Labour Market and Macroeconomic Performance

THAILAND DEVELOPMENT
RESEARCH INSTITUTE
(Labour market & macroeconomic
performance

Thailand Development Research Institute Foundation

LABOUR MARKET AND MACROECONOMIC PERFORMANCE

by

CHALONGPHOB SUSSANGKARN
THAILAND DEVELOPMENT RESEARCH INSTITUTE

February, 1991

Paper presented at the Annual Seminar of the Project on
"Promotion of Analysis and Consideration of Population
Consequences of Development Planning and Policy in Thailand,"
22-24 February 1991. Siam Bayshore Hotel, Pattaya City

LABOUR MARKET AND MACROECONOMIC PERFORMANCE

1.   INTRODUCTION

This paper describes a first cut into the building of an economic-demographic macro-model. At this stage, many of the parameters that would be endogenous in a fully integrated economic-demographic model are treated as exogenous. However, the model has desirable features that are particularly relevant in the current process of formulating the Seventh Plan. The model integrates many related pieces of work that have been used either explicitly or implicitly in the formulation of the Plan. The four main areas that are linked together are:

1.   Population projections.
2.   Education Enrollment projections.
3.   Labour Market modelling.
4.   Macroeconomic modeling.

The link between the first two components and the labour supply part of the third component is already presented in another paper.[1] The labour market modelling part also involved the building of a detailed labour market model, which separated the labour force into various education levels, and the production sectors into formal and informal.[2] This was used to estimate the future labour market situation during the course of

---

1. Sussangkarn (1991).
2. This was part of the current project on "Promotion of Analysis and Considerations of Population Consequences of Development Planning and Policy in Thailand."

the Seventh Plan.[3] However, the labour market model had a rather
simple assumption about the supply of labour of various education
types - extrapolating the past trend. Also, the demand for
labour was taken exogenously from macroeconomic projections of
production growth with assumptions about the elasticity of labour
demand with respect to output. While simple, the result has
however been utilized in the formulation of the Seventh Plan.

The last line of work is one of the key component in the
formulation of the Seventh Plan - the macroeconomic projection
model. The current macroeconomic model being used by the NESDB
and TDRI for macro forecast is a computable general equilibrium
model (CGE), which is an outgrowth of a model originally built to
analyze the impact of taxes on income distribution.[4] The model
contains 27 production sectors, but the main weakness of the
model is that the labour supply was not separated out into
various educational levels, and the labour market does not
distinguish between formal and informal - a distinction important
for understanding many labour market features as well as the
current development patterns in Thailand. Because labour was not
divided up into different education levels, the model cannot
address issues of different labour market situations of groups
with different education levels. For example, it is now fairly
well known that the labour market for those with middle to upper
levels of education is likely to get tight during the period of
the Seventh Plan, while that for the lower education level is
much less so. This is likely to lead to widening wage
differential between those with low education and those with more
education, with implications for income distribution and also the

---

3.   See Wongsuban, Kumjornkijbovorn and Sussangkarn (1990).
4.   See Sussangkarn, Tinakorn and Chongpeerapien (1988).

competitiveness of the Thai economy.[5] The macro model now being used for Plan formulation cannot address this issue in any detailed.

In the current exercise, the previous macro model being used by TDRI and NESDB is expanded to include a detailed labour market model with the labour force divided into different education levels. The macro part is currently linked to the population-education-workforce module through the labour supply for workers with different education levels.

In this paper, the basic features of the model is described, and some elasticity simmulations are carried out to get some idea of the model performance. For the future more detailed simulations to track the past performance of the economy and make projections will be carried out. In fact, the eventual aim is that a model along the line built here will replace the one currently being used at TDRI and NESDB.

2.   SOME SALIENT FEATURES OF THE MODEL

This section describes some key features of the model. The model, like the one which is now being used at TDRI and NESDB, is based on a Social Accounting Matrix (SAM) of the economy. This is simply an extension of the standard National Income Accounting to give a consistent picture of the income and expenditure flows in the economy. Explaining the detailed concept of a SAM is beyond the scope of this paper. For those completely unfamiliar

5.   See Sussangkarn and Chalamwong (1989).

with the concept, the annex describes a simple SAM that should help clarify the concept.[6]

In the current model and associated social accounting matrix, like the earlier one, there are 27 production sectors. There are also 22 imported commodity types, two types of capital (agriculture and non-agriculture), six types of labour corresponding to the population-education-workforce module (primary education and below, lower secondary, upper secondary, vocational, technical vocational, and university), land used in agriculture, 5 household types,[7] and four other institutions - government, state-enterprises, private corporation, and the rest of the world.[8]

The SAM that underlies the model being used in the preparation of the Seventh Plan and which is expanded upon here on the labour market side was described in Sussangkarn, Tinakorn and Chongpeerapien (1988), and the reader is referred to that

---

6. For detailed descriptions of the concept of a SAM, see for example King (1931), Pyatt and Round (1985). The description of a SAM for Thailand based on 1975 data can be found in Chewakrengkai and Lamsam (1982)and also in Amranand and Grais (1984), where the SAM is used as the data base for the SIAMII model, and where some experiments were carried out looking at the distributional impact of various policies.
7. In the previous model, there were 19 household types, corresponding to the income quintile and the occupation of the houshold head (agriculture, private non-agriculture, public employee, and state enterprise employee). There should have been 20 household types, but the number of state enterprise households in the fourth quintile was too small, so this household type was omitted. In the current SAM, the different occupations were aggregated so the five types of households correspond only to the income quintile the household lies in.
8. In total there were 312 accounts and 1543 non-zero entries in the SAM.

paper for more detailed descriptions. Here, the focus will be mainly on labour market details where the previous model and associated SAM has been extended.

The 27 sectors of production are shown in table 1. In agriculture there are five sectors; paddy, other major crops, fruit and vegetable, fishing, and other agriculture.[9] There are 15 industries, starting with slaughtering and ending with construction. The processing activities, such as rice milling and tobacco processing, are included as part of the industries. Finally, 7 service sectors are distinguished, including public administration. Each of the 27 sectors produces output using domestic and imported intermediate inputs and factors of productions, in a similar way to the simple SAM described in the Annex.

Table 1 also shows the distribution of value-added at factor cost for each sector, and the division to the main factors of production, capital, aggregate labour and land. The labour payment include imputed wage of own-account and unpaid family workers.

As mentioned earlier, there are six types of labour corresponding the various educational levels. There are also assumed to be four types of employment status:

1. Government Employment,
2. State Enterprise Employment,
3. Private formal sector employment, and
4. Private informal sector employment.

---

9.   Livestock was included as part of other agriculture.

This means that the wage payments for each sector has to be divided up into the different employment status and also the different educational levels. To do this, tabulations from the 1988 Labour Force Survey, round 3, was used to obtain the employment and wage rate data,[10] which were then used to split up the total wage payments in each sector.

Table 2 shows the distribution of employment by sector and by employment type. It is assumed that government employment is restricted to 3 sectors - public administration, education and health. In fact, government employees are found in other sectors as well, but these were not large in number, and they were allocated to public administration. State enterprise employees coexist with private workers in many sectors. Agriculture is assumed to be fully informal, and the private workers in non-agricultural sectors are split into formal and informal using tabulations from the Labour Force to give the shares. It should also be noted that the total employment is derived from workforce figures from the population-education-workforce module and unemployment tabulations from the Labour Force Survey.

Table 3 gives the distribution of employment by employment type and by educational levels. As already known and can be seen in the table, in the informal sector employment consists mostly of the less educated. In the private formal sector, less than half of total employment is made up from those with primary education and below.

10. The 1988 Labour Force Survey was used rather than the 1987 Survey because the former had more complete indicators which could be used to split up the formal and informal division of the labour market. For descriptions of how various indicators are used to divide up between formal and informal, see Sussangkarn (1987).

From the employment distribution, to arrive at the wage payments, wage information is needed. Here, data from the Labour Force Survey only give wage rates for employees. These are used as guidelines for imputed wage to own-account and unpaid family workers. Various adjustments[11] lead to the mean wage distribution in table 4. In general, these appear fairly reasonable. The low wage for university level government employment is due to this group also including many teachers, whose wage are relatively low. The employment and mean wage data then gives the distribution of wage payment of table 1 in table 5.

The various payments to the factors (labour, capital and land) then flow to the institutions (households, government, state enterprise, and private corporations). The institutions and exports are sources of final demand for commodities that lead back to the production sectors. The detailed income and expenditure flows are not described here.[12]

The general equilibrium model constructed for this exercise a SAM-based model similar in the main features to models such as the SIAMII.[13] Each account in the SAM had an associated price, quantity, and value, or for some accounts (eg. the account corresponding to government revenue) there were no prices but only values. The model specified which price, quantity or value

---

11. Mostly to make sure that total wage payments do not exceed the National Accounts total for value-added.
12. Many of these flows were described in Sussangkarn, Tinakorn and Chongpeerapien (1988).
13. See the description of the SIAMII model in Amranand and Grais (1984).

were endogenous or exogenous. To complete the model, the equations determining each non-empty cell of the SAM had to be specified. The economic specifications in the normal part of the model were fairly standard, for example the payment from a production sector to factors of production were treated as arising from the factor demand equations depending on the production function, and assuming profit maximizing behaviors and competitive industries.[14] The main aspects of the previous model upon which the current one is an extension was described in Sussangkarn, Tinakorn and Chongpeerapien (1988). Here, only the labour market will be described.

The specifications for the labour market tries to remain close to the spirit of the formal-informal structure introduced in Sussangkarn (1987). Basically, ignoring the government and state enterprise employees for the moment, each sector except for agriculture, which only employs informal sector worker, employs a composite labour made up of formal and informal workers. The composite labour is divided up into formal and informal according to an exogenous share which can vary over time. In general, given the current pattern of development in Thailand, the formal share is expected to increase into the future.

The formal and informal labour in each sector is in turn a composite of the six different types of labour of various educational levels. It is assumed that the six educational types are combined into the composite via CES production functions. Schematically, a production sector employing formal and informal labour may look as in diagram 1.

_____

14. For some standard specifications, and their derivations, see the paper by Grais (1982).

Governments and state enterprise workers are treated as separate factors of production from the private workers. A sector employing both private and government or state enterprise workers will pay value added to capita, composite private labour (formal-informal), and government or state enterprise workers. The total government and state enterprise demand for workers is assumed to be exogenous. This is also true of the wage levels of government and state enterprise workers.

The closure in the labour is as follows. Total supply of the workforce of each educational level is exogenous to the macro module, but is given by the population-education-workforce module. Government and state enterprise demand are also exogenous as indicated above. Agriculture is assumed to pay the same wage to all workers of what ever educational level, reflecting the data and evidences indicating almost no differential pay to workers with various levels of education. The agriculture wage can however adjust depending on supply and demand. For the informal non-agriculture sectors, wages are assumed to be some exogenous ratio (as given by the base period) to the agricultural wage. In the formal sector, wages are completely free to adjust.

Unemployment is also include in the model. It is assumed that unemployment occurs because of the wage differential between the formal and informal sectors, so that it is because of workers who cannot get into the formal sector choosing to wait for an opening in the formal sector rather than go and work in the informal sector.[15] The quantity of unemployment of each

_____

15. This is exactly as in Sussangkarn (1987).

educational type is given as a fixed ratio of the workers of that educational type that cannot get into the formal sectors (including the government and state enterprise).

In this model, workers can move freely between all sectors of production. Thus, fully mobile migration from agriculture is allowed for. This is obviously unrealistic in the short run, so results from the model should be interpreted as giving the longer run trends.

3.   ELASTICITY SIMULATIONS

This section reports some elasticity simulations to indicate the way the model performs. Two sets of experiments were performed. In the first set, changes were made to the supply of labour of various educational levels by one percentage point. This thus involved six different simulaitons corresponding to the six different educational levels. The second set of experiments involved increasing the export trend parameter for food and non-food exports by 5%, to see how the labour market would respond. In this set, there are therefore two simulations, one for food export and one for non-food export.

Table 6 report the results of the first set of experiments. Each column in the table correspond to on experiment where the labour supply of the educational level heading the column is increased by one percent. The rows are the reponses of various parts of the system.

Consider first increasing the labour supply of those with primary education and below by one percent (the first column in

the table). This leads as expected a decline in the mean wage of
this group of labour (the first row). The percentage decline is
quite substantial, 2.1%. This indicates that there is already
plentiful supply of this type of labour (labour surplus), so the
wage elasticity is very large. The increase in supply of those
with primary education and below, however, leads to increases in
the mean wages of the other educational levels. The reason is
that the bigger supply of the low educated, and the corresponding
large decline in their wage tends to favour the more traditional
sectors such as agriculture. This uses mostly labour with
primary education and below, but also employ some of the better
educated workers. As these sectors expand, additional demand is
also put on those with better education. As the supply of these
are limited and there is a big demand in the formal sectors,
their wages in the formal sectors increase rapidly, by 8.3% (see
the row labeled "mean formal wage"). The increase in wages in
the formal sector also lead to a decline in total formal sector
employment.

Because, there is a large decline in the wage of those with
primary education and below, income distribution becomes worse.
Only the top household quintile gains in real terms. The benefit
of an increase in the supply of those with primary education and
below is reflected in changes in export and GDP. The is a .25%
increase in export, mainly because of increases in agriculture
export. Agricultural GDP increases while that of industries and
services decline.

Next, consider increasing the supply of those with lower
secondary education. At first sight, it may appear surprising
that this leads to an average increase in their mean wage, by
.23%. However, the increases arises because of changes in the

composition of employment for this group. It can be seen that
formal employment of the lower secondary group increases by 8%,
implying a very large formal employment elasticity for this
group. As formal sector wages are much higher than informal
sector wages, this leads to an increase in the mean wage. There
is also decline in the formal employment of those with primary
education and below, so that they are being substituted for by
those with lower seconadary education. These results suggest
that the lower secondary group of workers is much in demand in
the formal sector, and fits with the intuition that for Thailand
in the future, the low transition from primary to seconadary
education and the associated decline in the growth rate of labour
supply for this group will be an important the future development
of the economy.

In this case export and real GDP growth still favours the
traditional sectors. This is probably because of the large
benefit impact to these sectors of those with primary education
and below being pushed out of the formal sectors. This effect
outweighs the benefit of the increase in lower secondary supply
to the formal, and mostly industrial and service, sectors.

For the other educational groups, the results are generally
similar in nature to that for the lower secondary groups. The
increases in their supply leads to large increases in formal
sector employment for the corresponding educational group, at the
expense mainly of those with primary education and below, so the
outcomes are generally similar.

In the second set of experiments, the export trend
parameters for food and non-food sectors are increased, keeping
every thing else fixed, including the labour supplies of the

various educational levels.[16] The results are reported in table 7.

Here, the differences are quite clear. Food exports generally favour the more traditional sectors and those with primary education and below, while non-food exports favour the more modern sectors and those with more than primary education. In the food export case, the mean wage of the primary and below group increase by the most of all the educational groups. Informal wage also increase by more than formal sector wage. Income distribution improves accordingly.

In the non-food export case, there is a large increase in demand for formal sector employment of those with more than primary education. There is strong substitution of those with more than primary education for those with primary education and below in the formal sectors. Mean formal sector wages increases by 19%, due partly to the changing composition of labour toward the better educated, and increasing labour demand in general. Mean informal sector wages decline, again because of the increase in supply of those with primary education and below being released from the formal sectors. This latter impact also outweights the demand increase for formal sector output coming from increases in export, leading to increases in price of sectors consisting mainly of formal sector employment, so that in terms of GDP growth the more traditional sectors are better off.

This last result as well as simulations on labour supply increases already indicate the critical role of the better

---

16. In the model, each export depend on relative domestic and world price, as well as on a trend parameter capturing increases in world trade and increases in Thai market share in world trade.

educated in formal sector growth. With increases in demand for
non-food export, which are produced in significant part by the
formal sectors, and no supply increases in the better educated
workers, the demand increase translate itself mostly to price
increases, with little impact on real output. Thus, generally,
the supply curve of formal sector output is rather inelastic.
The reason must be linked to the dependence of the formal sector
on the better educated workers. What this means is that in order
for Thailand to main the current rapid pace of growth through
increases in the more formal types of production, there must be
rapid supply increases in the better educated workers. Slow
increases in the supply will lead to large wage and price
increases with little output effect, thus making sustained growth
difficult. This conclusion simply reiterate what has already
been suspected from previous analyses about the coming "human
resource bottleneck" to sustained development. For those with
primary education and below, the simulations suggest that there
is still surplus in supply. Supply increase of this group leads
to large decline in wages.

In the future, it is fortunate that the supply of those
with primary education and below will not increase very fast (see
results from the population-educaiton-workforce module in
Sussangkarn, 1991). However, the supply growth of those with
more than primary education will also slow down. Projecting the
implications of these changes on the Thai economy can be
fruitfully carried out with the model that is presented in this
paper.

REFERENCES

Amranand, Piyasvasti and T. Chongpeerapien (Forthcoming);
""Petroleum Product Pricing in Thailand," **Energy Journal**.

Amranand, Piyasvasti and W. Grais (1984); "Macroeconomic and
Distributional Implications of Sectoral Policy Interventions: An
Application to Thailand." World Bank **Staff Working Papers**, No.
627.

Chewakrengkai, Arporn and Sujitpan Bow Lamsam (1982); "A Social
Accounting Matrix for Thailand, 1975. NESDB, Bangkok, and the
World Bank, Washington D.C.

King, B.B. (1981); "What is a SAM? A Layman's Guide to Social
Accounting Matrices." World Bank **Staff Working Papers** No. 463.

Pyatt G. and G. Round eds. (1985); **Social Accounting Matrices: A
Basis for Planning**. a World Bank Symposium, The World Bank,
Washington D.C., September.

Sussangkarn, Chalongphob (1987): "The Thai Labour Market: A Study
of Seasonality and Segmentation" Paper presented at the
International Conference on Thai Studies, The Australian National
University, Canberra, Australia, July.

------------ (1991): "Population-Education-Workforce: Projections
and Simulations," Paper presented at this Conference.

Sussangkarn, Chalongphob, Pranee Tinakorn and Tienchai
Chongpeerapien"The Tax Structure in Thailand and Its
Distributional Implications," Paper presented at the TDRI Year-
end Conference, Cha-am, December 17-18.

Sussangkarn, Chalongphob and Yongyuth Chalamwong (1989):
"Thailand's Economic Dynamism: Human Resource Contributions and
Constraints," (With) Paper prepared for Nihon University's
International Symposium on Sources of Economic Dynamism in the
Asia and Pacific Region: A Human Resource Approach. Tokyo, Japan.
November 20-23.

Wongsuban, S., S. Kumjornkijbovorn and C. Sussangkarn (1990)
"Labor Market Trends During the Period of the Seventh Plan,"
Paper prepared for project on Promotion of Analysis and
Consideration of Population Consequences of Development Planning

and Policy in Thailand, Human Resources and Social Development
Program, February (in Thai).

TABLE 1
SECTORS IN SAM AND VALUE ADDED AT FACTOR COST

	VALUE-ADDED AT FACTOR COST	CAPITAL	LABOUR	LAND
PADDY	85960	19575	63037	2849
OTHER MAJOR CROPS	36074	6219	27579	2276
FRUIT AND VEGETABLES	28433	20951	5677	1795
OTHER AGRICULTURE	33573	25274	3631	4868
FISHING	19794	17779	2015	0
SLAUGHTERING	1944	1528	416	0
CANNING AND FOOD PROCESS	11170	1599	9572	0
RICE MILLING	417	-3593	4010	0
BEVERAGES	10874	9837	1037	0
TOBACCO PROCESSING	1383	-338	1721	0
OTHER FOODS	13417	5373	8045	0
CLOTHING	83618	54343	29275	0
WOOD-PAPER-RUBBER PRDS.	43539	22305	21233	0
BASIC INDUSTRIES	22822	5068	17753	0
APPLIANCES	25054	15406	9648	0
OTHER HOUSEHOLD ITEMS	3014	-1230	4244	0
OTHER INDUSTRIES	12738	-669	13407	0
FUEL	2835	2663	171	0
UTILITIES	46256	34689	11567	0
CONSTRUCTION	62653	35321	27332	0
HOTELS AND RESTAURANTS	73703	41641	32062	0
TRANSPORT	73327	45683	27644	0
REAL ESTATE	45277	44123	1153	0
PUBLIC ADMINISTRATION	52700	21356	31344	0
EDUCATION	43918	998	42920	0
HEALTH	15651	6251	9300	0
OTHER SERVICES	253835	82127	171709	0
ALL SECTORS	1103466	514358	577522	11506

TABLE 2
EMPLOYMENT BY SECTORS AND EMPLOYMENT TYPE

	GOVERNMENT EMPLOYEE	STATE ENTERPRISE	PRIVATE FORMAL	PRIVATE INFORMAL
PADDY	0	0	0	11630072
OTHER MAJOR CROPS	0	0	0	5088205
FRUIT AND VEGETABLES	0	0	0	1047387
OTHER AGRICULTURE	0	0	0	669980
FISHING	0	0	0	371814
SLAUGHTERING	0	0	581	10672
CANNING AND FOOD PROCESS	0	0	67626	125323
RICE MILLING	0	0	21207	72543
BEVERAGES	0	1512	7616	8998
TOBACCO PROCESSING	0	21390	3024	4086
OTHER FOODS	0	2593	33638	147363
CLOTHING	0	4537	149889	494234
WOOD-PAPER-RUBBER PRDS.	0	5077	91136	380116
BASIC INDUSTRIES	0	5725	98227	251794
APPLIANCES	0	2161	46093	158951
OTHER HOUSEHOLD ITEMS	0	0	18584	78948
OTHER INDUSTRIES	0	0	58647	238008
FUEL	0	540	1333	60
UTILITIES	0	140113	2896	16922
CONSTRUCTION	0	0	76034	597222
HOTELS AND RESTAURANTS	0	0	147099	547892
TRANSPORT	0	78753	58682	462528
REAL ESTATE	0	1296	6910	7779
PUBLIC ADMINISTRATION	824552	0	0	0
EDUCATION	658047	0	79470	4299
HEALTH	171817	0	21426	4113
OTHER SERVICES	0	32733	556094	3181488
TOTAL	1654416	296429	1546212	25600801

TABLE 3
EMPLOYMENT BY EDUCATION AND EMPLOYMENT TYPE

	GOVERNMENT EMPLOYEE	STATE ENTERPRISE	PRIVATE FORMAL	PRIVATE INFORMAL	TOTAL
PRIMARY AND BELOW	370201	108471	740043	23635931	24854645
LOWER SECONDARY	255679	51279	200607	1118933	1626498
UPPER SECONDARY	68610	11015	106707	329131	515463
VOCATIONAL	197456	49970	214707	276913	739045
TECHNICAL VOCATIONAL	74900	33179	66154	92389	266622
UNIVERSITY	687570	42516	217995	147505	1095586
TOTAL	1654416	296429	1546212	25600801	29097859

TABLE 4
MEAN WAGE PER MONTH

	GOVERNMENT EMPLOYEE	STATE ENTERPRISE	PRIVATE FORMAL	PRIVATE INFORMAL	TOTAL
PRIMARY AND BELOW	2129.61	4956.59	5367.85	1049.55	1211.26
LOWER SECONDARY	3033.12	5246.3	7209.44	1937.16	2864.03
UPPER SECONDARY	3033.12	5797.73	7208.67	2076.37	3345.69
VOCATIONAL	3552.56	5797.73	7603.15	2755.58	4582.52
TECHNICAL VOCATIONAL	3552.56	8405.36	8842.4	2578.11	5131.29
UNIVERSITY	4644.18	8405.36	13754.73	2269.06	6283.14
TOTAL	3586.01	6060.42	7375.31	3017.5	1653.97

TABLE 5
TOTAL WAGE PAYMENT ('000000)

	GOVERNMENT EMPLOYEE	STATE ENTERPRISE	PRIVATE FORMAL	PRIVATE INFORMAL	TOTAL
PRIMARY AND BELOW	9461	6452	47669	297684	361266
LOWER SECONDARY	9306	3228	17355	26011	55900
UPPER SECONDARY	2497	766	9231	8201	20695
VOCATIONAL	8418	3477	19589	9157	40640
TECHNICAL VOCATIONAL	3193	3347	7020	2858	16417
UNIVERSITY	38318	4288	35982	4016	82605
TOTAL	71193	21558	136845	347927	577523

DIAGRAM 1

PRODUCTION SECTOR

INTERMEDIATE INPUT

Fixed coefficient

COMPOSITE VALUE ADDED

CES PRODUCTION FUNCTION

COMPOSITE FORMAL-INFORMAL LABOR   CAPITAL

FORMAL LABOUR   INFORMAL LABOUR

CES PRODUCTION FUNCTIONS

VARIOUS EDUCATION LEVELS   VARIOUS EDUCATION LEVELS

TABLE 6
INCREASES IN LABOUR SUPPLY OF VARIOUS EDUCATIONAL LEVELS BY 1%

PERCENTAGE CHANGES

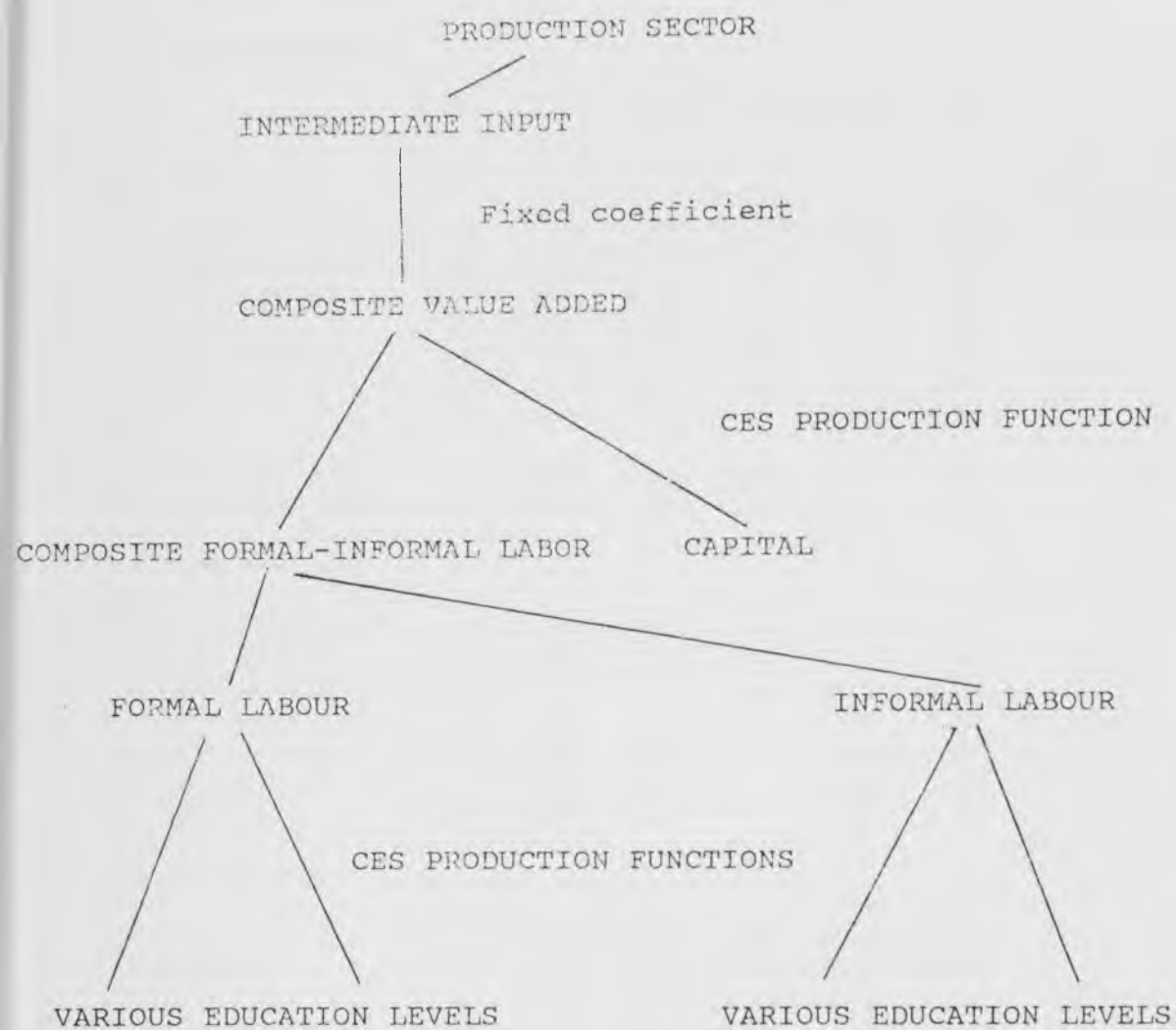|	LE.PRIM	L.SEC	U.SEC	VOCAT	TECH.VOC	UNIV
MEAN WAGES						
PRIMARY AND BELOW	-2.102	-0.275	-0.092	-0.136	-0.057	-0.260
LOWER SECONDARY	0.456	0.227	0.018	0.006	0.003	-0.016
UPPER SECONDARY	1.844	0.167	0.099	0.091	0.032	0.110
VOCATIONAL	2.834	0.174	0.085	-0.134	0.030	0.051
TECH.VOCATIONAL	2.489	0.182	0.073	0.079	-0.136	0.068
UNIVERSITY	2.598	0.179	0.074	0.068	0.027	0.074
TOTAL	-0.800	-0.059	-0.015	-0.031	-0.011	-0.036
MEAN FORMAL WAGE	8.315	0.960	0.364	0.518	0.241	1.347
MEAN INFORMAL WAGE	-2.425	-0.215	-0.070	-0.107	-0.044	-0.185
FORMAL EMPLOYMENT						
PRIMARY AND BELOW	-2.862	-3.064	-1.056	-1.574	-0.670	-3.321
LOWER SECONDARY	-2.838	8.069	-0.080	-0.126	-0.060	-0.352
UPPER SECONDARY	-1.422	-0.125	5.008	-0.061	-0.029	-0.185
VOCATIONAL	0.120	0.008	0.009	3.666	0.003	-0.032
TECH.VOCATIONAL	-0.108	-0.009	0.008	0.003	4.549	-0.053
UNIVERSITY	-0.316	-0.030	-0.010	-0.016	-0.009	5.150
TOTAL	-1.869	-0.432	-0.170	-0.267	-0.137	-0.929
REAL H-H INCOME						
QUINTILE 1	0.161	0.018	0.005	0.007	0.003	0.018
QUINTILE 2	-0.073	-0.009	-0.003	-0.005	-0.002	-0.003
QUINTILE 3	-0.360	-0.039	-0.013	-0.020	-0.008	-0.027
QUINTILE 4	-0.543	-0.059	-0.019	-0.029	-0.012	-0.043
QUINTILE 5	-0.549	-0.060	-0.020	-0.030	-0.013	-0.046
TOTAL	0.000	0.000	-0.001	-0.001	-0.001	0.004

TABLE 6 (CONTINUED)
INCREASES IN LABOUR SUPPLY OF VARIOUS EDUCATIONAL LEVELS BY 1%

PERCENTAGE CHANGES

	LE.PRIM	L.SEC	U.SEC	VOCAT	TECH.VOC	UNIV
EXPORT GROWTH						
MERC. EXPORT	0.250	0.004	0.015	0.001	0.002	0.009
RICE	5.617	0.523	0.146	0.270	0.108	0.483
OTHER FOODS	-0.548	-0.161	0.042	-0.080	-0.026	-0.123
MANUFACT.	-0.107	-0.008	-0.005	-0.006	-0.002	-0.006
OTHER EXPORTS	-0.006	-0.005	-0.005	-0.005	-0.005	-0.004
REAL GDP GROWTH						
AGRICULTURE	0.855	0.071	0.026	0.037	0.016	0.071
MAJOR CROPS	1.363	0.122	0.037	0.064	0.027	0.119
OTHER AGRICULTURE	0.108	-0.003	0.008	-0.002	0.000	0.001
INDUSTRIES	-0.299	-0.031	-0.010	-0.019	-0.006	-0.022
MANUFACTURING	-0.346	-0.036	-0.011	-0.022	-0.008	-0.027
OTHER INDUSTRIES	-0.154	-0.014	-0.007	-0.009	-0.002	-0.007
SERVICES	-0.052	-0.006	-0.001	0.000	-0.002	-0.016
TOTAL GDP	0.008	-0.002	0.000	0.000	-0.001	-0.004
CPI GROWTH	-0.008	-0.009	0.004	-0.004	0.000	-0.003

TABLE 7
INCREASE IN EXPORT TREND OF FOOD AND NON-FOOD BY 5%

PERCENTAGE CHANGES

	FOOD EXPORT	NON-FOOD EXPORT
MEAN WAGES		
PRIMARY AND BELOW	0.806	-2.002
LOWER SECONDARY	0.529	3.116
UPPER SECONDARY	0.490	5.683
VOCATIONAL	0.243	6.602
TECH.VOCATIONAL	0.200	5.906
UNIVERSITY	0.029	5.675
TOTAL	0.602	0.709
MEAN FORMAL WAGE	0.387	19.301
MEAN INFORMAL WAGE	1.333	-2.679
FORMAL EMPLOYMENT		
PRIMARY AND BELOW	-1.702	-13.436
LOWER SECONDARY	0.698	3.125
UPPER SECONDARY	0.452	2.067
VOCATIONAL	0.414	2.074
TECH.VOCATIONAL	0.459	2.247
UNIVERSITY	0.128	0.603
TOTAL	-0.598	-5.414
REAL H-H INCOME		
QUINTILE 1	0.009	0.188
QUINTILE 2	0.169	-0.402
QUINTILE 3	0.340	-1.075
QUINTILE 4	0.455	-1.505
QUINTILE 5	0.458	-1.531
TOTAL	0.114	-0.207

TABLE 7
INCREASE IN EXPORT TREND OF FOOD AND NON-FOOD BY 5%

PERCENTAGE CHANGES

EXPORT GROWTH

MERC. EXPORT	0.855	2.154
RICE	0.339	5.527
OTHER FOODS	2.163	-4.316
MANUFACT.	0.586	3.418
OTHER EXPORTS	-0.005	4.994

REAL GDP GROWTH

AGRICULTURE	0.104	0.631
MAJOR CROPS	0.103	1.264
OTHER AGRICULTURE	0.106	-0.299
INDUSTRIES	-0.117	-0.580
MANUFACTURING	-0.078	-0.494
OTHER INDUSTRIES	-0.238	-0.843
SERVICES	-0.060	-0.508
TOTAL GDP	-0.054	-0.347
CPI GROWTH	0.553	0.841

ANNEX
Example of a Simple Social Accounting Matrix

A Social Accounting Matrix (SAM) is a consistent accounting
of the income and expenditure flows in the economy. It is a
square matrix where each entry refers to some transaction in the
economy. An account in a SAM can be of various types, for
example a production sector, a factor of production, the
government, or a household. Each account appears both as a row
in the SAM, and a column in the SAM. An entry in the SAM refers
to a transaction in the economy. It represents a payment from
the column account to the row account. For example, a payment
from a sector of production to a factor of production would
appear in the SAM at the cell corresponding to the production
sector column and the factor of production row. Similarly, the
flow of income from a factor of production to a household would
appear as an entry from the factor of production column to the
row corresponding to the household. Perhaps the simplest way to
understand the structure of a SAM is to look at an example of a
simple SAM as in table A.1.

In this simple SAM, there are two production activities,
labeled "ACTIVITY PRIVATE" and "ACTIVITY GOVERNMENT" (accounts 1
and 2). These produce two commodities "TOTAL SUPPLY PRIVATE" and
"TOTAL SUPPLY GOV-SERV". The entries in the first two columns
correspond to the input-output table, and the payments to factors
of production. The commodities "TOTAL SUPPLY PRIVATE" and "TOTAL
SUPPLY GOV-SERV" are used as inputs in both sectors of
production, together with one imported commodity "IMPORT". Labor
and Capital are used in the private sector, and only labor in the
government sector. The activities produce commodities at

producer prices. These are supplied to the consumers after
paying taxes. Thus, in columns 3 and 4, the total supplies pay
to the activity an amount equal to the value of production at
producer prices, and pay taxes to the government (the tax on
government service might be regarded as some service charges).
Factors of productions, labor and capital, give the earnings to
the institutions according to the ownership patterns. Labor pays
everything to the current account of households (CA-INST
HOUSEHOLD), reflecting the full ownership of households of labor
assets in the economy. Households do not get all the profits of
capital, however. Most of it goes to households, but some also
go into public sector saving (CAP-INST SAV-POOL PUBLIC),
reflecting retained earnings of state-enterprises, and some are
retained earnings of the private corporations (SAV-POOL PRIVATE).
Households get income from the factors of production, and also
from the government (CA-INST GOVERNM) in the form of interest
payments, and from the rest of the world (CA-INST R-O-W), in the
form of remittances and transfers. Households' sources of
incomes are given along the household row (8). The entries in
column 8 refer to households' uses of incomes. There are
consumption expenditures (payments to TOTAL SUPPLY PRIVATE and
GOV-SERV, and for IMPORT), payment of income taxes to the
government, and there are payment outside of the country to the
rest of the world. The rest of income is saved, and goes into
the CAP-INST SAV-POOL PRIVATE account. The expenditures of the
government are given along column 9. It spends on domestic
commodities and imports, and pays interests and transfers to the
households and the rest of the world. On the revenue side (row
9), the government gets income from taxes and profits on
government services. The excesses of government expenditures
over incomes are financed by borrowings from abroad (payment in
row 9, column 10), and domestic borrowings (row 9, column 12).

For the rest of the world, the receipts (along row 10) are from
imports, transfers and interest payments. The payments from the
rest of the world (column 10) are for exports and various
remittances and transfers. Finally, the current account deficit
is given by the payment from the rest of the world to the saving
accounts (CAP-INST PRIVATE and PUBLIC). These represent the net
foreign borrowings of the private and public sectors, i.e. the
current account deficit equals the total net borrowings from
abroad. Investment (CAP-INST TOT-INV) buys domestic and imported
commodities, and are financed by the saving accounts (public and
private), which already included the needed borrowings to fill
the saving-investment gap, as explained above. Finally, the
saving pools are savings from the institutions' current accounts,
and they are used to finance investment.

This simple SAM illustrates the consistency of a SAM. Each
row total must equal the corresponding column total, i.e. the
full amount of income or commodity flows must be accounted for.
There is commodity balance, so that the production for each
commodity is exactly equal to the total uses of the commodity,
whether as intermediate inputs or as final demand. There is
income balance, so that for each institution, total receipts must
equal total expenditures (including saving). There is also
macroeconomic balance, in that the current account deficit on the
commodity side must exactly equal the net borrowings from abroad.

The construction of a SAM requires combining data from
three main sources - the National Income and Expenditure
Accounts, the Input-Output Tables, and the Socio-economic
Surveys. If details are needed on the labour market, as in the
SAM used for the model in this paper, then the Labour Force
Survey will also be needed. The SAM that was used as the basis

for the general equilibrium model in the paper was built by combining data from the 1985 Input-Output Table (the latest available at the present time), the 1987 National Accounts (New Series), the latest Socio-economic Survey (1988), and the 1988 Labour Force Survey, round 3. As with the building of any SAM, the data from various sources are usually inconsistent. For example, the household income data from the Socio-economic Surveys are usually much lower than that from the National Accounts (explainable by under-reporting of incomes in the survey). Similarly, the Input-Output table gives different value-added or import and export totals to the National Accounts. Given that the accounts in the SAM must balance, i.e. that the receipts and expenditures for each account must be equal, the data from various sources must be adjusted to lead to a consistent SAM. In the current analyses, the National Accounts totals were used as controls, and Input-Output data, household income and expenditure data, and employment and wage data were adjusted to give a consistent SAM, while preserving the structures from the Input-Output table, the Socio-economic Survey, and the Labour Force Survey as much as possible.

Table x.1
Example Social Accounting Matrix

			ACTIVITY PRIVATE	ACTIVITY GOV-SERV	TOTAL SUPPLY PRIVATE	TOTAL SUPPLY GOV-SERV	IMPORT	PRM-FAC LABOR	PRM-FAC CAPITAL	CA-INST HOUSEHOLD	CA-INST GOVERN	CA-INST R-O-W	CAP-INST TOT-INST	CAP-INST SAV-POOL PRIVATE	CAP-INST SAV-POOL PUBLIC	TOTAL ROW
			1	2	3	4	5	6	7	8	9	10	11	12	13	
ACTIVITY PRIVATE	1		0	0	1958741	0	0	0	0	0	0	0	0	0	0	1958741
ACTIVITY GOV-SERV	2		0	0	0	94530	0	0	0	0	0	0	0	0	0	94530
TOTAL SUPPLY PRIVATE	3		990348	9700	0	0	12040	0	0	635268	0	170468	188095	0	0	2029229
TOTAL SUPPLY GOV-SERV	4		195	76	0	20	0	0	0	20608	73523	0	0	0	0	94882
IMPORT	5		203412	1476	0	0	0	0	0	31078	21500	0	0	0	0	285109
PRM-FAC LABOR	6		293605	71359	0	0	0	0	0	0	0	0	0	0	0	364964
PRM-FAC CAPITAL	7		471181	0	0	0	0	0	0	0	0	0	0	0	0	471181
CA-INST HOUSEHOLD	8		0	0	0	0	357602	417600	0	0	87723	50093	0	0	0	913018
CA-INST GOVERN	9		0	11920	70480	331	31578	7361	0	22021	0	23985	0	0	0	167770
CA-INST R-O-W	10		0	0	0	0	241492	0	0	0	0	21598	0	0	0	286434
CAP-INST TOT-INST	11		0	0	0	0	0	0	0	0	0	0	0	139347	72974	212221
CAP-INST SAV-POOL PRIVATE	12		0	0	0	0	0	0	0	0	0	0	4212	832	0	185794
CAP-INST SAV-POOL PUBLIC	13		0	0	0	0	0	0	0	0	0	0	18315	27726	0	73556
TOTAL COLUMN			1958741	94530	2025229	94882	285109	364964	471181	913018	167770	286434	212221	185794	73556	

Rajapark Building, 163 Asoke, Sukhumvit Road, Bangkok 10110 Thailand
Tel. 258-9012-7, 258-9027-9 Fax. 258-9046 Telex 20666 Rajapak TH

Institute of
Development Studies