] \tag{4}$$

In particular, this expression can be used to determine the increase in imports required to meet an increase in exports from any sector.

A critical assumption that is implicit in this procedure is that the elements of $[M]$ are independent of whether the increase in final demand comes from the local or the export market. The imported input coefficients provided in the Input-Output Table are an average for all elements of final demand in 1985. Data that would permit us to distinguish between the import content of output produced in any sector for the local market, and that produced for export are not available. Casual evidence seems to suggest, however, that, especially in some of the rapidly growing manufacturing export sectors, the import content of export production is higher than that of production for the domestic market. Whereas garments aimed for sale in the local

market, for instance, might use a high proportion of domestically produced cloth, export garments typically rely almost exclusively on higher quality imported fabric. The initial estimates provided here are based on the assumption that there are no such differences in import content. Some tests of the sensitivity of the results to this assumption will be provided later.

Equation (4) can be used now to develop estimates of *net exports* of different sectors over the period 1980-90. Net exports in this context refers to the value of gross exports in any sector less the value of imported intermediate inputs required (directly and indirectly) for their production in Thailand. For this purpose, the export data presented earlier in Table 4 are used, together with information on input-output coefficients and imported intermediate input coefficients from the 1985 Input-Output Table.

The basic 1985 Input-Output Table provides input and output data for 180 sectors of the Thai economy in that year. For the purposes of this paper these data have been aggregated into the 27 sectors shown in Table 4 and subsequent tables. This is sufficiently disaggregated to provide a good sense of the sorts of intersectoral differences that exist in export performance and in linkages with the rest of the economy.

Table 7 presents estimates of real *net* exports from each of these sectors for each of the years from 1980 to 1990. By comparing the net export series in this table with gross exports shown in Table 4, it is possible to detect both intersectoral differences and general trends over time in the import intensity of Thailand's exports. A measure of the changing import intensity of exports can be provided by constructing an index of import dependence. The index is given by 100 minus the proportion of net to gross exports. This index can vary from 0 to 100, with a value of 0 indicating that exports require no direct or indirect imported intermediate

Table 7: Real Net Exports, in 1990 Prices (Millions of Baht)

	Sector	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
1	Paddy	65.6	101.9	30.8	0.0	0.0	11.4	0.0	0.0	0.0	0.0	0.0
2	Other Crops	9816.5	11352.0	11444.6	10712.2	12235.2	9193.1	10483.4	4357.6	4584.3	2018.2	2403.3
3	Vegetables & Fruit	596.4	931.6	1380.5	1128.8	1302.8	1980.8	1798.4	1511.1	1778.4	1456.1	1806.1
4	Other Agriculture	6222.3	6917.0	7402.9	5963.3	7562.3	8586.3	7407.6	6463.6	4134.0	4106.5	4530.0
5	Fish	94.1	82.6	68.4	61.1	66.9	75.9	85.0	120.0	893.1	707.8	577.5
6	Slaughtering	615.3	733.0	761.0	646.7	664.9	806.3	880.0	683.1	6375.0	7028.1	8752.0
7	Canned Food	10733.0	12885.8	15241.8	15743.9	19726.9	24343.4	33997.2	40798.4	44790.0	51648.6	57639.4
8	Rice	26788.5	33467.2	27614.5	23932.7	30770.4	26558.9	23291.7	24893.6	35860.1	44720.8	26059.1
9	Beverages	127.5	213.8	304.6	289.3	398.6	450.1	304.0	361.1	358.9	452.6	562.3
10	Tobacco	1429.0	2036.4	2888.3	2002.8	1802.4	1724.6	1571.3	1299.2	1028.4	1103.9	1421.5
11	Other Food	27707.6	35400.7	41754.1	28496.0	29913.2	29722.4	35571.1	37638.1	44254.3	55072.3	50836.2
12	Text. & Leath. Prods.	14903.8	16617.9	17758.9	17511.9	23906.6	28350.7	36167.1	54321.9	67197.9	78727.4	87698.3
13	Wood Prods. & Tires	16797.3	13931.2	12487.1	14552.2	16630.5	18449.0	21871.4	30991.9	32705.0	35587.0	35598.9
14	Min. & Chem. Prods.	22781.6	14535.9	12513.8	9217.2	10441.4	12723.5	10101.1	10841.8	14817.1	17310.1	17616.3
15	Mach. & Elect. Prods.	11766.0	12344.7	12708.4	14457.4	16357.5	21184.0	29814.2	43075.0	55592.2	82309.4	111079.8
16	Other Household Goods	1564.9	1734.1	1672.9	2023.0	2743.9	3246.7	4423.4	6997.6	9230.6	11595.6	12361.5
17	Other Industries	1167.7	983.1	994.0	1194.6	1844.9	2655.2	3053.6	5206.5	13372.3	11635.8	12616.4
18	Fuel	54.0	14.6	20.6	15.6	213.3	1257.9	913.5	1045.9	798.9	1157.0	1404.3
19	Utilities	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4245.0	6905.7	9293.9
20	Construction	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
21	Hotels & Restaurants	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
22	Transport	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
23	Real Estate	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
24	Public Administration	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
25	Education	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
26	Health	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
27	Other Services	28.6	3353.3	2599.2	1594.6	1545.7	1705.5	1760.9	2912.2	2849.8	5074.6	6565.0
	Total	153259.7	167636.9	169646.4	149543.3	178127.4	193025.8	223495.5	273518.8	344865.0	418917.5	448821.9

Source: Authors' calculations.

inputs, and a value of 100 indicating that exports are made up entirely of imported goods (the good is simply being transhipped through the country, with no domestic inputs added).

The first column of Table 8 shows base case estimates of the import dependence of aggregate exports from 1980 to 1990. The estimates show that the average import content of Thailand's exports has increased steadily over the 1980s -- from a low of 16.9 percent in 1981 and 1982 to a high of 23.7 percent in 1990. The average import content of Thailand's exports has increased by 27 percent during the 1980s. This would seem to support the contention that the rapidly growing manufactured exports of the 1980s have tended to contribute less to total income in Thailand than did the agricultural exports which they have been replacing.

Since the only sufficiently detailed data available on imported and domestic sectoral input coefficients are from the 1985 Input Output table, this measured increase in import dependence of exports is due entirely to the changes in the sectoral composition of exports over the 1980s. The first column of Table 9 shows the base case estimates of intersectoral differences in import dependence of exports for all sectors in which significant exports (i.e. more than 100,000 baht's worth) have occurred at any time during the 1980s. Using the average aggregate value of 20 percent, which occurred in 1985, as a point of comparison, it is apparent from this table that there is considerable variability across sectors. Six sectors have less than 10 percent import dependence, while three have more than 30 percent import dependence. Given the considerable differences in import dependence shown in Table 9, and the even greater intersectoral differences in export performance described in section 4 above, what is perhaps most surprising is not that the overall import dependence ratio changed significantly over the past decade, but rather that it did not change even more than we have found. This is particularly true when one considers that the sectors whose export shares have fallen over the 1980s are in agriculture, in which import dependence is typically considerably less than average. Rice, for instance, whose export share fell from almost 18 percent in 1981 to under 5 percent in 1990, has an import dependency ratio of less than 7 percent. This is considerably less than one-half of the average import

Table 8: Aggregate Import Dependence of Exports under different Scenarios WRT. Excess of Import content of Exports Relative to Local Sales

Year	Exports 0% Higher	Exports 25% Higher	Exports 50% Higher	Exports 100% Higher
1980	18.6	22.1	25.6	32.6
1981	16.9	20.1	23.2	29.5
1982	16.9	20.0	23.1	29.3
1983	18.1	21.4	24.7	31.3
1984	18.4	21.7	25.1	31.7
1985	20.0	23.6	27.3	34.4
1986	20.6	24.2	27.9	35.1
1987	22.1	26.0	30.0	37.8
1988	22.4	26.5	30.6	38.7
1989	22.5	26.5	30.6	38.6
1990	23.7	27.9	32.2	40.5

Source: Authors' calculations.

dependency for all exports in the 1980s.

The reason that overall import dependence of export production has not increased as much as might have been expected can be seen by examining more closely the particular sectors that account for the bulk of export growth over the period. One can start by looking at canned foods, and textile and leather products, which, together, account for just under 50 percent of export growth. From Table 9, it can be seen that their import dependence ratios are 18.2 and 23.8 percent respectively. The former is about 1.4 percent less than the overall import dependence ratio for the economy, and the latter is about 3.8 percent above the overall average. Thus the tremendous growth in exports from these two sectors would have been expected to lead to only a very modest increase in the overall index of import dependence. It can be estimated that the increase in the overall import dependence index due to export growth in these two important sectors would have been about 0.7 percentage points.

Table 9: Index of Import Dependence of Exports under different Scenarios WRT. Excess of Import content of Exports Relative to Local Sales

	Sector	Exports 0% Higher	Exports 25% Higher	Exports 50% Higher	Exports 100% Higher
1	Paddy	6.7	8.4	10.1	13.5
2	Other Crops	7.7	9.7	11.6	15.4
3	Vegetables & Fruit	10.3	12.7	15.2	20.2
4	Other Agriculture	8.4	10.3	12.2	16.0
5	Fish	21.1	26.4	31.6	42.1
6	Slaughtering	8.0	10.0	11.9	15.9
7	Canned Food	18.2	20.1	21.9	25.6
8	Rice	6.8	8.0	9.1	11.4
9	Beverages	12.0	15.0	17.9	23.8
10	Tobacco	14.0	17.4	20.7	27.5
11	Other food	10.3	12.0	13.7	17.2
12	Text. & Leath. Prods.	23.8	28.8	33.8	43.8
13	Wood Prods. & Tires	27.4	32.5	37.7	48.0
14	Min. & Chem. Prods.	24.8	30.4	36.0	47.2
15	Mach. & Elect. Prods.	31.8	36.8	41.8	51.7
16	Other Household Goods	29.2	34.9	40.6	52.1
17	Other Industries	42.4	52.5	62.6	82.8
18	Fuel	59.3	74.0	88.8	100.0
19	Utilities	13.0	16.2	19.5	25.9
20	Construction	NA	NA	NA	NA
21	Hotels & Restaurants	NA	NA	NA	NA
22	Transport	NA	NA	NA	NA
23	Real Estate	NA	NA	NA	NA
24	Public Administration	NA	NA	NA	NA
25	Education	NA	NA	NA	NA
26	Health	NA	NA	NA	NA
27	Other Services	5.6	6.9	8.3	10.9
	Total	20.0	23.6	27.3	34.4

Source: Authors' calculations.

With these two sectors more or less cancelling each other out in this respect, this leaves the machinery and electrical products sector as the only other major contributor to recent export

growth. Table 9 shows that the import dependence ratio of this sector is 31.8 percent, a little more than 50 percent greater than the overall average for the economy. By a similar calculation to that performed for the previous two sectors, export growth in this sector increased import dependence by about 4.2 percentage points. Export growth of machinery and electrical products, and cloth and leather products together caused overall import dependence to rise by about 5.1 points, which is exactly the amount by which the overall index increased between 1980 and 1990.

5.2 Sensitivity Analysis

In order to make the estimates discussed in the previous section, a number of assumptions were necessary. It was assumed that the information provided in the 1985 Input-Output Table about the production structure of the economy remained more or less true throughout the period under discussion. This is unlikely to be correct. The input-output structure, with respect to the use of both domestic and imported intermediate inputs, almost certainly continued to evolve throughout this very dynamic period of Thailand's recent economic history. It is fortunate, however, that the year for which data are available is midway through the decade being analyzed, so that it is not too unreasonable to take this information as, in some sense, representative of the situation for the whole period.

A second assumption was that the import dependence in any sector was the same for all goods in that sector, regardless of whether they were produced for sale in the domestic market or for export. This is also very unlikely to be correct. In particular, as was indicated earlier, there is considerable casual evidence to suggest that exported goods often use a higher proportion of imported intermediate goods than do those sold domestically. In the absence of any hard data on such differences in the import dependence of producers focusing primarily on the domestic market and those selling in export markets, however, the only thing that can be done is to test the sensitivity of the results to changes in the base case assumption.

This section presents the results of such a sensitivity analysis. In reality, the extent to which the import intensity of production for the export market exceeds that of production for the local market varies widely between sectors. However, in the absence of any data, the simplifying assumption is made that the degree to which these import intensities differ is the same for all sectors. This percentage differential was permitted to take on values of 25, 50 and 100 percent. In other words, the matrix of imported intermediate input coefficients, [*M*], in equation (4) above was adjusted according to whether the change in final demand under consideration came from exports or from the domestic market. The extent to which the elements in any particular column of [*M*] actually changed from those used in the initial calculations as a result of these adjustments had to depend, of course, on the proportion of total output that was initially produced for export. Suppose, for instance, that all but an infinitesimal amount of production in a particular sector was for export. Then assuming, say, that exports used 25 percent more imported intermediate goods than local production would not change the relevant import coefficients in the original [*M*] matrix. This arises because the published values already reflect the input choices of exporters. On the other hand, if exports made up only an infinitesimal portion of total final demand in a sector, and almost the full amount of production was for the local market, then the original import coefficients would reflect almost entirely the input choices of domestic market producers, and the relevant coefficients of [*M*] would have to be increased by the full 25 percent when analyzing the effects of an increase in export production.[6] In between these extreme values, the scale-up factor that was applied to the elements in any particular column of [*M*] was a smoothly decreasing function of the proportion of output exported.

The final three columns of Table 8 show the overall import dependence coefficients for the years 1980 to 1990 under each of the three sets of assumptions on the degree to which the

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[6] *We also had to ensure that these assumptions did not lead to the absurd result in any sector that the total demand for imported intermediate inputs exceeded one hundred percent of the value of the exports in question. To avoid this, we simply imposed a ceiling of 100 percent on the extimated import dependence coefficient under any of the scenarios being considered.*

import intensity of export production exceeds that of domestic production. The first column in this table, of course, represents the base case results which were discussed in the previous section. As one would expect, the average import dependence of exports increases with the differential between exports and local market production. The increase is not as great, however, as the assumed size of the differential. This is due to the fact that the size of the increase in the import dependence coefficient is negatively related to the share of exports in overall production. Only if exports were negligible would the increase in the coefficient match the assumed difference between exports and domestic market production. In all of the scenarios, however, the general pattern of increasing import dependence of exports over the decade continues to hold. However, since the fastest growing export sectors generally also had the highest share of exports in total production in 1985, the average measured percentage increase in the import dependence of exports is actually smaller with the higher assumed differential between exports and local market production (a 24 percent increase in import dependence between 1980 and 1990 in the 100 percent differential case versus a 27 percent increase in the base case).

Moving now to a higher level of disaggregation, the final three columns of Table 9 show the import dependence coefficients in each sector corresponding to the same set of assumptions as above. As would be expected, the import dependence coefficients again are positively related to the assumed size of the differential between exports and local market production. The average import dependence for all exports (last row of the table) increases much less than proportionately with the size of the assumed differential. This is due to the fact that, in general, sectors with the higher import dependence coefficients also have a higher proportion of production devoted to exports. For such sectors, as explained above, the proportionate increase in the measured import dependence coefficient in any given case will be less than for sectors with lower shares of production exported. This phenomenon occurs for two of the three most important export growth sectors over the decade -- canned food, and machinery and electrical products -- where it can be seen that the measured increases in the import dependence ratios in the "100 percent" case are only 41 and 63 percent respectively. The textile and leather products sector, on the other hand, shows an increase in import dependence in this scenario of 84 percent.

For comparison, the overall import dependence coefficient in this case is 72 percent.

For the three most import export growth sectors it can also be observed that there is a change in the relative dispersions of their import dependence coefficients about the mean. The canned food, and textile and leather products sectors, which are relatively close to the mean in the base case move proportionately further away from the mean (in opposite directions) as the assumed differential between import intensities in export and domestic market production increases. On the other hand, machinery and electrical products, which are proportionately much further from (higher than) the mean in the base case, move proportionately closer to the mean as the differential in the import intensities of production for the export and the local markets widens.

The general conclusion of this sensitivity analysis is that the overall level of import dependence of exports seems to depend quite critically on what is assumed about differences in import intensity of export goods and local sales in any given sector. The relative rankings of different sectors also depends, to some extent, on the same thing. The general pattern of increasing import dependence of exports over the decade is less affected; and the proportionate magnitude of the increase is diminished slightly as the assumed differential between production methods for exports and local sales widens.

6. EXPORTS AND INCOME GROWTH: SOME ESTIMATES

As mentioned earlier, it is a commonly held view that the rapid growth of exports, and especially of manufactured exports, has been the major cause of Thailand's remarkable economic performance in recent years. In this section an attempt is made to measure the direct contribution of exports to recent economic growth. The question is "How much of the increase in incomes in Thailand over the past decade can be accounted for by the growth of production for export?" Answering this question raises a number of methodological issues. The basic modelling issue concerns the assumptions that have to be made about what would have happened

to the resources employed in export production in the absence of the growth of exports. In this sort of exercise, there are a number of assumptions that could be made.

The first possibility would be to assume that: a) the total supply of primary factors of production (land, labor and capital) are independent of the rate of export growth; and b) the level of employment or utilization of these resources is also fixed, regardless of what happens to exports. In this case, any increase in the allocation of these resources to exports would have to be matched by a similar decrease in resources available for other uses. Any changes in income that occur as a result of export growth would thus result from increases in overall efficiency of resource utilization resulting from intersectoral shifts, or from (externally induced) changes in the terms of trade facing Thailand's export sectors. Estimates based on these assumptions would require data on intersectoral efficiency differences and their patterns of change over time.

At the opposite extreme, it could be assumed that resources drawn into increased export production would not otherwise have been available to the economy. This could result from underemployment of these resources in the rest of the economy, or from the financing of export growth primarily through inflows of investment, technology and other resources from abroad. In this case, all measured increases in income generated directly and indirectly by increased export production could be thought of as income growth due to exports. Analysis based on this assumption would yield a much higher estimate of the contribution of exports to economic growth than the previous method. In the context of export expansion, one possible justification for this assumption is that foreign investment has been important in many of Thailand's most rapidly growing export sectors. This methodology also has the virtue that the information requirements can be met primarily from the data provided by a good input-output table.

An intermediate, and probably more realistic assumption would be that export growth leads to some combination of the effects described in the first two methods. To make estimates based on this assumption would require, in addition to all the information necessary for the first

two methods, a macro-econometric model capable of predicting changes in overall resource availability and utilization arising from changes in aggregate demand.

The method used here is the second one described above. That is, it is based on the assumption that there are excess resources available to meet the demands of growing export sectors. This choice was based primarily on considerations of data availability. However, as indicated above, it will almost certainly produce an overestimate of the direct contributions of export growth to economic performance. This arises from the assumption of perfectly elastic supplies of unemployed resources to growing export sectors, which is clearly incorrect for the booming Thai economy of the latter 1980s. To some extent, growth of export production must have led to decreases in output and incomes in other sectors from which resources have been drawn. Nonetheless, knowing at least the sign, if not the magnitude, of the estimation bias, means that it can be stated with considerable confidence that the results are upper bound estimates of the contribution of exports to recent growth.

To estimate the contribution to national income of an additional 100 baht of exports from a particular sector according to this method, therefore, it is necessary to determine the resulting direct and indirect needs for local inputs to produce the additional goods for export. Unless production of a good for export had no (direct or indirect) requirements for imported inputs, the domestic income generated by 100 baht of additional exports would be less than 100 baht. The ratio of the increase in domestic income to the amount of exports that generated the increase is known as the *export multiplier*. Clearly the export multiplier for any sector will be inversely related to the import dependence of that sector's output. In fact, the export multiplier is simply the ratio of net to gross exports.[7]

Table 10 presents estimates of the export multipliers of all export sectors, under the four different assumptions about the import requirements of export production -- that they are the

[7] *In other words, the export multiplier is given by ((100 - import dependence coefficient)/100).*

same as, or 25, 50 or 100 percent higher than that of goods from the same sector produced for sale in the domestic market. These are the same scenarios considered in the previous section's estimates of the import dependence of exports.

The average aggregate export multiplier over the whole decade varies from 0.80 in the base case to 0.66 in the fourth scenario, in which exports in any sector are 100 percent more import intensive than local market production in any given sector. There is considerable intersectoral variation in the magnitudes of these multipliers. While the "traditional" or declining export sectors have relatively high multipliers, some of the "rising star exporters" have relatively low multipliers. Consider the base case. Rice, and other foods, which together accounted for over 30 percent of gross exports at the beginning of the decade have export multipliers which are considerably above the average (0.93 and 0.90 respectively). On the other hand, among the three most important (in absolute terms) export growth sectors, two -- textile and leather products, and machinery and electrical products -- have relatively low multipliers (0.76 and 0.68 respectively). Only the third "star", canned foods, has an above average export multiplier (0.82).

The aggregate export multiplier for the economy shows the effects on national income of a proportionate increase in all exports in any given year. Unless sectoral export multipliers were identical (which they are not), the changes in the composition of exports would be expected to cause corresponding changes in the aggregate multiplier. Since, as was seen earlier, the import dependence of exports has generally increased, the aggregate export multiplier should have fallen. Table 11 shows the implications of the changing composition of Thailand's exports over the 1980s for the evolution of the aggregate export multiplier over this period, under each of the four cases considered. What is shown here is a mirror of what was seen earlier with respect to the import dependence of exports. The aggregate export multiplier is inversely related to the assumed differential in import dependence of export and local market production within sectors. Furthermore, the aggregate export multiplier has been declining over the decade.

Table 10: Export Multipliers under different Scenarios WRT. Excess of Import content of Exports Relative to Local Sales

	Sector	Exports 0% Higher	Exports 25% Higher	Exports 50% Higher	Exports 100% Higher
1	Paddy	0.93	0.92	0.90	0.87
2	Other Crops	0.92	0.90	0.88	0.85
3	Vegetables & Fruit	0.90	0.87	0.85	0.80
4	Other Agriculture	0.92	0.90	0.88	0.84
5	Fish	0.79	0.74	0.68	0.58
6	Slaughtering	0.92	0.90	0.88	0.84
7	Canned Food	0.82	0.80	0.78	0.74
8	Rice	0.93	0.92	0.91	0.89
9	Beverages	0.88	0.85	0.82	0.76
10	Tobacco	0.86	0.83	0.79	0.73
11	Other Food	0.90	0.88	0.86	0.83
12	Text. & Leath. Prods.	0.76	0.71	0.66	0.56
13	Wood Prods. & Tires	0.73	0.67	0.62	0.52
14	Min. & Chem. Prods.	0.75	0.70	0.64	0.53
15	Mach. & Elect. Prods.	0.68	0.63	0.58	0.48
16	Other Household Goods	0.71	0.65	0.59	0.48
17	Other Industries	0.58	0.48	0.37	0.17
18	Fuel	0.41	0.26	0.11	0.00
19	Utilities	0.87	0.84	0.81	0.74
20	Construction	NA	NA	NA	NA
21	Hotels & Restaurants	NA	NA	NA	NA
22	Transport	NA	NA	NA	NA
23	Real Estate	NA	NA	NA	NA
24	Public Administration	NA	NA	NA	NA
25	Education	NA	NA	NA	NA
26	Health	NA	NA	NA	NA
27	Other Services	0.94	0.93	0.92	0.89
	Total	0.80	0.76	0.73	0.66

Source: Authors' calculations.

Table 11: Aggregate Expenditure Multipliers under different Scenarios WRT. Excess of Import content of Exports Relative to Local Sales.

Year	Exports 0% Higher	Exports 25% Higher	Exports 50% Higher	Exports 100% Higher
1980	0.81	0.78	0.74	0.67
1981	0.83	0.80	0.77	0.71
1982	0.83	0.80	0.77	0.71
1983	0.82	0.79	0.75	0.69
1984	0.82	0.78	0.75	0.68
1985	0.80	0.76	0.73	0.66
1986	0.79	0.76	0.72	0.65
1987	0.78	0.74	0.70	0.62
1988	0.78	0.74	0.69	0.61
1989	0.78	0.73	0.69	0.61
1990	0.76	0.72	0.68	0.59

Source: Authors' calculations.

Given the enormous change in the composition of exports over the period, and the large intersectoral differences in import dependence, what is most surprising, however, is how *small* has been the decline in the aggregate export multiplier.

The final question to be asked is, given the sizes of the export multipliers calculated here, what has been the effect on aggregate GNP growth of the *actual* growth of exports that has occurred over the 1980s? The top half of Table 12 shows, in millions of 1990 baht, the effect of aggregate export growth in each year of the decade on annual GNP growth under each of the four scenarios. This is obtained simply by multiplying each year's aggregate export multiplier by the growth of exports that actually occurred in that year. For comparison, the last row shows the actual GNP growth in each year.

These numbers are more easily understood if expressed as proportions. The bottom half of Table 12 shows the *proportion* of annual GNP growth that is accounted for by export growth, under each of the four scenarios. Consider the base case. The first important result is the

Table 12: Annual Contribution of Total Export Growth to Total GNP Growth

A) Millions of 1990 Baht

Excess of Import Content of Exports Relative to Local Sales	1980-81	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89	1989-90	Total 1980-90
0%	14377	2010	-20103	28584	14898	30470	50023	71346	74052	29904	295562
25%	14663	2011	-19786	27278	13366	28962	46469	67014	70393	26873	277242
50%	14948	2012	-19469	25971	11833	27454	42915	62682	66734	23842	258922
100%	15501	2017	-18837	23447	9236	24283	35865	53907	59576	17891	222886
Actual GNP Growth	67599	42212	62840	45344	31464	62076	134611	227635	257528	277500	1208809

B) Percent of GDP Growth Which is Export Induced

Excess of Import Content of Exports Relative to Local Sales	1980-81	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89	1989-90	Total 1980-90
0%	21.3	4.8	-32.0	63.0	47.3	49.1	37.2	31.3	28.8	10.8	24.5
25%	21.7	4.8	-31.5	60.2	42.5	46.7	34.5	29.4	27.3	9.7	22.9
50%	22.1	4.8	-31.0	57.3	37.6	44.2	31.9	27.5	25.9	8.6	21.4
100%	22.9	4.8	-30.0	51.7	29.4	39.1	26.6	23.7	23.1	6.4	18.4

Source: Authors' calculations.

estimate that, over the entire decade, 24.5 percent of total GNP growth can be attributed to the growth of exports. The second major observation is that this proportion has varied considerably over the period. In the first three years of the decade, the contribution of exports was very low, and was negative in 1982-83. In other words, if there had been no change in export performance between 1982 and 1983, Thailand's GNP growth would have been almost one-third higher than what it actually was. From 1984 until 1990, export growth has made a significant contribution to Thailand's overall economic growth. In 1990, however, the contribution of exports decreased considerably -- to about one-third of its contribution in the previous three years, and less than one-half of its average level over the decade.

The commonly told story of Thailand's recent episode of export led growth suggests not only that exports have played a major role in income growth, but also that a large share of this credit is due to the growth of *manufactured* exports. It is interesting, therefore, to ask how much of the export induced income growth over the decade is due to each of the exporting sectors. Table 13 presents a summary of the results in this regard for each of the four scenarios that have been considered. The first half of the table shows the absolute contribution of each sector's export growth over the period to Thailand's GNP growth. The second half shows the *proportion* of the export induced growth that is attributable to export growth in each sector. What is very clear from this table is that by far the greatest part of export induced income growth over the decade has been due to the performance of the three "star" sectors -- canned and processed food, textile and leather products, and machinery and electrical products. Regardless of the scenario chosen, these three sectors account for about 75 percent of the export induced income growth over the period. Another three sectors -- wood products and tires, other household goods, and other industries -- account for another 14 percent of this export induced growth (although only 11 percent in the "100 percent higher" scenario). Many of the traditional agricultural and primary product exports (including other crops, rice, fish, and energy and mining) have made a *negative* contribution to income growth. However, this has been compensated for by the growth of the slaughtering, and other food sectors.

Table 13: Contribution of Sectoral Export Growth to GNP Growth, 1980-1990

		Millions of 1990 Baht				Percent of Export-Induced Growth			
Exports	Sector	Exports 0% Higher	Exports 25% Higher	Exports 50% Higher	Exports 100% Higher	Exports 0% Higher	Exports 25% Higher	Exports 50% Higher	100% Higher
1	Paddy	-66	-64	-63	-61	0.0	0.0	0.0	0.0
2	Other Crops	-7413	-7258	-7103	-6793	-2.5	-2.6	-2.7	-3.0
3	Vegetables & Fruit	1210	1176	1143	1076	0.4	0.4	0.4	0.5
4	Other Agriculture	-1692	-1657	-1622	-1552	-0.6	-0.6	-0.6	-0.7
5	Fish	483	451	419	354	0.2	0.2	0.2	0.2
6	Slaughtering	8137	7962	7788	7440	2.8	2.9	3.0	3.3
7	Canned Food	46906	45847	44788	42670	15.9	16.5	17.3	19.1
8	Rice	-729	-721	-712	-694	-0.2	-0.3	-0.3	-0.3
9	Beverages	435	420	405	376	0.1	0.2	0.2	0.2
10	Tobacco	-8	-7	-7	-6	0.0	0.0	0.0	0.0
11	Other Food	23129	22687	22246	21364	7.8	8.2	8.6	9.6
12	Text. & Leath. Prods.	72795	68024	63254	53714	24.6	24.5	24.4	24.1
13	Wood Prods. & Tires	18802	17469	16136	13471	6.4	6.3	6.2	6.0
14	Min. & Chem. Prods.	-5165	-4781	-4398	-3630	-1.7	-1.7	-1.7	-1.6
15	Mach. & Elect. Prods.	99314	92079	84844	70375	33.6	33.2	32.8	31.6
16	Other Household Goods	10797	9921	9046	7296	3.7	3.6	3.5	3.3
17	Other Industries	11449	9439	7429	3410	3.9	3.4	2.9	1.5
18	Fuel	1350	861	373	0	0.5	0.3	0.1	0.0
19	Utilities	9294	8948	8601	7909	3.1	3.2	3.3	3.5
20	Construction	0	0	0	0	0.0	0.0	0.0	0.0
21	Hotels & Restaurants	0	0	0	0	0.0	0.0	0.0	0.0
22	Transport	0	0	0	0	0.0	0.0	0.0	0.0
23	Real Estate	0	0	0	0	0.0	0.0	0.0	0.0
24	Public Administration	0	0	0	0	0.0	0.0	0.0	0.0
25	Education	0	0	0	0	0.0	0.0	0.0	0.0
26	Health	0	0	0	0	0.0	0.0	0.0	0.0
27	Other Services	6536	6444	6352	6167	2.2	2.3	2.5	2.8
	Total	295562	277242	258922	222886	100.0	100.0	100.0	100.0

Source: Authors' calculations.

7. CONCLUSIONS: REFLECTIONS ON THAILAND'S "EXPORT LED" GROWTH

Between the 1970s and the 1980s there were some fundamental shifts in thinking about economic policy in Thailand. While the 1970s were dominated by ideas of import substitution, the 1980s became increasingly influenced by the importance of outward orientation and growth of manufactured exports. This was made more urgent by the price volatility, and general decline, of traditional primary exports.

Trade and industrial policies adjusted accordingly, but probably much less than one might deduce from much of the rhetoric heard in policy discussions. The 1980s, especially the latter half, witnessed a reorientation of Board of Investment promotion policies towards export-oriented investments. Duty drawback and exemption schemes seem to have played an important role in relieving exporters of some of the penalties imposed by the tariff regime. Furthermore, the tariff regime itself has been liberalized somewhat. However, this has often been done in ways which preserved, and in some cases increased, the effective protection provided to many producers in the domestic market.

The growth of manufactured exports in the latter part of the 1980s, therefore, has been partially a response to incentives created by the policy regime. In large part, however, this growth has been a result of changes in underlying economic forces in Thailand and the global economy. Economic policies certainly did not interfere with the ability of the economy to respond to these changes, at least in the short to medium term. Overall macroeconomic management has been very helpful. The ability of the government to respond to infrastructural, environmental and human resource development needs, however, will play a major role in determining the sustainability of the recent growth process.[8]

The structural transformation that has been occurring over the past decade has seen more rapid growth in some sectors than in others. Manufacturing has been one of the fast growing sectors; but others, including some parts of the service sector, have also been growing rapidly. Within manufacturing, there have also been large intrasectoral differences in performance. The composition of exports over the 1980s has changed dramatically, generally in favor of manufacturing and "at the expense of" traditional primary exports. Over most of the 1980s, manufactured export growth has been much greater than most other parts of the economy.

How important has the recent stellar performance of manufactured exports in contributing

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[8] *See Akrasanee, Dapice and Flatters (1991), for instance, for a more detailed review of these events and policy issues.*

to economic growth in the 1980s been? The estimates reported in Table 13 showed that almost all of the export induced income growth over the decade could be attributed to manufactured exports. Figure 1 shows the actual growth of GNP, together with estimated export induced income growth, for each year in the 1980s. The data are taken from the base case scenario presented earlier in Table 12 and thus provide upper bound estimates of the contribution of exports to economic growth. It is apparent that in the mid-1980s, especially between 1984 and 1987, exports made a major contribution to economic growth. In the years prior to that, exports played a much smaller, and occasionally negative, role. Since 1986, however, the proportionate contribution of exports has been diminishing rapidly. In 1990, it was not only their proportionate, but also their *absolute* contribution that fell.

On the basis of the evidence and analysis presented here, therefore, it seems difficult to make the case that Thailand's economic success over the past decade has been due simply, or even in large part, to the growth of manufactured exports. It would be equally foolish, however, to argue that the two are not related. This argument would be difficult to make, not only in the Thai case, but also for the other rapidly growing East Asian economies that have been, at the same time, increasingly successful in expanding their manufactured exports.

The correct interpretation is less simplistic, but more satisfying, than either of these two extremes. The roots of Thailand's economic success lie in a complex number of factors which have made Thailand responsive to changes in internal resource balances and external demands and opportunities. Rapid economic growth and success in penetrating international markets in sectors where Thailand has a comparative advantage are joint products of these underlying conditions. The challenge for the future is to continue the process of liberalization which has fostered the ability of the Thai economy to respond to change, and to ensure continued investment in physical and human capital which will enable Thailand to continue to move up the ladder of international competitiveness. This is unlikely to lead to growth which is "balanced" in any simple arithmetic sense; but it will allow the economy to respond to continually evolving, and generally unpredictable, forces of change in a more fundamentally balanced way.

Appendix

Classification Scheme for 1985 I-O Table, and 27 Sector Aggregation

27 Sector Aggregation		Basic Table (180 Sectors)	
01	Paddy	001	Paddy
02	Other Crops	002	Maize
		004	Cassava
		009	Sugar Cane
		016	Rubber
03	Vegetable & Fruit	005	Other Root Crops
		007	Vegetables
		008	Fruits
04	Other Agriculture	003A	Sorghum
		003B	Other Cereals
		006A	Soy Bean
		006B	Ground Nuts
		006C	Mung Bean
		006D	Other Beans and Nuts
		010	Coconut
		011	Palm Nut and Oil Palm
		012	Kenaf and Jute
		013A	Cotton
		013B	Cotton Seed
		013C	Kapok
		013D	Kapok Seed
		013E	Other Crops for Textile and Matting
		014	Tobacco
		015A	Coffee Beans
		015B	Tea Leaves
		017	Other Agricultural Products
		018	Cattle and Buffalo
		019	Swine
		020	Other Livestock
		021	Poultry
		022	Poultry Products
		023	Silk Farming
		025	Logging
		027	Other Forestry Products
05	Fish	028	Ocean and Coastal Fishing
		029	Inland Water Fishing
06	Slaughtering	042	Slaughtering

27 Sector Aggregation		Basic Table (180 Sectors)	
07	Canned & Preserved Food	043	Canning & Preservation of Meat
		044A	Milk
		044B	Other Dairy Products
		045A	Frozen Pineapple
		045B	Canned Pineapple
		045C	Canning & Preserving of Fruits & Vegetables
		046	Canning & Preserving of Fish & Other Seafood
08	Rice	049A	Rice Milling
		049B	Rice Husk
09	Beverages	062	Distilling & Blending of Spirits
		063	Breweries
		064	Soft Drinks & Carbonated Water
10	Tobacco	065	Tobacco Processing
		066	Tobacco Products
11	Other Food	047A	Coconut Oil
		047B	Palm Nut Oil
		048A	Animal Oil
		048B	Vegetable Oil
		050A	Flour & Sagu Mild Products
		050B	Pellet & Chips
		051	Grinding Corn
		052	Flour & Other Grain Mills
		053	Bakery Products
		054	Noodles & Similar Products
		055A	Sugar
		055B	Bagasse
		055C	Glucose & Syrup
		055D	Coconut & Palm Nut Sugar
		056	Confectionery
		057	Ice
		058	Monosodium Glutamate
		059A	Coffee Processing
		059B	Tea Processing
		060	Other Food Products
		061A	Fish Meal
		061B	Animal Feed
12	Cloth	067	Spinning
		068	Weaving
		069	Textile Bleaching, Printing & Finishing
		070	Made-Up Textile Goods
		071	Knitting
		072	Wearing Apparel

27 Sector Aggregation		Basic Table (180 Sectors)	
12	Cloth (Continued)	073	Carpets and Rugs
		074	Jute Mill Products
		075	Tanneries and Leather Finishing
		076	Leather Products
		077	Footwear (Except Rubber)
13	Wood & Paper & Tires	078A	Saw Mill
		078B	Saw Mill Waste
		078C	Plywood and Veneer
		078D	Wooden Construction Materials
		079	Wood and Cork Products
		080	Wooden Furniture & Fixtures
		081A	Pulp
		081B	Paper and Paperboard
		082	Paper & Paperboard Products
		083	Printing & Publishing
		095	Rubber Sheet & Block Rubber
		096	Tires and Tubes
		097	Other Rubber Products
14	Mineral & Chemical Products	026A	Charcoal
		026B	Firewood
		030A	Coal
		030B	Lignite
		031A	Crude Oil
		031B	Natural Gas
		032	Iron Ore
		033	Tin Ore
		035	Other Non-ferrous Metal Ore
		036	Fluorite Ore
		037	Natural Chemical & Fertilizer
		038	Salt
		039	Limestone
		040	Stone Quarrying
		041	Other Mining & Quarrying
		084	Primary Chemical Products
		085A	Fertilizer
		085B	Pesticide & Insecticide
		086	Synthetic Resin & Plastic
		087	Paints
		088	Drugs & Medicine
		089	Soap & Cleaning Preparations
		090	Cosmetics
		091	Matches
		092	Other Chemical Products
		100	Glass & Glass Products
		101	Structural Clay Products
		102	Cement
		103	Concrete & Cement Products
		104	Other Non-Metallic Products

27 Sector Aggregation		Basic Table (180 Sectors)	
15	Machinery and Electrical Products	105	Iron & Steel
		106	Secondary Steel Products
		107	Non-Ferrous Metals
		113	Agricultural Machinery & Equipment
		114	Wood & Metal Working Machines
		115	Special Industrial Machinery
		116	Office & Household Machinery
		117	Electrical Industrial Machinery & Appliances
		118A	Radio, Television and Communication Equipment
		119	Household Electric Appliances
		120	Insulated Wire & Cable
		121	Electric Accumulators & Batteries
		122	Other Electrical Apparatus & Supplies
		129	Scientific Equipment
		130	Photographic & Optical Goods
		131	Watches & Clocks
		132	Jewelry & Related Articles
		133	Recreational & Athletic Equipment
16	Other Household	098	Plastic Wares
		099	Ceramic & Earthen Wares
		134	Other Manufactured Goods
17	Other Industries	108	Cutlery & Hand Tools
		109	Metal Furniture & Fixtures
		110	Structural Metal Products
		111	Other Fabricated Metal Products
		112	Engines & Turbines
		123	Ship Building
		124	Railway Equipments
		125	Motor Vehicles
		126A	Motorcycle
		126B	Bicycle
		126C	Other Carriages
		127	Repairing of Vehicles
		128	Aircraft
18	Fuel	093A	Petroleum
		093B	LPG
		094	Other Petroleum Products
19	Utilities	135	Electricity
		136	Gas Distribution
		137	Water Supply
		159	Post & Telecommunication
20	Construction	138	Residential Construction
		139	Non-Residential Construction

27 Sector Aggregation		Basic Table (180 Sectors)	
		140	Public Works for Agriculture and Forestry
		141	Non-Agricultural Public Works
		142	Construction of Electric Plant
21	Hotel & Restaurant	143	Construction of Communication Facilities
		144	Other Construction
		147	Restaurants & Drinking Places
		148	Hotel & Lodging Places
22	Transport	149	Railways
		150	Road Passenger Transport
		151	Road Freight Transport
		152	Land Transport Supported Services
		153	Ocean Transport
		154	Coastal & Inland Water Transport
		155	Water Transport Services
		156	Air Transport
		157	Other Services
23	Real Estate	163	Real Estate
24	Public Administration	165	Public Administration
25	Education	167	Education
26	Health	169	Hospital
27	Other Services	024	Agricultural Services
		145	Wholesale Trade
		146	Retail Trade
		158	Storage & Warehousing
		160	Banking Services
		161	Life Insurance Services
		162	Other Insurance Services
		164	Other Business Services
		166	Sanitary & Similar Services
		168	Research
		170	Business & Labor Associations
		171	Other Community Services
		172	Motion Picture Production
		173	Movie Theatres
		174	Radio, Television & Related Services
		175	Libraries & Museums
		176	Amusement & Recreation
		177	Repairs
		178	Personal Services
		180	Unclassified

Source: National Economics and Social Development Board.

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