



CHAPTER 4

PROJECTIONS OF REGIONAL EMPLOYMENT GROWTH: A SHIFT AND SHARE ANALYSIS

4.1 Introduction

The shift and share method of regional analysis is a useful technique for comparing an area's economic growth performance to that experienced by the entire nation. It has been used both as a descriptive device and as an analytical tool. The shift and share components have been calculated from historical data in hopes of identifying future strengths and weaknesses in a regional economy. Further, the use of the technique as a framework for regional projections has been suggested by Dunn <sup>1/</sup>, Ashby <sup>2/</sup>, and has actually been applied by Phisit Pakkasem <sup>3/</sup> and Boonkong Hungchangsit <sup>4/</sup> analyzing the regional growth of Thailand.

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- <sup>1/</sup> Edgar S. Dunn, Jr., 'A Statistical and Analytical Technique for Regional Analysis', Paper and Proceedings of the Regional Science Association, Vol. VI 1960
  - <sup>2/</sup> Lowell D. Ashby, 'Growth Patterns in Employment by County: 1940 - 1950 and 1950 - 1960', U.S. Department of Commerce, Office of Business Economics, Washington, 1965.
  - <sup>3/</sup> Phisit Pakkasem, 'Selected Regional Growth Models for Future Northeast Economic Development Planning', Thai Economic and Social Journal. Vol. 10 1973.
  - <sup>4/</sup> Boonkong Hunchangsit, 'Patterns of Growth and Employment in the Thai and Japanese Economics'. Bangkok, Thammasat University, 1978.

#### 4.2 Shift and Share Methodology (The Descriptive Model)

The shift and share method's greatest virtue is its ability to place regional growth in a national perspective, eliminating the narrow view that often results from comparing the performance of a regional economy to its own performance in some past period or to that of some closely linked geographical area.

The shift and share model is an identity which divides the growth of a regional variable, such as growth of employment, into the following components:

##### The National Share (or National Growth) Component. (NS)

The national share component represents the growth that would have occurred in a particular industry if its employment had grown at the same rate as the average for all industries combined.

From Table 4-1, for the 1971 and 1976 period it can be computed by multiplying the individual industry employment totals for 1971 by the national all industries growth rate 10.78 per cent. For example, Table 4-1 shows the national share component for manufacturing industry to be 71,081. This figure represents the increase that would have occurred in the number of persons employed in manufacturing industry in Thailand between 1971 and 1976 if employment in this particular industry had increased at a national rate for all industries combined. It was computed by multiplying manufacturing employment in 1971, 659090, by the national all - industry

growth rate, 10.78 per cent.

The Industrial Mix (or Proportionality) Component.(IM)

Because structural changes such as demand patterns and technological innovation vary, employment in certain industries grows more rapidly than it does in others. These relative employment changes are indicated by the industrial mix component. A negative value indicates that employment in the industry grew at a slower rate than did employment for all industries combined. A positive value indicates that employment in the industry grew at a faster rate than did employment for all industries combined.

Using the manufacturing industry as an example, the industrial mix component for the 1971 to 1976 period is computed as follows. First, an industrial mix percentage is derived by subtracting the national employment growth rate for all industry, 10.78 per cent, from the 73.77 per cent growth rate experienced by the manufacturing industry (computed by dividing the national actual change in manufacturing employment from 1971 to 1976, 486,240, by 1971 manufacturing employment 659,090). This industrial mix percentage 62.98 per cent, is then multiplied by the manufacturing industry total in 1971 to determine the industrial mix component, 415,159. This represents the number of jobs created in this industry resulting from a growth rate higher than the national average rate for all industries. Conversely, the negative figure for



commerce sector indicates the number of additional jobs that would have been available in 1976 if it had grown at the national average for all industries during the 1971 to 1976 period.

The Regional Share Component. (The Differential Shift Component). (RS)

Just as the rate of employment growth in some industries is greater than or less than national average rate for all industries combined, the rate of regional employment growth in a particular industry may be greater than or less than that experienced by the industry throughout the nation. For example, the data of Table 4.2 shows that if construction industry employment in the North had grown at the same rate during the 1971 to 1976 period as it did throughout the nation, than the North would have recorded an construction employment 4,585 during this period (the sum of 1,988 national growth component and a 2,597 industrial mix component). Since the data show that the North construction employment actually increased by 54,140, the North must have gained a larger regional share of a nationally slow growth industry. This fact is indicated by the positive a regional share component, 49,555. This is due to a given industry growing more rapidly in some region than in others because of unique locational or competitive advantages. If an industry expands more rapidly in one region than it does in other regions possessing the same structure will experience a positive



regional share. If a region does less well on the average than the nation or other regions in particular industries it will have a negative signs.

Net Relative Shift (NS).

The sum of the industrial mix and regional share components for all industries represents the net relative shift in employment for a region compared to the entire nation. A positive net relative shift indicates the margin by which a region's employment growth exceeded the national growth rate for all industry. A negative figure indicates the number of additional jobs that would have been available if total employment in the region had grown at the national all industry growth rate.

In short, the shift and share model allow regional growth of employment to be attributed to national growth, industrial mix effect, and expansion within the region due to locational advantage. The results of the analysis show the source of region's ability to grow either absolutely or relatively than other regions. The relationship among the three components for all industry in a region in the shift and share model may be expressed mathematically in the following manner. Let

$E_i^1$  = Regional employment in industry  $i$  in base period 1.

- $E_i^2$  = Regional employment in industry i in period 2  
 $TE_i^1$  = National employment in industry i in base period 1.  
 $TE_i^2$  = National employment in industry i in period 2.  
 $TE^1$  = Total national employment in base period 1  
 $TE^2$  = Total national employment in period 2.  
 $r_{oo}$  = National all - industry employment growth rate  
 between period 1 and period 2. ( $=TE^2/TE^1$ ).  
 $r_{io}$  = National individual industry growth rate between  
 period 1 and period 2. ( $TE_i^2/TE_i^1$ ).  
 $r_{ij}$  = Regional individual industry growth rate between  
 period 1 and period 2. ( $=E_i^2/E_i^1$ ).  
 NS = National share component of regional growth.  
 IM = Industry mix component of regional growth.  
 RS = Regional share component of regional growth.  
 TC = Total change in regional employment between  
 period 1 and period 2.  
 NC = Net relative shift in regional employment between  
 period 1 and period 2.

Then

- (1)  $NS = r_{oo} (E_i^1)$   
 (2)  $IM = E_i^1 (r_{io} - r_{oo})$   
 (3)  $RS = (r_{ij} - r_{io}) E_i^1 = TC - (NS + IM)$   
 (4)  $TC = (E_i^2 - E_i^1) = NS + IM + RS$   
 (5)  $NC = IM + RS$

Where  $r_{oo} = TE^2 / TE^1$

$r_{io} = TE_i^2 / TE_i^1$

$r_{ij} = E_i^2 / E_i^1$

From equation (4), to compute the change in employment in industry i of a certain region, the growth rate of total national employment would be multiplied by  $E_i^1$  to obtain the national share effect (NS). To calculate the industry mix (IM), the divergence between the national employment growth rate of industry i and  $TE^1$  is multiplied by E. The industry mix component is positive or negative depending on the relative growth rates of  $TE^1$  and  $TE_i^1$ . A negative industry mix component, for instance, indicates that the region has a preponderance of slow rather than rapid growth industries, and is growing slower than total national employment. Industry mix gains or losses are attributable to such factors as the changing demand and supply structure of the industry at the national level, and the capacity of different regions to assimilate rapid and slow growth industries.

The third component of changes is the regional share (RS) which depends on the rates of growth of a given industry in different regions due to its competitive or locational advantages. The competitive component is negative if E is not keeping pace with the same industry in other regions and positive if it is enjoying faster growth. The regional share component, when calculated



for the region as a whole, indicates whether the region has competitive or locational advantages over other regions possessing the same structure.

The summation of the three components of change (NS + IM + RS) over each industry within a region permits the identification of the results of factors operating on regional economic growth. The shift and share model is extended to regional analysis of Thailand in order to identify those variables which have influenced regional change and past growth experience.

#### 4.3 Projection Methodology (The Projection Model).

The shift and share technique can also be used to project future employment growth. The additional requirements are an internal or external projection of national employment growth and some assumption regarding the stability of the regional share component over time.

Two observations are appropriate regarding employment projections. First, the probability of error is inversely related to the size of the region. Generally, the greater the level of regional and industrial aggregation, the greater the stability of the regional share component. Second, when making or using projections, one should remember that they are not predictions of definitely will occur in the future - they are extensions of existing

or assumed trends. The purpose is to make reasonable estimates of future employment change in order to provide a solid basis for rational economic policy decisions.

Mathematically, the projection technique can be represented as follows : Let

$E_i^2$  = Regional employment in industry  $i$  in base period 2.

$E_i^3$  = Projected employment in industry  $i$  in period 3.

$P_{oo}$  = National projected all - industry employment growth rate between period 2 and period 3.

$P_{io}$  = National projected individual industry growth rate between period 2 and period 3.

$NS'$  = Projected national share component.

$IM'$  = Projected industry mix component.

$RS'$  = Projected regional share component.

$RS_i$  = Regional share component for industry  $i$  in previous period.

Then

$$NS' = \sum_{i=1}^n (p_{oo} E_i^2)$$

$$IM' = \sum_{i=1}^n (p_{io} - p_{oo}) E_i^2$$

$$RS' = \sum_{i=1}^n (k RS_i) \text{ where}$$

RS is the Regional Share component in the previous period and k is a scalar adjustment if the projection period is a different length from the historical period over which the analysis is made

The resulting RS' must be considered a first approximation because a continuation of the past regional share trend can lead to very low or even negative industry employment projections. Since negative employment projections are implausible, some adjustment must be made, either through the use of an algorithm as suggested by Ashby, or some judgement.

When the projected regional share component has been determined, then

$$(6) \quad \begin{aligned} TC'_i &= NS'_i + IM'_i + RS'_i \quad \text{and} \\ E_i^3 &= E_i^2 + NS'_i + IM'_i + RS'_i \end{aligned}$$

#### 4.4 Data Requirements for the Shift and Share Analysis and Projection.

Since the theoretical and mathematical structure of the model has been specified, it is relatively easy to describe the kind of information necessary to fill in that structure.

In order to apply the shift and share model in the preceding section, the following data are needed



(1) Total national employment in 1971 and 1976 (second round) broken down into 8 sectors.

(2) Regional employment in 1971 and 1976 (second round) broken down into 8 sectors.

(3) Projected individual sectors growth rate of the national employment derived from chapter 3.

(4) Projected individual sector regional share component (differential shift component) derived from preceding section.

Two technical difficulties with the labor force surveys must be noted. Firstly, the labor force surveys were carried out twice a year during the slack (first round) and peak (second round) agricultural periods make it difficult to compare the industrial structure of employment between two periods. Secondly, a change in the definition of the labor force was introduced in 1974. Prior to this date, all unpaid family workers were included as part of the labor force and persons without work who were not looking for work were treated as outside the labor force. Since 1974, unpaid family workers who worked less than 20 hours a week and who wanted to work more have been treated as unemployed while those who worked less than 20 hours but did not want to work more were classified as out of the labor force. Those out of work and not looking for work because of the belief that there is no work available were reclassified as unemployed. Since data is not available after 1973 on the number falling in these new classification nor in the particularly of the

labor force. There is, however, some offsetting increase of employment in rural non - farm activities and labor migration to urban and other rural areas for seasonal employment. But while these are in hundreds of thousands, agricultural employment changes are in millions. Hence, rural employment and aggregate labor utilization in the whole country varies considerably between agricultural peak and slack periods. Most of the labor force in rural area is unpaid family workers, so the second round labor force survey will be influenced by changing labor force definition in a lesser extent.

For the reasons mentioned above, we use the unadjusted second round labor force survey for the shift and share analysis and projection. However, comparability of data on labor force for the years under study has its own limitations. While interpreting the results, therefore, allowance will have to be made for all these limitations.

#### 4.5 Shift and Share Model Applied to Thailand: 1971 - 1976

Reference to table 4.1 for whole kingdom and table 4-2 - 4-6 for the north, south, north - east, Bangkok metropolis and the central (except Bangkok metropolis) respectively, will aid in understanding the shift and share analysis. Table 4.1 shows that the total number of employed persons throughout Thailand grew by 1792 thousand persons during the 1971 and 1976 period, an increase of 10.78 per cent. However, not every industry grew

at the national rate for all industries combined; employment in some industries grew more rapidly; employment in other grew less rapidly or, in some cases, declined. The number increased could be attributed to a national share component and a net relative shift component already described in the model.

Considering the national share component as a whole, it is found ~~that~~ if employment in agricultural sector has increased precisely at the same rate as the total employment of the whole kingdom during the same period, employment in agricultural sector would have increased 1419 thousand persons. But this is not the case, since employment in this sector actually increased less. This can be seen from the actual change of 791 thousand persons. Accordingly, the agricultural sector has the negative shift of 628 thousand persons. It is the biggest negative shift, indicating this sector is having a low rate of employment creation. However, this does not mean that the employment in this sector has declined, but only expanded slowly.

Commerce is another industry having a negative shift in employment of 9952 persons, indicating a relatively low labor absorption for the sector during 1971 - 1976 duration. On the other hand, during the same period the following sectors are having positive shifts in employment, listed in order of magnitude, would be as follows: manufacturing (415 thousand persons), transport, storage and communication (90 thousand persons), services (83 thousand persons),



construction, repair and demolition (26 thousand persons), electricity, gas, water and sanitary services (24 thousand persons), mining and quarrying (7 thousand persons). These sectors showed relatively high labor absorption during the 1971 - 1976 period. Therefore, employment structure has been relatively shifted towards the above mention sectors. However, although agriculture has low labor absorption it has the highest percentage share of the total employment. In 1971 its share is 80 % declining to 76 % in 1976. Also over 1971 - 1976 period, 44 % of labor absorbed into agricultural sector.

During the 1971 - 1976 period, employment in the north had actually increased by 102 thousand persons, this can be seen from the total sum of column ' total change' as shown in table 4.2 Looking at the national share component it is found that if employment in the north had expanded precisely at the same rate as the employment of the country as a whole, employment of all industries in the north would have expanded 428 thousand persons. In fact, this is not the case as employment in the north declined Accordingly, the region has a negative shift of 325 thousand persons. This shift could be attributed to two shift components: the industrial mix effect or the proportionality shift of - 87 thousand persons, and the regional share effect or the differential shift of - 235 thousand persons.

From table 4-2 , it is found that there is only two sectors in the north having negative shift component namely, agricultural and

and commerce sectors. The negative shift in the agricultural sector in the north is attributable to negative industrial mix component (the proportionality shift component) of - 165 thousand persons and negative regional share component (the differential shift component) of - 339 thousand persons. The negative shift in the commerce sector in the north is attributable to negative industrial mix component of - 1653 persons rather than the regional competitive effects. In fact, this sector might have been even larger if it has not had a positive differential shift (regional share) of 1194 persons, or the regional competitive effect as an offset. The meaning of this differential shift (regional share) is that commerce sector of this region absorbed labor at a relatively high rate when compared to the other regions. But the resulting total negative shift is due to other factors, not to the absorptive inability of this industry. In other words the nature of commerce sector of this region is capable to absorb more labor but industrial mix factor hampered it.

The other industries have entirely positive shift and the nature of the shift are mostly due to both favourable industrial mix effects and regional competitive factors. The exceptions are for manufacturing and transport, storage and communication. In fact, the positive shift might have been even bigger if it has not been hampered by regional uncompetitive or local factor effect. The positive shift of manufacturing is due totally to the favourable combination of industrial structure but offset by relatively unfavourable



regional factor.

The results of the net relative shift of all regions as presented in table 4-2 - 4-6 are summarized in a compact form as follows

1. The north

a) negative shift

agriculture, forestry, hunting and fishing -504622

commerce 459

b) positive shift

service 66247

construction 52152

manufacturing 51425

transport, storage and communication 10157

electricity, gas, water and sanitary services  
6063

mining and quarrying 1180

2. The south

a) negative shift

agriculture, forestry, hunting and fishing-185858

mining and quarrying -4251

b) positive shift

manufacturing 54974

services 45696

commerce 25052



construction	12630
transport, storage and communication	2449
electricity, gas, water and sanitary- services	216

3. The north - east

a) negative shift

agriculture, forestry, hunting and - fishing	-69099
services	-26826
construction	-18409

b) positive shift

manufacturing	116714
transport, storage and communication	36721
commerce	4554
mining and quarrying	3280
electricity, gas, water and sanitary services	2912

4. Bangkok Metropolis

a) negative shift

agriculture, forestry, hunting and - fishing	-55541
commerce	-28235
construction	-8545
mining and quarrying	-142

b) positive shift		
manufacturing		120719
services		33262
transport, storage and communication		14295
electricity, gas, water and sanitary-		
services		10254
5. The central (except Bangkok Metropolis)		
a) negative shift		
services		-34873
construction		-11212
commerce		-10856
b) positive shift		
agriculture, forestry, hunting and-		
fishing		186949
manufacturing		71327
transport, storage and communication		26669
mining and quarrying		7504
electricity, gas, water and sanitary		
service		4655

Table 4 - 1 Shift and Share Analysis: Employment and Components of employment change, Thailand, 1971 - 1976

ITEM  SECTORS	EMPLOYED PERSONS IN		TOTAL  CHANGE	COMPONENTS OF CHANGE		COMPONENTS OF NET RELATIVE SHIFT	
	1971	1976		NATIONAL SHARE	NET RELATI -VE SHIFT	INDUSTRIAL MIX	REGIONAL SHARE
1. Agriculture, Forestry, hunting and fishing.	13157680	13948530	790850	1419017	-628167	-628167	-
2. Mining and Quarrying.	19000	28520	9520	2049	7471	<u>7471</u>	-
3. Manufacturing.	659090	1145330	486240	71081	415159	<u>415159</u>	-
4. Construction, Repair and Demolition.	188910	235900	46990	20373	26617	26617	-
5. Electricity, Gas, Water and Sanitary Services.	18540	44640	26100	1999	24101	14101	-
6. Commerce.	1180860	1298260	117400	127352	-9952	<u>-9952</u>	-
7. Transport, Storage and Communication.	213340	332640	113300	23008	90292	<u>90292</u>	-
8. Services.	1171970	1381870	209900	126393	83507	<u>83507</u>	-
9. Activities not Adequat -ely Described.	9250	1220	-8030	998	-9028	-9028	-
TOTAL	16618640	18410910	1792270	1792270	-	-	-



Table 4 - 2 Shift and Share Analysis: Employment and components of employment change, North , 1971 - 1976

ITEM SECTORS	EMPLOYED PERSONS IN		TOTAL CHANGE	COMPONENTS OF CHANGE		COMPONENTS OF NET RELATIVE SHIFT	
	1971	1976		NATIONAL SHARE	NET RELATI VE SHIFT	INDUSTRIAL MIX	REGIONAL SHARE
1. Agriculture, Forestry, Hunting and Fishing.	3446970	3336250	-130720	373902	-504622	-165537	-339085
2. Mining and Quarrying.	90	1280	1190	10	1180	35	1145
3. Manufacturing.	98430	160470	62040	10615	51425	62001	-10576
4. Construction, Repair and Demolition.	18430	72570	54140	1988	52152	2597	49555
5. Electricity, Gas, Water and Sanitary Services.	710	6850	6140	77	6863	923	5140
6. Commerce.	196100	216790	20690	21149	-459	-1653	1194
7. Transport, Storage and Communication:	24410	37200	12790	2633	10157	10331	-174
8. Services.	155710	238750	83040	16793	66247	11095	55152
9. Activities not Adequately Described.	6970	-	-6970	750	-7720	-6800	-920
TOTAL	3967820	4070160	102340	427917	-325577	-87008	-238569

Table 4-3 Shift and Share Analysis: Employment and components of employment change, South, 1971-1976

ITEM SECTORS	EMPLOYED PERSONS IN		TOTAL CHANGE	COMPONENTS OF CHANGE		COMPONENTS OF NET RELATIVE SHIFT	
	1971	1976		NATIONAL SHARE	NET RELATIVE SHIFT	INDUSTRI- AL MIX	REGIONAL SHARE
1. Agriculture, Forestry, Hunting and Fishing.	1604940	1592170	-12770	173088	-185858	-76631	-109227
2. Mining and Quarrying.	14200	11380	-2820	1531	-4351	5583	-9934
3. Manufacturing.	45210	105060	59850	4876	54974	28477	26497
4. Construction, Repair and Demolition.	10850	24650	13800	1170	12630	1529	11101
5. Electricity, Gas, Water and Sanitary Services.	1150	1490	340	124	216	1495	-1279
6. Commerce.	110880	147890	37010	11958	25052	-934	25986
7. Transport, Storage and Communication.	43400	50530	7130	4681	2249	18368	-15919
8. Services.	106400	163660	57180	11484	45696	7537	38199
9. Activities not Adequa- tely Described.	-	-	-	-	-	-	-
TOTAL	1937110	2096830	159720	208912	-49192	-14526	-34666

Table 4-4 Shift and Share Analysis: Employment and components of employment change, North-east, 1971-1976

ITEM SECTORS	EMPLOYED PERSONS. IN		TOTAL CHANGE	COMPONENTS OF CHANGE		COMPONENTS OF NET RELATIVE SHIFT	
	1971	1976		NATIONAL SHIFT	NET RELATIVE SHIFT	INDUSTRIAL MIX	REGIONAL SHARE
1. Agriculture, Forestry, Hunting and Fishing.	5592310	6126330	534020	603113	-69093	-267015	197922
2. Mining and Quarrying.	-	3280	3280	-	3280	-	3280
3. Manufacturing	89810	216210	126400	9686	116714	56571	60143
4. Construction, Repair and Demolition.	34110	19380	-14730	3679	-18409	4806	-23215
5. Electricity, Gas, Water and Sanitary Services.	1560	4640	3080	168	2912	2028	884
6. Commerce.	219630	247870	28240	23686	4554	-1851	6405
7. Transport, Storage and Communication.	23450	62700	39250	2529	36721	9925	26796
8. Services.	223890	221210	-2680	24146	-26826	15953	-42779
9. Activities not Adequately Described.	120	-	-120	13	-133	-117	-16
TOTAL	6184880	6901620	716740	667020	49720	-179700	229420



Table 4-5 Shift and Share Analysis: Employment and components of employment change, Bangkok Metropolis, 1971-1976

ITEM SECTORS	EMPLOYED PERSONS IN		TOTAL CHANGE	COMPONENTS OF CHANGE		COMPONENTS OF NET RELATIVE SHIFT	
	193060	1976		NATIONAL SHARE	NET RELATIVE SHIFT	INDUSTRIAL MIX	REGIONAL SHARE
1. Agriculture, Forestry, Hunting and Fishing.	193060	158340	-34720	20821	-55541	-9218	-46323
2. Mining and Quarrying.	670	600	-70	72	-142	263	-405
3. Manufacturing	211230	354730	143500	22781	120719	133053	-12334
4. Construction, Repair and Demolition.	62450	60640	-1810	6735	-8545	8799	-17344
5. Electricity, Gas, Water and Sanitary Services	10720	22130	11410	1156	10254	13935	-3681
6. Commerce.	361280	372000	10720	38963	-28243	-3045	-25198
7. Transport, Storage and Communication.	66250	87690	21440	7145	14295	28039	-13744
8. Services.	324890	393190	68300	35038	33262	23149	10113
9. Activities not Adequately Described.	490	-	-490	53	-543	-478	-65
TOTAL	1231040	1449320	218280	132764	85516	194497	-108981

Table 4-6 Shift and Share Analysis: Employment and components of employment change, Central (except Bangkok Metropolis), 1971-1976

ITEM SECTORS	EMPLOYED PERSONS IN		TOTAL CHANGE	COMPONENTS OF CHANGE		COMPONENTS OF NET RELATIVE SHIFT	
	1971	1976		NATIONAL SHARE	NET RELATIVE SHIFT	INDUSTRIAL MIX	REGIONAL SHARE
1. Agriculture, Forestry, Hunting and Fishing.	2300400	2735440	435040	248091	186949	-109837	296786
2. Mining and Quarrying.	4040	11980	7640	436	7504	1589	5915
3. Manufacturing.	214410	308860	94450	23123	71327	135056	-63729
4. Construction, Repair and Demolition.	63070	58660	-4410	6802	-11212	8886	-20098
5. Electricity, Gas, Water and Sanitary Services.	4400	9530	5130	475	4655	5720	-1065
6. Commerce.	292970	313710	20740	31596	-10856	-2469	-8387
7. Transport, Storage and Communication.	55830	88520	32690	6021	26669	23629	3040
8. Services.	361000	365060	4060	38933	-34873	25722	-60595
9. Activities not Adequately Described.	1970	1220	-450	180	-630	-1630	1000
TOTAL	3297790	3892280	595190	355657	239533	86666	152867

4.6 Shift and Share Projection of the Regional Employment of Thailand:  
1976 - 1985

The shift and share analysis of regional employment performed in the preceding section is purely descriptive. The empirical results explain past regional employment growth of Thailand in terms of industrial mix component or the proportionality effect and regional share component or the differential shift effect. The model explains the sectoral composition of national share (or national growth) and the deviation experienced by the region. This categorization is definitional and without behavioral content.

As previously indicated, the shift and share model as the basis for projections of regional employment growth is possible if individual or combined sectoral employment growth at the national level and differential shifts can both be projected. The model assumes an interrelationship between national and regional growth paths. In addition, the projection model also rests on the assumption of 'persistence' in the regional share component (differential shift effect). The assumption of stability or persistency of the competitive component raises a question on the usefulness of shift and share not only as a projection model, but also as a planning and policy tool. On a prior grounds, one would expect the economic forces determining comparative as well as locational advantage to albeit gradually. Instability in the component may be caused by changing input-output access, namely change in local supply relationship



and cyclical activity, weather etc., any of which may be highly erratic in some regions. In particular, variables like the weather seem to have more to do with explaining the annual differential shifts than other variables

The shift and share projection model can now be rewritten where all variable definitions are the same as equation (6) except that the superscripts are used to denote the projected value and base year value of the variables in the model.

$$E_i^{80} = E_i^{76} + p_{io}^{76-80} (E_i^{76}) + (p_{io}^{76-80} - p_{oo}^{76-80}) E_i^{76} + k_i^{76-80} RS_i^{71-76}$$

$$(7) \quad E_i^{80} = (1 + p_{io}^{76-80}) E_i^{76} + k_i^{76-80} RS_i^{71-76}$$

Similarly,

$$(8) \quad E_i^{85} = (1 + p_{io}^{76-85}) E_i^{76} + k_i^{76-85} RS_i^{71-76}$$

where  $k_i RS_i$  = The sum of all regional share component (differential shift component) for the period 1971-1976 multiplied by the scalar factor,  $k$ , since the historical period is 5 years and the projected period is 4 and 9 years respectively, so  $k = 4/5$  and  $9/5$  respectively.

Equation (7) and (8) indicate that in order to project the employment of the  $i^{th}$  industry in some regions for 1980, 1985,  $p_{io}$  and the regional share component must be known

The projected employment in each sectors for the whole kingdom for 1980, 1985 are derived from the preceding chapter. The empirical results obtained under the specification are presented in table 4-7 - 4+36

Reference to successive stages in the productive process, the major categories used for this structural employment analysis have been suggested into three in number.<sup>5/</sup>

1) Resource or primary sector, which are concerned with the extraction of raw materials. It consists of such varied occupations as agriculture, forestry, hunting, fishing, mining and quarrying.

2) Processing or secondary sector, which have to do with the tranformation of raw materials into finished or semi - finished goods - in short, with manufacture.

3) Servicing or tertiary sector, which are essentially the 'all others' types of employment engaged in either the extraction of materials or the manufacture of products. It consists of such varied occupation as construction, electricity, gas, water and sanitary service, commerce, transport, storage and communication, and services.

From the derived future national employment growth rate of individual sector at different national GDP growth rates in the preceding section, manpower demand in 1980 and 1985 can

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<sup>5/</sup> Perloff, Harvey S, 'Regions, Resources and Economic Growth', Lincoln, University of Nebraska Press, 1960.

be calculated by using equation (7) and (8) as shown in table 4-7 - 4-36 From our projections, the employment structure result in changes in the sectoral distribution of employment. From table 4-7 and 4-22, the proportion of employed persons in primary sector to total employment of the north will decrease from 68 % in 1980 to 59 % in 1985, whereas slightly increase from 4 % in 1980 to 5 % in 1985 in secondary sector and significantly increase in tertiary sector from 28 % in 1980 to 36 % in 1985 corresponding to assumed growth rate of GDP at 5 per cent per annum. The tertiary sector in the north will have been increasing at a speedy rate than the secondary sector and it seems that this sector will significantly absorb the primary sector labor force in the future year. The region which will have the same employment structure as the north in the near future is the south. The decrease in proportion of total employment in the south in primary sector will be about ten per cent from 61 in 1980 to 51 % in 1985, where as slightly increase in secondary sector and nearly ten per cent increase in tertiary sector from 32 % in 1980 to 41 % in 1985, as shown in table 4-8 and 4-23. The north - east will constantly be predominance in labor absorptive in primary sector which slightly decrease in proportion of total employment from 82 % in 1980 to 79 % in 1985, while secondary sector will increase from 4 % to 6 % and tertiary sector will slightly increase from 14 % to 15 % as shown in table 4-9 and 4-24 The future distribution of employment structure in the central (except Bangkok Metropolis) will be resemblance to the north - east

for the preponderance of the primary sector but a lesser extent of concentration in employment proportion which will constantly be unchanged of 61 % in 1980 and 1985, while the secondary sector will have a slightly decrease in proportion of total employment from 7 % in 1980 to 6 % in 1985 but slightly increase from 32 % to 33 % in tertiary sector during the same period as shown in table 4-11 and 4-26. In conclusion, the north - east and the central (except Bangkok Metropolis) distribution of employment structure will constantly be unchanged in the near future and primary sector will significantly absorb most of the labor force where as the north - east will have a higher percentage than the central. Bangkok Metropolis will still have a significant labor absorption in secondary and tertiary sectors, from table 4-10 and 4-25, the proportion in total employment will slightly increase from 19 % in 1980 to 20 % in 1985 in secondary sector where as 76 % to 78 % in tertiary sector.

From our projections, the table 4-7, 4-12, 4-17, 4-22, 4-27 and 4-32 clearly show that the total employment in the north will be 4.1, 4.9 and 5.9 million workers in 1980 and 4.2, 5.6 and 7.2 million workers in 1985 respectively corresponding to assumed growth rate of GDP at 5 percent, 7 per cent and 9 per cent per annum. The results show that at the lower growth rate, at 5 per cent per annum, the total employment between 1980 and 1985 will be slightly increased by as follows: 0.1 million workers in the north (table 4-7 and 4-22), 0-2 million



workers in the south (table 4.8 and 4.23), 0.7 million workers in the north - east (table 4.9 and 4.24), 0.45 million workers in Bangkok Metropolis (table 4.10 and 4.30), and 0.7 million workers in the central (except Bangkok Metropolis) (table 4.11 and 4.31) While as the higher growth rate of GDP, at 9 per cent per annum, the total employment projections between 1980 and 1985 will be increase by as follows: 1.4 million workers in the north (table 4.17 and 4.32), 2.7 million workers in the south (table 4.18 and 4.33), 2.5 million workers in the north - east (table 4.19 and 4.34), 0.9 million workers in Bangkok Metropolis (table 4.20 and 4.35), and 2.2 million workers in the central (except Bangkok Metropolis)(table 4.21 and 4.36). Conclusively, the national economic growth responsible for the increasing of the employment, the higher the growth rate of GDP, the more increasing of the employment creation.

Net relative shift is attributed to two components: the proportionality shift or the industrial mix effect and the differential shift or local factor effect or the regional share component. Arranging in order of magnitude, the regions which will be having negative relative shift out the primary sector in the near future at any assumed growth rate of GDP are as follows: the north, the north - east, the south, the central (except Bangkok Metropolis) and Bangkok Metropolis. The regions which will be having positive relative shift in the tertiary

sector at any assumed growth rate of GDP, ranking in order of magnitude, are as follows: Bangkok Metropolis, the central (except Bangkok Metropolis), the north, the north - east and the south, In conclusion, the proportion of workers in the primary sector of the north, the south, the north - east and Bangkok Metropolis will be significantly declined while still be unchanged in the central (except Bangkok Metropolis) in the near future, Despite the continuous decline of the proportion of employed persons, the primary sector will still be predominant. Employment in secondary sector of every regions, except Bangkok Metropolis, will be shared a much smaller proportion while employment in tertiary sector will be increased much more rapidly than secondary sector. Therefore, it seems that the tertiary sector of each regions will absorbed some of workers shifting out the primary sector in the near future.

The national share (national growth) component in each regions will offset the negative relative shift and reinforce the positive relative shift. The labor force requirements of each regions in the near future can be calculated by adding the number of workers in the base period (1976) with the national share component and net relative shift component as shown in Table 4-7-4-6. The regional distribution of employment projections shown in table 4-7 - 4-36 is summarised in table 4-37 in a compact form.

Table 4.37 shows that the proportion of national employment of the north will be declined from 23.9 % in 1971 to about 19 % in 1985, of the north - east from 37.2 % in 1971 to about 34 % in 1985, of the south from 11.7 % in 1971 to about 11.2 % in 1985. The proportion of national employment of Bangkok Metropolis will be increased from 7.4 % in 1971 to about 12 % in 1985, of the central (except Bangkok Metropolis) from 19.8 % in 1971 to about 23 % in 1985, showing that the central (including Bangkok Metropolis) will have had increasing of labor force demand at a speedy rate than the lther regions resulting in the shifting out of the labor force of the otehr regions to some extent.

#### 4.7 Summary of Finding

The hypothesis, in which the regional employment growth is related to its industrial structure, is placed in the macro framework of shift and share analysis and related regional employment growth to both the industrial mix component as well as the regional share component or the competitive position of the region's industrial structure. The shift and share method of regional analysis is a useful technique for comparing an region's employment growth performance to that experienced by the entire nation. This national basis of comparison eliminates the narrow

view that often results from comparing the performance of a regional economy to some past period or to that of some closely linked geographical area.

The analysis shows that the north and the south was unable to grow relatively faster than the other regions during the period 1971 - 1976. Despite of the most favorable regional competitive factor among each regions, the positive shift in employment of all sectors of the north - east was ranked third because of the industrial mix factor hampered it. During the period 1971 - 1976, the positive shift to Bangkok Metropolis might have been even bigger if it had not been dampered by the uncompetitive factor, while the central (except Bangkok Metropolis) and a relatively high labor absorptive capacity due to both favourable industrial mix effects and regional competitive factors.

Considering the sectoral distribution of employment of each regions, the proportion of workers in the primary sector of the north, the south, the north-east and Bangkok Metropolis will be signifacantly declined while the central (except Bangkok Metropolis) still be unchanged in the near future, while the tertiary sector of each regions will share a much more proportion resulting from the absorption the labor force shifting out from the primary sector. Considering the regional distribution of employment, the central (including Bangkok Metropolis) will have an increasing of proportion showing the labor absorptive capability of the region.



The results obtained from the application of industrial structure model to regional employment study help to initiate the regional development strategies for a comprehensive development plan. Also, the model offers useful insights as to how labor absorptive capacity of each regions can be fulfilled. However, use of shift and share analysis alone is not sufficient to answer all questions, for their complete analysis requires much deeper probing into the factors determining industrial location and regional growth. Shift and share is not more capable of furnishing simple answers to complex problems than any other technique, but it is valuable aid in evaluating to identify basic relationships and the direction of further analysis. The model also gives an impulse to handle a comprehensive regional planning, so deliberate spatial resource reallocation could be implemented to remedy unfavourable industrial structure of some regions.

Table 4-7 Shift and Share Projection of Employment, North 1980, with assumed growth rate of GDP at 5 per cent per annum.

ITEM SECTORS	1976	COMPONENTS OF CHANGE		COMPONENTS OF NET RELATIVE SHIFT		1980	%
		NATIONAL SHARE	NET RELATIVE SHIFT	INDUSTRIAL MIX	REGIONAL SHIFT		
1. Agriculture, Forestry Hunting and	3336250	313140	-874491	-573968	-300523	2774890	68
2. Mining and Quarrying	1280	120	1794	780	1014	3194	
3. Manufacturing	160470	15062	5141	14514	-9373	180673	4
4. Construction, repair and Demolition	72570	6811	27607	-16312	43919	106988	
5. Electricity, Gas, Water and Sanitary Services	6850	643	5663	1108	4555	13156	28
6. Commerce	216790	20348	121933	120875	1058	359071	
7. Transport, Storage and Communication	37200	3492	4833	4987	-154	45525	
8. Services	238750	22409	318097	269217	48880	579256	
9. Activities not adequately described	-	-	-	-	-	-815	
TOTAL	4070160	382025	-390238	-178799	-211439	4061947	100

Table 4-8 Shift and Share Projection of Employment, South 1980 with assumed growth rate of GDP at 5 per cent per annum

ITEM SECTORS	1976	COMPONENTS OF CHANGE		COMPONENTS OF NET RELATIVE		1980	%
		NATIONAL	NET RELATIVE SHIFT	SHIFT INDUSTRIAL MIX	REGIONAL SHARE		
1, Agriculture, Forestry, Hunting and Fishing	1592170	149411	-370721	-273917	-96804	1370890	61
2. Mining and Quarrying	11380	1068	-1863	6940	-8803	10585	
3, Manufacturing	105060	9861	32985	9502	23483	147906	7
4, Construction, Repair and Demolition	24650	2314	4297	-5541	9398	31261	32
5. Electricity, Gas Water and Sanitary	1490	140	-892	241	-1133	738	
6. Commerce	147890	13881	105489	82459	23030	267260	
7. Transport, Storage and Communication	50530	4743	-7335	6773	-14108	47938	
8. Services	163660	15361	218319	184545	33774	397340	-
9. Activities not adequately described	-	-	-	-	-	-	
Total	2096830	196808	-19721	11002	-30723	2273917	100

Table 4-9 Shift and Share Projection of Employment, North-east 1980, with assumed growth rate of GDP at 5 per cent per annum.

ITEM SECTORS	1976	COMPONENTS OF CHANGE		COMPONENTS OF NET RELATIVE SHIFT		1980	%
		NATIONAL SHARE	NET RELATIVE SHIFT	INDUSTRIAL MIX	REGIONAL SHARE		
1. Agriculture, Forestry, Hunting and Fishing	6126330	575017	-878562	-1053974	175412	5822785	82
2. Mining and Quarrying	3280	308	4907	2000	2907	8465	
3. Manufacturing	216210	20293	72858	19555	53303	309361	4
4. Construction, Repair and Demolition	19380	1819	-24930	-4356	-20574	-3731	
5. Electricity, Gas, Water and Sanitary Services	4640	435	1533	750	783	6608	
6. Commerce	247870	23256	143881	138205	5676	415016	14
7. Transport, Storage and Communication	62700	5885	32153	8405	23748	100738	
8. Services	221210	20763	211526	249429	-37913	453499	
9. Activities not adequately described	-	-	-14	-	-14	-14	
Total	6901620	647785	-436648	-639976	203328	7112757	100



Table 4-10 Shift and Share Projection of Employment, Bangkok  
1980 with assumed growth rate of GDP at 5 per cent per annum

ITEM SECTORS	1976	Components of change		components of net relative shift		1980	%
		national share	net relative shift	Industrial Mix	Regional Share		
1. Agriculture, Forestry, Hunting and Fishing	158340	14862	-68296	-27241	-41055	104906	5
2. Mining and Quarrying	600	56	7	366	-359	663	
3. Manufacturing	354730	33295	211353	32084	-10931	409178	19
4. Construction, Repair and Demolition	60640	5691	-29001	-13630	-15371	37330	
5. Electricity, Gas, Water and Sanitary Services	22130	2077	318	3580	-3262	24525	76
6. Commerce	372000	34916	185084	207416	-22332	592700	
7. Transport, Storage and Communication.	87690	8230	-426	11755	-12181	95494	
8. Services	393190	36905	452328	443365	8963	882423	
9. Activities not adequately described	-	-	-58	-	-58	-58	
Total	1449320	136032	561108	657695	-96507	2146469	100

Table 4-11 Shift and Share Projection of Employment, Central(except Bangkok Metropolis), 1980 with assumed growth rate of GDP at 5 per cent per annum

ITEM SECTORS	1976	COMPONENTS OF CHANGE		COMPONENTS OF NET RELATIVE SHIFT		1980	%
		NATIONAL SHARE	NET RELATIVE SHIFT	INDUSTRIAL MIX	REGIONAL SHARE		
1. Agriculture, Forestry, Hunting and Fishing	2735440	256748	-207573	-470605	263032	2784615	61
2. Mining and Quarrying	11980	1124	12548	7306	5242	25652	
3. Manufacturing	308860	28989	-28546	27935	-56481	309303	7
4. Construction, Repair and Demolition	58660	5506	-30997	-13185	-17812	33169	37
5. Electricity, Gas, Water and Sanitary Services	9530	864	597	1541	-944	11021	
6. Commerce	313710	29445	167482	174915	-7433	510637	
7. Transport, Storage and Communication	88520	8308	14560	11866	2624	111388	
8. Services	365060	34265	357942	411645	-53703	757267	
9. Activities not adequately described	1220	114	-448	-1334	886	886	
Total	3892980	365393	285565	150084	135481	4543938	100

Table 4-12 Shift and Share Projection of Employment, North 1980 with assumed growth rate of GDP at 7 per cent per annum

ITEM SECTORS	1976	COMPONENTS OF CHANGE		COMPONENTS OF NET RELATIVE SHIFT		1980	%
		NATIONAL SHARE NET RELATI VE SHIFT	INDUSTRIAL MIX	REOTINAL SHIFT			
1. Agriculture, Forestry, Hunting and Fishing	3336250	1021226	-1046708	-746185	-300523	3310768	68
2. Mining and Quarrying	1280	392	2323	1309	1014	3995	
3. Manufacturing	160470	49945	19945	29318	-9373	229534	5
4. Construction, Repair and Demolition	72570	22214	47361	3442	43919	142145	27
5. Electricity, Gas, Water and Sanitary Services	6850	2097	5805	1250	4555	14752	
6. Commerce	216790	66359	154697	153639	1058	437846	27
7. Transport, Storage and Communication	32700	11387	6556	6710	-154	55143	
8. Services	238750	73081	374487	325607	48880	686318	27
9. Activities not adequa tely described	-	-	-815	-	-815	-815	
Total	4070160	1245875	-436349	-224910	-211439	4879686	100

Table 4-13 Shift and Share Projection of Employment, South 1980

with assumed growth rate of GDP at 7 per cent per annum

ITEM SECTORS	1976	Components of Shange		Components of net relative		1980	%
		National Share	Net Relative Shift	Industrial Mix	Reoicnal Shift		
1. Agriculture, Forestry, Hunting and Fishing	1592170	487363	-452908	-356104	-96804	1626625	60
2. Mining and Quarrying	11380	3483	2833	11636	-8803	17696	
3. Manufacturing	105060	32159	42677	19194	23433	179896	7
4. Construction, Repair and Demolition	24650	7545	11007	1169	9838	43202	
5. Electricity, Gas, Water and Sanitary Services	1490	456	-861	272	-1133	1085	
6. Commerce	147890	45269	127839	104809	23030	320998	33
7. Transport, Storage and Communication	50530	15467	-4993	9115	-14108	61004	
8. Services	163660	50096	256973	223199	33774	470729	
9. Activities not adequately described	-	-	-	-	-	-	
Total	2096830	641838	-17433	13290	-30723	2721235	100



Table 4-14 Shift and Share Projection of Employment, North-east 1980, with assumed growth rate of GDP at 7 per cent per annum

SECTOR \ ITEM	1976	COMPONENTS OF CHANGE		COMPONENTS OF NET RELATIVE SHIFT		1980	%
		NATIONAL SHARE	NET RELATIVE SHIFT	INDUSTRIAL MIX	REGIONAL SHARE		
1. Agriculture, Forestry, Hunting and Fishing	6126330	1875269	-1194802	-1370214	175412	6806797	81
2. Mining and Quarrying	3280	1004	6260	3353	2907	10544	
3. Manufacturing	216210	66182	92804	39501	53303	375196	4
4. Construction, Repair and Demolition	19380	5932	-19655	919	-20574	5657	
5. Electricity, Gas, Water and Sanitary Services	4640	1420	1630	847	783	7690	
6. Commerce	247870	75873	181341	175665	5676	505084	15
7. Transport, Storage and Communication	62700	19192	35059	11311	23748	116951	
8. Services	221210	67712	263773	301686	-37913	552695	
9. Activities not adequately described	-	-	-14	-	-14	-14	
Total	6901620	2112584	-633604	-836932	203328	8380600	100

Table 4 - 15 Shift and Share Projection of Employment, Bangkok Metropolis 1980, with assumed growth rate of GDP at 7 per cent per annum

ITEM SECTORS	1976	COMPONENTS OF CHANGE		COMPONENTS OF THE RELATIVE SHIFT		1980	%
		NATIONAL SHARE	NET RELATIVE SHIFT	INDUSTRIAL MIX	REGIONAL SHARE		
1. Agriculture, Forestry, Hunting and Fishing	158340	48467	-75542	-35414	-40128	131265	5
2. Mining and Quarrying	600	184	262	615	-351	1046	
3. Manufacturing	354730	108582	54125	64809	-10684	517437	20
4. Construction, Repair and Demolition	60640	18562	-12148	2876	-15024	67054	
5. Electricity, Gas, Water and Sanitary Services	22130	6774	852	4040	-3188	29756	
6. Commerce	372000	113869	241808	263636	-21828	727677	75
7. Transport, Storage and Communication	87690	26842	3913	15819	-11906	118445	
8. Services	393190	120355	544992	536232	8760	1058537	
9. Activities not adequately described	-	-	-56	-	-56	-56	
Total	1449320	443635	758206	852613	-94407	2651161	100

Table 4-16 Shift and Share projection of Employment, Central (except Bangkok Metropolis) 1980 with assumed growth rate of GDP at 7 per cent per annum

ITEM SECTORS	1976	COMPONENTS OF CHANGE		COMPONENTS OF NET RELATIVE SHIFT		1980	%
		NATIONAL SHARE	NET RELATIVE SHIFT	INDUSTRIAL MIX	REGIONAL SHARE		
1. Agriculture, Forestry, Hunting and Fishing	2735440	837318	-348776	-611808	263032	3223982	60
2. Mining and Quarrying	11980	3667	17491	12249	5242	33138	
3. Manufacturing	308860	94542	-53	56428	-56481	403349	7
4. Construction, Repair and Demolition	58660	17955	-15030	2782	-17812	61585	
5. Electricity, Gas, Water and Sanitary Services	9530	2917	795	1739	-944	13242	
6. Commerce	313710	96027	214893	222326	-7433	624630	33
7. Transport, Storage and Communication	88520	27096	18663	15969	2694	134279	
8. Services	365060	111745	444166	497869	-53703	920971	
9. Activities not adequately described	1220	373	-707	-1593	886	886	
Total	3892980	1191640	331442	195961	135481	5416062	100



Table 4 - 17 Shift and Share Projection of Employment, North 1980, with assumed growth rate of GDP at 9 per cent per annum

ITEM SECTORS	1976	COMPONENTS OF CHANGE		COMPONENTS OF NET RELATIVE SHIFT		1980	%
		NATIONAL SHARE	NET RELATIVE SHIFT	INDUSTRIAL MIX	REGIONAL SHARE		
1. Agriculture, Forestry, Hunting and Fishing	3336250	1872136	-1255958	-955435	-300523	3952428	68
2. Mining and Quarrying	1280	718	2979	1965	1014	1977	
3. Manufacturing	160470	90048	38527	47900	-9373	289045	5
4. Construction, Repair and Demolition	72570	40722	72573	28654	43919	185865	27
5. Electricity, Gas, Water and Sanitary Services	6850	3843	5877	1322	4555	16570	
6. Commerce	216790	121651	189229	188171	1058	527670	
7. Transport, Storage and Communication	37200	20875	9502	9659	-154	67577	
8. Services	238750	133974	445778	396898	48880	818502	
9. Activities not Adequately described	-	-	-815	-	-	-815	
Total	4070160	2283967	-492308	-280869	-211439	5861819	100



Table 4-13 Shift and Share Projection of Employment, South 1980 with assumed growth rate of GDP at 9 per cent per annum

ITEM SECTORS	1976	COMPONENTS OF CHANGE		COMPONENTS OF NET RELATIVE			%
		NATIONAL SHARE	NET RELATIVE SHIFT	INDUSTRIAL MIX	REGIONAL SHARE	1980	
1. Agriculture, Forestry, Hunting and Fishing	1592170	892446	-552769	-445965	-96804	1932847	60
2. Mining and Quarrying	11380	6386	8675	17478	-8803	26441	
3. Manufacturing	105060	58954	54843	31360	23483	218857	7
4. Construction, Repair and Demolition	24650	13832	19571	9733	9838	58053	
5. Electricity, Gas, Water and Sanitary Services	1490	836	-846	287	-1133	1480	
6. Commerce	147890	82988	151397	128367	23030	382275	33
7. Transport, Storage and Communication	50530	28355	-992	13166	-14108	77893	
8. Services	163660	91838	305842	272068	33774	561340	
9. Activities not adequately described	-	-	-	-	-	-	
Total	2096830	1176635	-14279	16444	-30723	3259186	100

Table 4-19 Shift and Share Projection of Employment, North-east 1980, with assumed growth rate of GDP at 9 per cent per annum

ITEM SECTORS	1976	COMPONENTS OF CHANGE		COMPONENTS OF NET RELATIVE SHIFT		1980	%
		NATIONAL SHARE	NET RELATIVE SHIFT	INDUSTRIAL MIX	REGIONAL SHARE		
1. Agriculture, Forestry, Hunting and Fishing	6126330	3437790	-1579046	-1754450	175412	7985074	81
2. Mining and Quarrying	3280	1840	7945	5038	2907	13065	
3. Manufacturing	216210	121326	117842	64539	53303	455378	5
4. Construction, Repair and Demolition	19380	10875	-12922	7652	-20574	17333	14
5. Electricity, Gas, Water and Sanitary Services	4640	2604	1679	896	783	8923	
6. Commerce	247870	139092	220824	215148	5676	607786	
7. Transport, Storage and Communication	62700	35184	40023	16275	23748	137907	14
8. Services	221210	124132	329826	367739	-367739	675168	
9. Activities not adequately described	-	-	-14	-	-14	-14	
Total	6901620	3782843	-873843	-1077171	203328	9900620	100

Table 4-20 Shift and Share Projection of Employment, Bangkok Metropolis 1980,  
with assumed growth rate of GDP at 9 per cent per annum

ITEM SECTORS	1976	COMPONENTS OF CHANGE		COMPONENTS OF NET RELATIVE SHIFT		1980	%
		NATIONAL SHARE	NET RELATIVE SHIFT	INDUSTRIAL MIX	RNOTONAL SHARE		
1. Agriculture, Forestry, Hunting and Fishing	158340	88852	-85473	-45345	-40128	161719	5
2. Mining and Quarrying	600	337	570	923	351	1507	
3. Manufacturing	354730	199057	95202	105886	-10684	648989	20
4. Construction, Repair and Demolition	60640	34028	8920	23944	-15024	103588	
5. Electricity, Gas, Water and Sanitary Services	22130	12418	1084	4272	-3188	35632	
6. Commerce	372000	208747	301154	322892	-21828	881901	75
7. Transport, Storage and Communication	87690	49207	10856	22762	-11906	147753	
8. Services	393190	220638	662399	653639	8760	1276227	
9. Activities not adequately described	-	-	-56	-	-56	-56	
Total	1449320	813284	994656	1088973	-94407	3257260	100



Table 4-21 Shift and Share Projection of Employment, Central (except Bangkok Metropolis) 1980 with assumed growth rate of GDP at 9 per cent per annum

ITEM SECTORS	1976	COMPONENTS OF CHANGE		COMPONENTS OF NET RELATIVE SHIFT		1980	%
		NATIONAL SHARE	NET RELATIVE SHIFT	INDUSTRIAL MIX	REGIONAL SHARE		
1. Agriculture, Forestry, Hunting and Fishing	2735440	1534992	-520343	-783375	263032	3750089	59
2. Mining and Quarrying	11980	6722	23642	18400	5242	42344	
3. Manufacturing	308860	173316	35714	92195	-56481	517890	8
4. Construction, Repair and Demolition	58660	32917	5350	23162	-17812	96927	
5. Electricity, Gas, Water and Sanitary Services	9530	5347	895	1839	-944	15772	
6. Commerce	313710	176038	264864	272297	-7433	754612	
7. Transport, Storage and Communication	88520	49672	25671	22977	2694	163863	33
8. Services	365060	204853	553172	606875	-53703	1123085	
9. Activities not adequately described	1220	685	-1019	-1905	886	386	
Total	3892980	2184152	387946	252465	135481	6464378	100



Table 4-22 Shift and Share Projection of Employment, North 1985, with assumed growth rate of GDP at 5 per cent per annum

ITEM SECTORS	1976	COMPONENTS OF CHANGE		COMPONENTS OF NET RELATIVE SHIFT		1985	%
		NATIONAL SHARE	NET RELATIVE SHIFT	INDUSTRIAL MIX	REGIONAL SHARE		
1. Agriculture Forestry, Hunting and Fishing	3336250	720130	-1599008	-922873	-676135	2457372	59
2. Mining and Quarrying	1280	276	3483	1200	2283	5039	
3. Manufacturing	160470	34638	24441	45530	-21089	219546	5
4. Construction, Repair and Demolition	72570	15664	89896	-8916	98812	178130	
5. Electricity, Gas, Water and Sanitary Services	65850	1479	12526	2277	10249	20855	
6. Commerce	216790	46794	197241	194860	2381	460825	36
7. Transport, Storage and Communication	37200	8030	18665	19012	-347	63895	
8. Services	238750	51534	482905	372932	109973	238750	
9. Activities not adequately described	-	-	-1834	-	-1834	-1834	
Total	4070160	878544	<u>-771685</u>	-295978	-475707	<u>4177019</u>	100

Table 4-23 Shift and Share Projection of Employment, South 1985, with assumed growth rate of GDP at 5 per cent per annum

ITEM SECTORS	1976	COMPONENTS OF CHANGE		COMPONENTS OF NET RELATIVE shift		1985	%
		NATIONAL SHARE	NET RELATIVE SHIFT	INDUSTRIAL MIX	REOTONAL SHARE		
1. Agriculture, Forestry, Hunting and Fishing	1592170	343669	-658225	-440426	-217799	1277614	51
2. Mining and Quarrying	11380	2456	-9135	10673	-19808	4701	
3. Manufacturing	105060	22677	82644	29809	52835	210381	8
4. Construction, Repair and Demolition	24650	5321	19106	-3029	22135	49077	41
5. Electricity, Gas, Water and Sanitary Services	1490	322	-2055	495	-2550	-243	
6. Commerce	147890	31922	184745	132929	51816	364557	
7. Transport, Storage and Communication	50530	10907	-5917	25825	-312475	55520	41
8. Services	163660	35326	331629	255640	75989	530615	
9. Activities not adequately described	-	-	-	-	-	-	
Total	2096830	452600	-57208	11916	-69124	2492222	100

Table 4-24 Shift and Share Projection of Employment, North-east 1985, with assumed growth rate of GDP at 5 per cent per annum

ITEM SECTORS	1976	COMPONENTS OF CHANGE		COMPONENTS OF NET RELATIVE SHIFT		1985	%
		NATIONAL SHARE	NET RELATIVE SHIFT	INDUSTRIAL MIX	REGIONAL SHARE		
1. Agriculture, Forestry, Hunting and Fishing	6126330	1322368	-1300008	-1694665	394657	6148690	79
2. Mining and Quarrying	3280	708	9616	3076	6540	13604	
3. Manufacturing	216210	46669	181270	61345	119925	444149	6
4. Construction, Repair and Demolition	19380	4183	-48672	-2381	-46291	-25109	
5. Electricity, Gas, Water and Sanitary Services	4640	1001	3306	1543	1763	3947	
6. Commerce	247870	53503	235566	222795	12771	536939	
7. Transport, Storage and Communication	62700	13534	85476	32045	53431	161710	15
8. Services	221210	47748	260233	345534	-85301	529161	
9. Activities not adequately described	-	-	-32	-	-32	-32	
Total	6901620	1489714	-573245	-1030708	457463	7818089	100

Table 4-25 Shift and Share Projection of Employment, Bangkok Metropolis 1985,  
with assumed growth rate of GDP at 5 per cent per annum

ITEM SECTORS	1976	COMPONENTS OF CHANGE		COMPONENTS' NET RELATIVE SHIFT		1985	%
		NATIONAL SHARE	NET RELATIVE SHIFT	INDUSTRIAL MIX	REGIONAL SHARE		
1. Agriculture, Forestry, Hunting and Fishing	158340	34178	-136168	-438000	-92368	56350	2
2. Mining and Quarrying	600	129	-244	563	-807	485	
3. Manufacturing	354730	76568	76053	100647	-24594	507351	20
4. Construction, Repair and Demolition	60640	13089	-42034	-7450	-34584	31695	
5. Electricity, Gas, Water and Sanitary Services	22130	4777	17	7357	-7340	26924	
6. Commerce	327000	80296	284123	334368	-50245	736419	78
7. Transport, Storage and Communication	87690	18928	17412	44817	-27405	124030	
8. Services	393190	84870	634336	614171	20165	1112396	
9. Activities not adequ ately described	-	-	-130	-	-130	-130	
Total	1449320	312835	83365	1050673	-217308	2595520	100



Table 4-26 Shift and Share Projection of Employment, Central (except Bangkok Metropolitan) 1985, with assumed growth rate of GDP at 5 per cent per annum

Item sectors	1976	COMPONENTS OF CHANGE		COMPONENTS OF NET RELATIVE		1985	%
		NATIONAL SHARE	NET RELATIVE SHIFT	INDUSTRIAL MIX	REGIONAL SHARE		
1. Agriculture, Forestry, Hunting and Fishing	2735440	590445	-164886	-756677	591791	3160999	61
2. Mining and Quarrying	11980	2586	23020	11236	11794	37596	
3. Manufacturing	308860	66667	-39443	87633	-127076	336084	6
4. Construction, Repair and Demolition	58660	12662	-47282	-7207	-40875	24040	
5. Electricity, Gas, Water and Sanitary Services	9530	2507	1045	3168	-2123	12623	
6. Commerce	313710	67714	265251	281975	-16724	646675	
7. Transport, Storage and Communication	88520	19107	51303	45241	6062	158930	33
8. Services	365060	78798	449405	570231	-120826	893263	
9. Activities not adequately described	1220	263	511	-1483	1994	1994	
Total	3892980	840299	538934	234117	304817	5272213	100

Table 4-27 Shift and Share Projection of Employment, North 1985, with assumed growth rate of GDP at 7 per cent per annum

ITEM SECTORS	1976	COMPONENTS OF CHANGE		COMPONENT OF NET RELATIVE SHIFT		1985	%
		NATIONAL SHARE	NET RELATIVE SHIFT	INDUSTRIAL MIX	REGIONAL SHARE <sup>2</sup>		
1. Agriculture, Forestry, Hunting and Fishing	3336250	1923936	-1949168	-1273033	-616135	3311018	60
2. Mining and Quarrying	1280	739	4242	1956	2283	6261	
3. Manufacturing	160470	92539	51505	72594	-21089	304514	5
4. Construction, Repair and Demolition	72570	41849	123786	24974	98812	238205	
5. Electricity, Gas, Water and Sanitary Services	6850	3950	13111	2862	10249	23911	
6. Commerce	216790	125017	233972	231591	2381	575779	35
7. Transport, Storage and Communication	37200	21352	24114	24461	-347	82766	
8. Services	238750	137681	638858	528885	109973	1015289	
9. Activities not adequate ly described	-	-	-1834	-	-1834	-1834	
Total	4070160	2347163	-861414	-385707	-475707	5555909	100



Table 4-28 Shift and Share Projection of Employment, South 1985, with assumed growth rate of GDP at 7 per cent per annum

ITEM SECTORS	1976	COMPONENTS OF CHANGE		COMPONENTS OF NET RELATIVE SHIFT		1985	%
		NATIONAL SHARE	NET RELATIVE SHIFT	INDUSTEAL MIX	REGIONAL SHARE		
1. Agriculture, Forestry, Hunting and Fishing	1592170	918166	-825333	-607534	-217799	1685003	52
2. Mining and Quarrying	11380	6562	-2391	17417	-19808	15551	
3. Manufacturing	105060	60586	100362	47527	52835	266008	8
4. Construction, Repair and Demolition	24650	14215	30618	8483	22135	69483	40
5. Electricity, Gas, Water and Sanitary Services	1490	859	-1927	623	-2550	422	
6. Commerce	147890	85285	209803	157987	51816	442978	
7. Transport, Storage and Communication	50530	29139	1484	33226	-31742	81153	
8. Services	163660	94379	438532	362543	75989	696571	
9. Activities not adequately described	-	-	-	-	-	-	
Total	2096830	1209191	-48852	20272	-69124	3257169	100



Table 4 - 29 Shift and Share Projection of Employment, North-east 1985,  
with assumed growth rate of GDP at 7 per cent per annum

SECTORS	1976	COMPONENTS OF CHANGE		COMPONENTS OF NET RELATIVE SHIFT		1985	%
		NATIONAL SHARE	NET RELATIVE SHIFT	INDUSTRIAL MIX	REGIONAL SHARE		
1. Agriculture, Forestry, Hunting and Fishing	6126330	3532907	-1943003	-2337660	394675	7716234	78
2. Mining and Quarrying	3280	1891	11560	5020	6540	16731	
3. Manufacturing	216210	124683	217735	97810	119925	558628	6
4. Construction, Repair and Demolition	19380	11176	-39622	6669	-46291	-9066	
5. Electricity, Gas, Water and Sanitary Services	4640	2676	3702	1939	1763	11018	16
6. Commerce	247870	142941	277564	264793	12771	668375	
7. Transport, Storage and Communication	62700	36158	94659	41228	53431	193517	16
8. Services	221210	127566	404728	490029	-85301	753504	
9. Activities not adequately described	-	-	-32	-	-32	-32	100
Total	6901620	3979998	-927709	-1430172	457463	9908909	



Table 4-30 Shift and Share Projection of Employment, Bangkok Metropolis 1985,  
with assumed growth rate of GDP at 7 per cent per annum.

ITEM SECTORS	1976	COMPONENTS OF CHANGE		COMPONENTS OF NET RA TIVE SHIFT		1985	%
		NATIONAL	NET RELATIVE	INDUSTRIAL MIX	REGIONAL SHARE		
		SHARE	SHIFT				
1. Agriculture, Forestry, Hunting and Fishing	158340	91312	-152787	-60419	-92368	96865	77
2. Mining and Quarrying	600	346	111	918	-807	1057	
3. Manufacturing	354730	204564	135880	160474	-24594	695174	
4. Construction, Repair and Demolition	60640	34969	-13716	20868	-34584	81893	
5. Electricity, Gas, Water and Sanitary Services	22130	12762	1907	9247	-7340	36799	
6. Commerce	372000	214523	347153	397398	-50245	933676	
7. Transport, Storage and Communication	87690	50569	30255	57660	-27405	168514	
8. Services	393190	226743	891169	871004	20165	1511102	
9. Activities not adequately described	-	-	-130	-	-130	-130	
Total	1449320	835788	1239842	1457150	-217308	3542950	100

Table 4-31 Shift and Share Projection of Employment, Central (except Bangkok Metropolis 1985) with assumed growth rate of GDP at 7 per cent per annum

SECTORS	ITEM	1976	COMPONENTS OF CHANGE		COMPONENTS OF NET RELATIVE SHIFT		1985	%
			NATIONAL SHARE	NET RELATIVE SHIFT	INDUSTRIAL MIX	REGIONAL SHARE		
1. Agriculture, Forestry, Hunting and Fishing		2735440	1577463	-451987	-1043778	591791	3860916	58
	2. Mining and Quarrying	11900	6909	30129	18335	11794	49018	
3. Manufacturing		308860	178112	12647	139723	-127076	499619	7
4. Construction, Repair and Demolition		53660	33828	-19888	20187	-40075	72600	35
5. Electricity, Gas, Water and Sanitary Services		9530	5496	1859	3982	-2123	16885	
6. Commerce		313710	180909	318404	335128	-16724	813023	
7. Transport, Storage and Communication		88520	51047	64268	58206	6062	203835	
8. Services		365060	210521	687863	808689	-120826	1263444	
9. Activities not adequately described		1220	704	71	-1923	1994	1995	
Total		3892980	2244989	643366	338549	304817	6781335	100

Table 4-32 Shift and Share Projection of Employment, North 1985, with assumed growth rate of GDP at 9 per cent per annum

ITEM SECTORS	1976	COMPONENTS OF CHANGE		COMPONENTS OF NET RELATIVE SHIFT		1985	%
		NATIONAL SH- ARE	NET RELATIVE SHIFT	INDUSTRIAL MIX	REGIONAL SHARE		
1. Agriculture, Forestry Hunting and Fishing	3336250	3430432	-2469403	-1793268	-676135	4297279	59
2. Mining and Quarrying	1280	1316	5430	3147	2283	8026	
3. Manufacturing	160470	165000	96417	117506	-21089	421887	6
4. Construction, Repair and Demolition	72570	74619	162084	63272	98812	309273	35
5. Electricity, Gas, Water and Sanitary Services	6850	7043	13953	3704	10249	27846	
6. Commerce	216790	222910	344423	342042	2381	784123	
7. Transport, Storage and Communication	37200	38250	26047	26394	-347	101497	
8. Services	238750	245490	815095	705122	109973	1299335	100
9. Activities not adeq- uately described	-	-	-1834	-	-1834	-1834	
Total	4070160	4185060	<u>-1007788</u>	-532081	-475707	<u>7247432</u>	



Table 4-33 Shift and Share Projection of Employment, South 1985, with assumed growth rate of GDP at 9 per cent per annum

ITEM SECTORS	1976	COMPONENTS OF CHANGE		COMPONENTS OF NET RELATIVE SHIFT		1985	%
		NATIONAL SHARE	NET RELATIVE SHIFT	INDUSTRIAL MIX	REGIONAL SHARE		
1. Agriculture, Forestry, Hunting and Fishing	1592170	1637117	-1073606	-855807	-217799	2155681	51
2. Mining and Quarrying	11380	11701	8176	27984	-19808	31257	
3. Manufacturing	105060	108026	129766	76931	52835	342852	86
4. Construction, Repair and Demolitions	24650	25346	43626	21491	22135	93622	41
5. Electricity, Gas, Water and Sanitary Services	1490	1532	-1744	806	-2550	1278	
6. Commerce	147890	152065	285151	233335	51816	585106	
7. Transport, Storage and Communication	50530	51956	4110	35852	-31742	106596	
8. Services	163660	168280	559341	483352	75986	891281	
9. Activities not adequately described	-	-	-	-	-	-	
Total	2096830	2156023	-45,180	23944	-69124	4207673	100



Table 4-34 Shift and Share Projection of Employment, North-east 1985,  
with assumed growth rate of GDP at 9 per cent per annum

ITEM SECTORS	1976	COMPONENTS OF CHANGE		COMPONENTS OF NET RALA TIVE SHIFT		1985	%
		NATIONAL SHARE	NET RELA TIVE SHIFT	INDUSTRIAL MIX	REGIONAL SHARE		
1. Agriculture, Forestry, Hunting and Fishing	6126330	6299276	-2898306	-3292963	394657	9527300	77
2. Mining and Quarrying	3280	3372	14605	8065	6540	21257	
3. Manufacturing	216210	222314	278247	158322	119925	716771	
4. Construction, Repair and Demolition	19380	19927	-29394	16897	-46291	9913	17
5. Electricity, Gas, Water and Sanitary Services	4640	4771	4272	2509	1763	13683	
6. Commerce	247870	254867	403850	391079	12771	906587	
7. Transport, Storage and Communication	62700	64470	91918	44487	53431	225088	
8. Services	221210	227454	568018	653319	-85301	1016682	
9. Activities not adequately described	-	-	-32	-	-32	-32	
Total	6901620	7096451	-1560822	-2018285	457463	12437249	100

Table 4-35 Shift and Share Projection of Employment, Bangkok Metropolis 1985, with assumed growth rate of GDP at 9 per cent per annum

SECTORS \ ITEM	1976	COMPONENTS OF CHANGE		COMPONENTS OF NET RELATIVE SHIFT		1985	%
		NATIONAL SHARE	NET RELATIVE SHIFT	INDUSTRIAL MIX	REGIONAL SHARE		
1. Agriculture, Forestry Hunting and Fishing	158340	162810	-7259	85109	-92368	313891	6
2. Mining and Quarrying	600	617	668	1475	-807	1885	
3. Manufacturing	354730	364744	235160	259754	-24594	954634	19
4. Construction, Repair and Demolition	60640	62352	18286	52870	-34584	141278	75
5. Electricity, Gas, Water and Sanitary Services	22130	22754	4628	11968	-7340	49512	
6. Commerce	372000	382501	536681	586926	-50245	1291182	
7. Transport, Storage and Communication	87690	90165	34813	62218	-27405	212668	
8. Services	393190	404289	1181408	1161243	20165	1978887	
9. Activities not adequately described	-	-	-130	-	-130	-130	
Total	1449320	1490232	2004255	2221563	-217308	4943807	100

Table 4-36 Shift and Share Projection of Employment, Central (except Bangkok Metropolis) 1985, with assumed growth rate of GDP at 9 per cent per annum

ITEM SECTORS	1976	COMPONENTS OF CHANGE		COMPONENTS OF NET RELATIVE SHIFT		1985	%
		NATIONAL SHARE	NET RELATIVE SHIFT	INDUSTRIAL MIX	INDONAL SHARE		
1. Agriculture, Forestry, Hunting and Fishing	2735440	2812661	-878535	-1470326	591791	4669566	55
2. Mining and Quarrying	11980	12318	41253	29459	11794	65551	
3. Manufacturing	308860	317579	99090	226166	-127076	725529	8
4. Construction, Repair and Demolition	58660	60316	11069	51144	70075	130045	37
5. Electricity, Gas, Water and Sanitary Services	9530	9799	3031	5154	-2123	22360	
6. Commerce	313710	322566	478235	494959	-16724	1114511	
7. Transport, Storage and Communication	88520	91019	68869	62807	6062	248408	
8. Services	365060	375366	957338	1078164	-120826	1697764	
9. Activities not adequately described	1220	1254	-480	-2474	1994	1994	
Total	3892960	4002878	779870	475053	304817	8675728	100



Table 4\*37 Distribution of Regional Employment Projections with Assumed Growth rate of GDP.

(Unit: thousand workers)

Year Region	1971	1980			1985		
		5%	7%	9%	5%	7%	9%
North	3967 (23.9)	4061 (20.2)	4879 (20.3)	5861 (20.4)	4177 (18.7)	5555 (19.1)	7247 (19.3)
South	1937 (11.7)	2273 (11.3)	2721 (11.3)	3259 (11.3)	2492 (11.1)	3257 (11.2)	4207 (11.2)
North-east	6184 (37.2)	7112 (35.3)	8380 (34.8)	9900 (34.4)	7818 (35.0)	9908 (34.1)	12437 (33.1)
Bangkok	1231 (7.4)	2146 (10.7)	2651 (11.0)	3257 (11.3)	2595 (11.6)	3542 (12.2)	4943 (13.2)
Central (except Bangkok)	3297 (19.8)	5453 (22.6)	5416 (22.5)	6464 (22.5)	5272 (23.6)	6781 (23.3)	8765 (23.1)
Total	16618 (100)	20139 (100)	24048 (100)	28743 (100)	22355 (100)	29046 (100)	37509 (100)

Note: Figures inside brackets give the percentage of distribution of regional employment.