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Income and Growth in Malaysia

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PREFACE

This research was funded by grants AID/OTR-C-1432 and AID/OTR-G-1822 to The Rand Corporation from the Agency for International Development. The second grant supports the Rand Corporation's Family in Economic Development Center. The Center's purpose is to provide effective policy research on issues related to the development process by integrating technical research with training of, and collaboration with, Third World scholars and government officials. The Center's research emphasizes the role of human resources in the process of economic development, and individual and family responses to development programs and policy.

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SUMMARY

The purpose of this research was to study life-cycle career wage and employment histories of male workers in Malaysia, a country that has been undergoing rapid economic development. These labor market histories were investigated with an eye towards identifying the main consequences of economic development for the earnings and employment patterns that we observe within labor markets. Particular attention was directed at isolating how the benefits of this growth were distributed between the young and the old, the more and less educated, rural and urban areas of the country, and among Malaysia's three main ethnic groups. An equally important aim was to identify those factors that were the main contributors to Malaysia's success. To that end, we were able to test a number of prominent hypotheses about the underlying determinants of economic development.

Given its record of sustained economic growth during the last thirty years, Malaysia easily merits inclusion in the expanding list of economic success stories in Southeast Asia. For example, real GNP in Malaysia grew by 6.6 percent per year between 1961 and 1976. This remarkable growth occurred alongside some of its expected correlates: high rates of savings, considerable investments in the knowledge and skills of its people, rapid technological advances in its major economic activities, a reliance on markets, and a vigorous private sector that allowed Malaysia to exploit and not dissipate its comparative advantage in world trade.

The research was based on the male retrospective employment history component of the Malaysian Family Life Survey, which Rand conducted in three rounds in 1976-1977, in collaboration with the Government Department of Statistics and Survey Research Malaysia, a private survey research firm. For each male respondent, this survey gives a complete retrospective history of schooling, job training, migration, occupation, and income. The result is a unique body of rich information on the labor market experiences of male workers in a country undergoing rapid and sustained economic growth. These data permit the opportunity to

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test important hypotheses concerning the consequences of economic growth, as well as to isolate some of the determinants of the growth that occurred. In addition to these substantive issues, the data provide a test of the usefulness of recall data covering a reference period of 30 years or more. With some reason, the literature has been skeptical about the value of surveys based heavily on recall questions.

As a prelude to our statistical analysis of wage growth, we first present a brief summary of some salient characteristics of Malaysian labor markets. The dimensions of the labor market that are highlighted include life-cycle and cohort occupation distributions, the extent and character of job and residential mobility, and the amount of work effort or labor supply and incomes. In all these dimensions, the research takes care to distinguish life-cycle changes for a given work cohort and changes that occur across work cohorts. The principal findings of this part of the research include:

- In both farming (for Malays) and in sales (for Chinese), the family serves as an important training ground for each new generation of workers, with first jobs frequently in family-owned businesses. Rural Malays typically start careers as agricultural workers on family farms. But employment on the family farm erodes quickly as workers become salaried employees for other agricultural employers, and eventually (much later in their careers) many become owners of their own farms. Similar to the worker-farmer progression for Malays in agriculture, many Chinese transit from entry-level jobs as assistants and helpers in family-owned shops to ownership of their own businesses.
- In two of the major occupational groups--agriculture and sales--life-cycle changes for total aggregate employment were relatively small. Twenty years into careers, total farm or sales employment averaged 90 percent of its initial level, but the pronounced life-cycle progression from worker to owner discussed above still persists in both fields.

- The principal life-cycle pattern uncovered in this research is the increased representation of men in production work. Ten years into careers, the fraction of workers in production jobs is 60 percent higher than its initial level.
- Contrary to widespread notions about the necessary prerequisites for economic growth, there was very little change over time or across labor market cohorts in the distribution of employment between the agricultural and manufacturing sectors. Apparently, Malaysia was able to grow without placing great emphasis on the development of a manufacturing sector. Indeed, the favorable contrast of Malaysia with many other less successful developing countries probably lies in the attention Malaysia gave to agriculture, particularly with continuing improvement in the principal technologies of agricultural production.
- Multiple job holdings are a common practice, particularly in rural areas, with the propensity to hold second jobs exhibiting a strong life-cycle trend. Compared with entry levels, the fraction of workers with second jobs trebles by the time a typical Malaysian worker has achieved 30 years of work experience. While second jobs are predominantly in agriculture at the beginning of the work career, a significant fraction of second jobs are in production and service as life cycles move into their later phases.
- The patterns of job mobility in the Malaysian labor market are remarkably similar to those found in Western developed economies such as the U.S. Thirty-five years into careers, the typical male Malaysian worker had held four distinct primary jobs. This inter-job mobility, a process in which almost all Malaysian male workers participate, indicates that workers are not tied inexorably to initial employers, contrary to an all-too-frequent assertion about labor markets in less developed countries.

- Over their careers, agricultural workers average about one job change less than their nonagricultural counterparts. Fully 60 percent of all job changes for agricultural workers involve movement from agricultural to nonagricultural employment, lending little support to the notion of coexistence of rigid dual labor markets.
- Job market and residential mobility are concentrated early in the career and decline steadily after the first five years of work. This pattern mirrors that found in the U.S. One interpretation is that as workers accumulate job- or location-specific human capital, and as investment horizons shorten, ties develop between workers and their employers or their locations that make this joint association more profitable than an alternative match. As additional evidence for this interpretation, job mobility takes place within increasingly narrow occupational clusters as we move further along into careers.
- In their residential mobility, the Malaysian population can be separated into two groups. Half of all men are locationally inert, never making any long-term move after they have started work. The other half are highly mobile, averaging more than 4 migrations each by the time they have spent 30 years in the labor market.
- Malaysia contradicts a number of stereotypes about the nature of migration in the Third World. First, there is little evidence that economic development significantly increased the volume of migration over time. This conflicts with the notion that development necessarily implies large-scale movement of people or relocation of economic activity. Nor was urbanization a necessary consequence of development. Most Malaysian men who moved went to places quite similar in urbanness to those they left. In fact, for those flows that did involve a change in urban status, the largest flow was from urban to rural areas, and not, as typically assumed, the reverse.

- Our results involving the volume and direction of internal migration imply that, over life-cycle careers, male workers were not becoming more urbanized. Similarly, we did not find any secular trend induced by migration in the urban-rural division of the population. If more recent cohorts of Malaysians live in more urban settings than their predecessors, it is the result of increased urbanization of existing areas rather than the redistribution of people from rural to urban places.
- The characterization of rural labor markets in less developed countries as constantly in chronic labor surplus receives little support in the Malaysian context. In terms of average workweeks, traditional and modern sectors work similar long hours. The major difference is that work is more standardized in the production sector, with fewer workers working either very large or small numbers of hours.
- The cohort life-cycle income profiles derived from the Malaysian Family Life Survey indicate the presence of both substantial money wage growth over labor market careers and across calendar time. Real monthly income rises with years of market experience, but rates of wage growth diminish as time spent in the labor market lengthens. Similarly, there is evidence of significant cohort effects, with more recent labor market cohorts having wage profiles that lie above those of older work cohorts.

The final part of this report consists of a statistical analysis of the determinants of life-cycle and cohort wage growth for male Malaysian workers, based on the Malaysian Family Life Survey. The purpose of this analysis was to quantify the main consequences of economic development for the earnings and employment patterns we observed within Malaysian labor markets. The principal conclusions from this part of our research are:

- All major subgroups of the Malaysian population benefitted from the rising levels of real income over time. There is an understandable concern that the rewards of development can be concentrated on the few, leaving many of the poor untouched. At least in Malaysia, this fear was unrealized.
- Economic growth had a non-neutral effect on age earnings profiles, raising the earnings of the young more than it did those of older people. In a growing economy, such as Malaysia, undergoing frequent waves of technical change, this tilt towards the young may not be surprising. Younger workers, with much of their job investments before them, can more easily absorb and adapt to the introduction of new technologies and different methods of production. In contrast, the skills of older workers become increasingly tied to obsolete technologies.
- More educated workers also gained more from economic growth in Malaysia than those with less schooling. Many people have persuasively argued that the more educated have a comparative advantage in adapting to change in dynamic environments. In a variety of country settings, researchers have established a link between schooling and the ability to deal with disequilibria and change. Our evidence from Malaysia adds support to that finding.
- As the Malaysian economy developed, incomes in urban areas rose more rapidly than incomes in rural places. Thus, one consequence of development in Malaysia was the emergence of significant urban-rural income differences among its population. However, this is not to say that rural areas failed to participate in economic growth; average incomes in rural areas merely rose less rapidly than they did in urban areas.
- Ethnic Malays have been at least coequal participants in the economic resurgence of Malaysia. Their money incomes apparently grew at a slightly faster rate over time than did incomes of Chinese.

- Still, very large life-cycle career differences prevail between Malays and Chinese, differences that are strongly in favor of the Chinese. Chinese incomes increase twice as rapidly over their careers as do incomes of Malays. In terms of money income, Chinese earn substantially more than Malays, and this disparity expands greatly as workers age. The magnitude of these life-cycle changes in favor of Chinese is five times larger than the rate at which we estimate Malays are catching up in money income over time.
- The proportionate effect of schooling on income is highly nonlinear. Income rates of return to schooling are twice as large at the secondary level as they are at the primary level, and are larger still for those few men who attended university. Moreover, income benefits from secondary and university attendance increased over time, while the benefits from primary schooling declined. One-third of those income benefits from primary schooling are a result of the achievement of literacy.
- Rising levels of labor supply and the increased frequency of multiple jobs increase income growth over careers. However, the contribution of labor supply to career wage growth is modest, explaining only about 5 percent of total monthly income growth. Similarly, changes in neither health status, trade union membership, or rural-to-urban migration explain much of the life-cycle wage growth over careers in Malaysia.
- Participation in formal job training programs is an important underlying reason for wage growth related to labor market experience. Approximately 20 percent of the men in the Malaysian sample reported participation in formal training programs. For those who did, income grew twice as rapidly over careers than it did for nonparticipants in formal training. The principal effect of training is on the rate at which earnings increase over careers, and not on average differences in incomes at the start of careers between those who are trained and those who are not.

- The life-cycle transition from family farms or shops to salaried employment is also an important reason for the observed career growth in earnings. Those men with salaried jobs reported money income more than twice as large as money incomes received in family businesses. Thus, as individuals transit from the family farm or shop to salaried work, their money incomes will rise.
- The most important correlate of time-related growth in Malaysian incomes is education. Conditioning on schooling reduces our estimate of per capita income growth over time from 2.4 percent to 0.9 percent per year. We found that investments in people, both through schools and through formal training, have had large income payoffs for the people involved. These investments also appear to be an important reason for Malaysia's success.
- We estimate that changes in Malaysian terms of trade affect incomes of Malaysian men. Since the terms of trade of Malaysia deteriorated during the post World War II period, changing world price structures actually served to reduce average incomes over time.
- The concentration of Malaysia's export goods in a few commodities, and the sales of exports to a few nations, apparently did not inhibit Malaysia's growth. Growth in income per capita long preceded any diversification of export mix and no significant diversification in consumers of Malaysia's exports has occurred.
- The most promising remaining explanation for Malaysian growth is the emphasis the country has placed on research and development in its principal productive activities. Significant productivity growth has occurred in both rubber and rice. In rubber, a continual series of new varieties have been introduced that have raised output by astonishing amounts. Similarly, new varieties of rice and double-cropping have almost doubled productivity since World War II.

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The results of this research were presented at the National Family Planning Board, Malaysia-Rand Workshop on Human Resources, held in Penang, Malaysia in October 1982. The participants at that workshop offered a number of helpful comments, particularly some related to the Malaysian economic and social context. Needless to say, the conclusions and interpretations I offer in this paper are exclusively my own. They do not necessarily reflect opinions of AID, The Rand Corporation, or any Malaysian organization.

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FOREWORD

This report examines how economic development has affected the life-cycle wage and employment histories of various cohorts of Malaysian male workers. One aim of this research is to isolate the principal beneficiaries of economic growth, as well as to assess its overall success or failure in reducing income inequality. A second goal is to identify the main determinants of the growth that took place, at least in a Dennison-styled accounting sense. Because it has experienced rapid economic growth for at least three decades, Malaysia offers an excellent empirical laboratory for a study of economic development. In addition, a recently collected retrospective survey for that country permits us to monitor the development process at the individual level in a detail that has not been possible to date.

The report contains four sections. Section I briefly sketches the structure of the Malaysian economy and highlights the main changes that have occurred since World War II. Section II describes the Malaysian Family Life Survey (MFLS), the data file on which this research is based. To my knowledge, these data are unique in providing the first detailed portrait of career and cohort evolutions of wages and employment for a less developed country that is undergoing substantial economic growth. Because there is so little hard evidence on labor markets in less developed countries, Sec. III presents a descriptive summary of the principal characteristics of the Malaysian labor market. Finally, Sec. IV presents a statistical analysis of individual wages, with an emphasis on trying to sort out determinants of life-cycle and across-cohort wage growth.

I. THE MALAYSIAN ECONOMY

This section briefly reviews the post-World War II Malaysian economy. The review has a dual purpose: to give at least a rudimentary sense of place to those unfamiliar with Malaysia and to identify the motive factors for the analysis described.

Among less developed countries, Malaysia easily merits inclusion in the list of economic success stories. Real GNP and per capita income grew by 6.6 and 4 percent per year between 1961 and 1976. This remarkable growth occurred alongside high rates of savings; considerable investments in the knowledge and skills of its people (through education and job training) and its productive activities (the introduction and adoption of high-yielding varieties of rubber and palm oil, and the double-cropping of rice, facilitated by irrigation projects); a vigorous private sector that adapted rapidly to changing relative world prices; and an economic policy to exploit, not dissipate, its comparative advantage in world trade.

In spite of its impressive record, however, the Malaysian people remain quite poor by Western standards. In 1976, the final year of the survey to be analyzed here, average per capita income was \$860 U.S. Standards of living are reported to be particularly bleak in the traditional agricultural sector, where smallholders of rubber and rice eke out a meager existence.

The Malaysian economy is predominately agricultural, heavily dependent upon external trade, and keyed to a few primary commodities. To illustrate, agriculture accounts for 30 percent of GNP and the value of exports is half of GNP. The critical commodities are natural rubber, tin, rice, tropical hardwoods and, more recently, palm oil and crude petroleum. The broad characteristics of the economy are documented in Tables 1 and 2. Table 1 lists the distribution of employment in 1970 by major economic sectors. Table 2 lists the percentage contributions of the important traded goods to total export value, and the acreage planted in the four largest agricultural products. These two tables illustrate the continuing dominance of agriculture, especially rubber

Table 1
EMPLOYMENT BY INDUSTRY IN PENINSULAR MALAYSIA, 1970

Sector	Thousands of Workers	% of Labor Force
Rubber	724	25.9
Palm oil	44	1.6
Rice	296	10.6
Forestry & fishing	113	4.0
Other agricultural	<u>229</u>	<u>8.2</u>
Total, agriculture	1406	50.3
Mining	85	3.0
Manufacturing	265	9.5
Trade, transportation, and private services	595	21.3
Utilities and construction	94	3.4
Government and related	<u>349</u>	<u>12.5</u>
Total, all sectors	2794	99.9

SOURCE: K. Young, W. Brussink, and P. Hasan, *Malaysia: Growth and Equity in a Multiracial Society*, Johns Hopkins Press, Baltimore, 1980.

and rice, which employed more than 1/2 of the 1970 work force; the gradual shift in the last two decades from essentially a two-goods export sector--rubber and tin--toward a more balanced portfolio; and the emergence of petroleum and palm oil as important sectors in the economy.

To understand economic development in Malaysia requires knowledge of trends in prices, production, and technology for the principal goods. Table 3 lists levels of production and prices of the major commodities between 1949 and 1978. Rubber is consistently the most important crop and virtually all of it is exported.¹ Malaysia produces almost half of the total world production of natural rubber.² Rubber is produced on

¹ In 1978, rubber accounted for 10 percent of GNP (one-third of the agricultural contribution) and employed 15 percent of the work force.

² Rubber, from a Brazilian seed, was first introduced into Malaysia in 1877. The commercialization of Malaysian rubber is largely a 20th-century phenomenon.

Table 2

PERCENTAGE CONTRIBUTION TO TOTAL EXPORT VALUE BY
MAJOR COMMODITIES, AND PRINCIPAL CROP ACREAGES

A. Contribution to Export Value

Commodity	Year		
	1961	1970	1976
Rubber	48%	33%	23%
Tin	16	20	11
Petroleum	3	4	13
Timber	6	16	17
Palm oil	2	5	9
Manufactured goods	5	7	15
Other	20	15	12

B. Acreage Planted in 4 Principal Crops
(thousands of acres)

Crop	1960	1970	1975
Rubber	3889	4331	4188
Rice ^a	929	992	944
Palm Oil	135	691	1436
Coconuts	520	528	567

^aAcreage figures do not reflect double-cropping.

both large estates and smallholdings, with smallholdings accounting for 60 percent of total output.³ Estate labor is organized around direct wage payment while smallholders use family labor, sharecropping, and wage payments in proportions more or less inversely related to the size of plots. Between 1949 and 1972, rubber prices (adjusted for inflation) fell by more than half, largely as a result of increased

³ In 1977, estates planted 640,000 hectares and smallholdings 1,360,000 hectares. In the last two decades, smallholders have risen in importance relative to estates.

competition from synthetics. As indicated in Table 3, this trend reversed after 1972 and rubber prices have risen.⁴ In spite of declining prices, rubber output expanded by 3.1 percent per year after 1952, with output growth particularly rapid during the 1960s. The principal cushion against falling prices has been the increased use of high-yielding varieties and other technological improvements.⁵ In 1920, average yield was about 325 pounds per acre, but by 1970, clones producing in excess of 2,000 pounds per year were common. Between 1968 and 1972 alone, output per worker rose by 5 percent per year. Large estates adopted new varieties more rapidly, but substantial new plantings in high-yield varieties were common even among smallholders by 1976.

During the last decade, estates have increasingly shifted from rubber to palm oil, which is used principally in the manufacture of margarine, shortening, and soaps. Palm oil production rose by 600 percent after 1968, largely in response to a substantial rise in its relative price.⁶ (Palm oil prices rose relative to rubber prices by 50 percent since 1968.) Malaysia now produces over 46 percent of the total world supply of palm oil, with the major competition coming from other oils and fats (e.g., soybeans).

Rice is the principal domestic field crop.⁷ Output has risen substantially over time, most significantly during the 1960s and early 1970s. Production stabilized during the 1970s at levels about 200

⁴ In addition, rubber prices exhibit considerable year-to-year variation.

⁵ In addition to high-yielding varieties, two important changes have been the substitution of polybags in place of cups (which increases the intervals of collection from 2 days to 4 or 5 days) and the use of stimulants such as ethrel. Tapping of trees usually begins 6 or 7 years after planting and the productive life of trees is around 35 years. Thus, there is a substantial lag before the benefits of introducing new varieties begin to accrue.

⁶ By 1978, 83,000 people were employed in palm oil on 500,000 hectares of land.

⁷ Other agricultural crops of lesser importance are coconuts, pepper, pineapples, tobacco, and wheat. In addition, Malaysia has 76,000 fishermen, 2/3 of whom are located on the Western coast. Fishing villages were oversampled in the Malaysian data.

Table 3
PRODUCTION AND REAL PRICES OF MAJOR COMMODITIES

Period	Rubber	Palm Oil	a Tin	Sawn Logs	Sawn Timber	Crude Petroleum	b Rice
A. Production (in million tons)							
1949-1952	702	50	57.6	NA	NA	NA	488
1953-1956	649	55	61.2	NA	NA	NA	517
1957-1960	731	74	47.6	NA	NA	NA	582
1961-1964	821	113	59.6	5124	1047	1.08	711
1965-1968	995	212	71.1	9101	1449	1.75	827
1969-1972	1292	524	74.8	12420	2114	47.2	1120
1973-1976	1552	1122	67.1	16273	3110	101.2	1296
1977-1978	1795	1794	64.2	17587	3226	202.5	1281
B. Real Prices (in \$ per ton)							
	c					d	e
1949-1952	251	876	8253	NA	NA	6.33	NA
1953-1956	207	759	6643	NA	NA	6.78	545
1957-1960	226	783	6847	NA	NA	6.51	444
1961-1964	181	733	8795	82	173	5.83	461
1965-1968	139	715	10799	91	184	5.60	550
1969-1972	118	675	10426	96	206	5.74	431
1973-1976	126	845	12031	106	269	14.89	620
1977-1978	127	847	16281	108	261	16.43	386

- a Volume in tin concentrates.
- b Volume in barrels per day.
- c Price in cents per keg.
- d Price in \$U.S. per barrel.
- e Price in real 1979 \$U.S. of Thai rice, milled, f.o.b. Bangkok.

million tons below domestic consumption. Agricultural workers in rice are virtually all smallholders and they constitute the poorest segment in the economy. The principal technological developments in

rice are the introduction of new varieties and the increased frequency of double-cropping. Table 4 demonstrates that double-cropping expanded significantly in the last fifteen years and accounted for much of the increase in production. Double-cropping was greatly facilitated by irrigation projects (in particular, the large MUDA Irrigation project), and the introduction of new varieties.

Two-thirds of Malaysia is forested. Timber accounts for 9 percent of GNP, and Malaysia produces 14 percent of the world's tropical hardwoods. As its real price rose, timber production increased in the last two decades, rising from 3 million tons in 1961 to 20 million tons by 1978.⁸

Tin predated rubber as Malaysia's first modern commercial activity. The industry developed rapidly during the late 19th century and was initially dominated by Chinese immigrants. During the 20th century, European control and ownership became more common, mainly because of larger capital requirements for new methods of mining. Malaysia currently accounts for 40 percent of world production of tin. Unlike

Table 4
EXTENT OF DOUBLE-CROPPING OF RICE

Year	Acreage Planted (thousands)			Production (thousands of long tons)	
	Wet Rice			Dry Rice	Off Season
	Main Season	Off Season			
1960	864	21	61	868	23
1970	938	326	54	1002	377
1975	920	527	24	1008	668

the other commodities listed in Table 3, tin appears to have limited potential for expansion. Because of the depletion of known reserves, its economic role is likely to diminish in the future. Tin production was already in a period of decline during the 1970s.

In the 1970s, petroleum became an important export commodity.⁹ Spurred by the quadrupling of oil prices, production rose from 4000 to 210,000 barrels a day. Although Malaysia still produces only a small fraction of world output (1/2 of 1 percent), petroleum will likely grow in importance as long as OPEC price agreements are enforced. Because of its recent emergence and the fact that the most lucrative fields are located in non-Peninsular Malaysia, oil had an insignificant part in the economic development of Malaysia during the historical period considered here. In addition, although natural gas has considerable potential, it has not been exploited yet. Malaysia imports heavy crude from Africa for domestic use.

Although still small, manufacturing grew rapidly during the 1970s. After maintaining its 6 percent share in export value during the 1960s, that share doubled by 1976. Table 5 describes the composition of manufacturing output for the years 1959, 1968, and 1973. Manufacturing is predominantly small-scale and labor-intensive, and is concentrated in products that rely on low-wage labor. The processing of Malaysia's primary agricultural products--food, wood, and rubber--dominates its industry. The variety of activities has diversified recently with the growth of textile and electronic plants. Official government policy has increasingly encouraged the expansion of manufacture through subsidies, tax incentives, and import substitutions.

⁸ The two principal types of wood produced in Malaysia are sawn logs and sawn timber. Sawn logs expanded rapidly during the 1960s, but sawn timber expanded after 1965, partly because the export of certain types of logs was prohibited. The other two major producers of tropical hardwoods are Indonesia and The Philippines.

⁹ In 1974, the Malaysian government cancelled the old concession agreements with the American oil companies. A corporation, PETRONAS, was set up to own reserves and issue regulations. After considerable negotiation, a 20-year agreement was made with Shell and ESSO to share revenue with the government.

Table 5

COMPOSITION OF MANUFACTURING SECTOR, BY PERCENT
OF TOTAL VALUE OF MANUFACTURING OUTPUT

Product	Year		
	1959	1968	1973
Food, beverages	36.7	29.2	23.8
Wood products	16.1	11.8	13.1
Rubber products	7.5	6.4	9.5
Textiles	----	3.4	5.9
Chemicals	7.5	9.9	7.5
Metal products	4.3	4.9	4.9
Machinery and trans. equip.	6.7	5.5	4.4
Electrical machinery	----	2.6	8.1
Other	21.2	26.3	20.8

Because some serious economic, social, and political tensions exist among them, this short summary would be incomplete without mentioning Malaysia's three ethnic groups: Malays (53 percent of the total population), Chinese (36 percent), and Indians (10 percent). National unity has been difficult to achieve and in many ways the three live, work, and are schooled apart. Malays are the poorest and are predominantly rural, specializing in smallholdings of rubber and rice and in fishing. Urban Malays are employed primarily in the government sector, where they receive preferential treatment, and in low-skill manufacturing enterprises. In contrast, the Chinese, descendants of earlier immigrants destined for the tin mines, are largely urban, dominate commerce and trade, and have the highest incomes. Rural Chinese work in tin mines and as agricultural smallholders. Indians are about evenly distributed between rural and urban areas. Rural Indians, in consonance with their migratory past, are employed largely on the rubber and palm oil estates, while urban Indians are found mainly in the professions and the service sector. Considerable concern revolves around the disparate standards of living of the three groups and a suspicion that Malays in particular have not shared in the rewards of economic growth. Since the country gained independence, government

policy has increasingly emphasized raising the standard of living of Malays and dissipating the rigid association of economic function and race.

II. THE MALAYSIAN DATA

The Malaysian Family Life Survey (MFLS) on which this analysis is based is a 3-round survey that was administered in 1976-1977. The sample consists of 1262 private households, each containing at least one ever-married woman less than 50 years of age at the time of the initial visit.¹ These households were located in 52 geographic areas of Peninsular Malaysia. The main data used in this research were derived from the male retrospective survey, which was administered to all present husbands of the sample of married women. In the first round of the survey, each husband was requested to give a complete retrospective history of his schooling and training; marital status changes; migration; occupation; earnings and bonus payments; and weeks and hours of work. This retrospective history starts at age 15 or first marriage (whichever is earlier) and terminates in 1976. Work and earnings information is recorded at each job change or, if no job change occurred, at 3-year intervals.

Although the Malaysian data constitute a significant advance in the quality and quantity of information on career wage and employment histories in a less developed country, the data have their deficiencies. The most obvious limitation lies in its retrospective design. Men were required to recall and report accurately on wage and employment events that occurred, in some cases, 20 and 30 years before the interview. Less reliable responses for most distant events are certainly to be expected.² The second major problem is that the sample consists of

¹ Ever-married women were sampled because the primary purpose of the Malaysian Survey was to provide data on economic and biomedical relationships affecting birthspacing, family size, breastfeeding, and contraceptive use. For a description of the survey design and instruments see W. P. Butz and J. DaVanzo, *The Malaysian Family Life Survey: Summary Report*, The Rand Corporation, R-2351-AID, March 1978.

² To mitigate the extent of this bias, considerable care was taken in the survey to cross-reference and check errors across different life events (e.g., employment, marriage, education and training, and births of children). The referencing of employment events with these other life experiences should reduce inconsistencies and provide more accurate timing. In spite of these efforts, misreporting no doubt still exists.

currently married survivors of a cohort. Such men will not be completely representative of their original birth cohorts if employment histories vary by marital status or mortality.

Given the design of the Malaysian survey, the amount of information available, or the number of observations per person, depends most directly on the age of respondents during the survey year.³ The older a male is in 1976, the more complete his life-cycle history will be. Conversely, the younger a worker is in 1976, the shorter the length of his work history that we can track from time of first job. The most natural way of exploiting the Malaysian data is to view it as a set of life-cycle job histories for individual birth or work cohorts.⁴ Formatting the data in the form of a matrix of work histories arranged by cohorts facilitates the detection of major trends over life cycles in experience profiles as well as across-cohort improvement as development proceeds.

The nature of the Malaysian data is illustrated in Fig. 1. Beginning with the 1940 work cohort and then at 5-year intervals, career earnings profiles for work cohorts are graphed in Fig. 1. The solid line segment of these profiles represents the actual earnings experience of the cohort, while the dashed lines plot hypothetical post-1976 future paths. The observations within the Malaysian data are contained in the shaded area. For those Malaysian men who entered the labor market in 1940, we can follow them through 36 years of their work careers. However, for those men first who entered the labor market in 1975, we are able to observe only the initial year of their actual work experience.

Although the results are less useful, the Malaysian data can be employed to derive cross-sectional snapshots for each year between 1945 and 1976. The 1976 cross-section, illustrated in Fig. 1, will be a reasonably accurate portrait of the male work force (at least those with wives less than 50 years old) in that year. As we go further back in

³ It also depends on other factors, especially the extent of job turnover and mobility.

⁴ A work cohort is defined as a group of workers who began their job careers in a specific year.

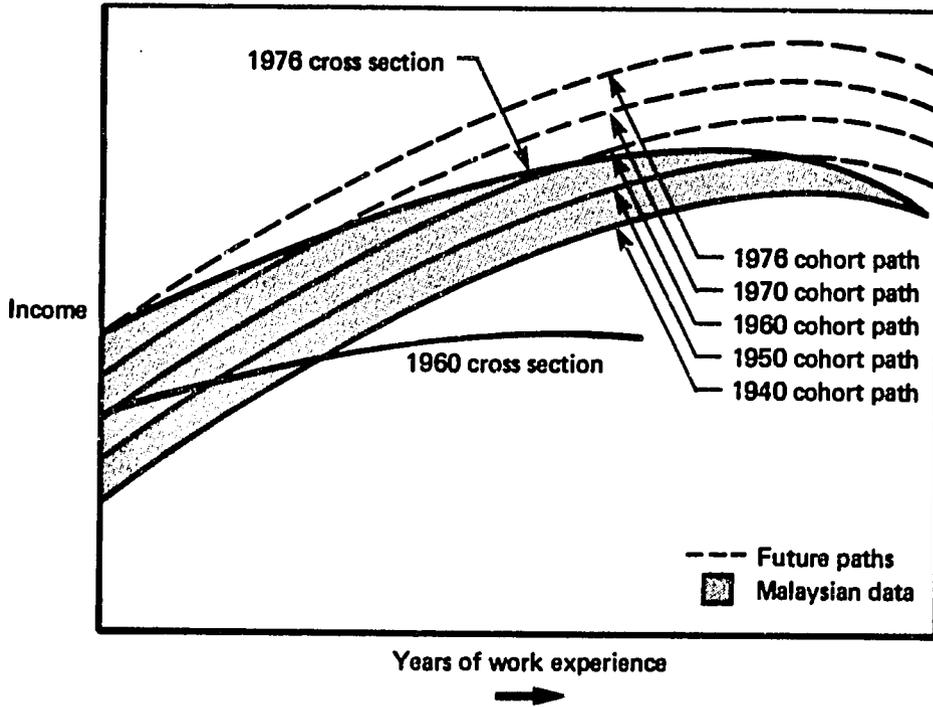


Fig. 1 – The Malaysian data

time, however, we are cutting off an additional segment of the older male work force for that year (see, for example, the 1960 cross-section depicted in Fig. 1). Comparisons across calendar-year cross-sections are not strictly valid because they rest on different samples of the aggregate work force that existed in each year. In addition, we can see from Fig. 1 that because of the substantial economic growth that occurred, the 1976 cross-section does not accurately capture the career path of any labor market cohort.

Finally, compare the form of the Malaysian data with panel data on individual incomes that have recently become available in the U.S. American panel data typically follow a given group of workers sampled in one year over a specified number of years in the future. Ignoring sample attrition, U.S. panel data on income histories contain equal numbers of observations per person (balanced design). The unbalanced design of the Malaysian data requires some special statistical techniques to address it.

In addition to the retrospective employment histories, the Rand Malaysian Survey gathered very detailed information on respondents at the time of the survey. In the initial wave, the subset of the survey used here concentrated on all economic activities pursued during the twelve months prior to the interview. This information was updated in two subsequent rounds four months apart.⁵ These contemporaneous data include aspects of family background,⁶ characteristics of farm,⁷ methods of farming,⁸ and type of nonfarm business.

⁵ Sample attrition was not a severe problem in the Malaysian data. Of the original 1262 households, 98 percent (1239) were interviewed in Round 2, and 96 percent (1212) in Round 3.

⁶ For example, education and occupation of respondents' parents.

⁷ For example, acreage in each crop, types of crops, value of sales.

⁸ For example, use of improved seed varieties, irrigation, fertilizers, insecticides, the extent of double-cropping for rice, amount of immature crop land, and average age of crop for rubber.

III. LABOR MARKETS IN MALAYSIA

This section offers a descriptive summary of Malaysian labor markets, with the major emphasis on life-cycle and cohort trends in occupations, job and residential mobility, labor supply and earnings. While the issues addressed here are important in their own right, this section also provides some background for the statistical analysis of wage growth in Sec. IV.

OCCUPATIONS

Table 6 lists the 1976 cross-sectional occupational distribution by ethnic group and for the total male sample. Three categories--agriculture, production, and sales--account for 75 percent of all jobs and our summary will concentrate on them. Almost 4 in 10 males work in agriculture, mainly as farmers or employees in rubber or rice. Malays are represented in all the major agricultural subsectors: farmers with plots of less than 100 acres, workers in rice padis and rubber farms, and fishing. Although a substantial number of Indians are also in agriculture, most are in the single occupation of rubber-tappers. In contrast to the other two ethnic groups, relatively few Chinese are employed in agriculture (remember that fishing villages were oversampled in the survey).

The Chinese dominate two nonagricultural occupations, holding three-quarters of sales and half of all production jobs. The Chinese domination of sales extends from the entry level position of salesman to late-career proprietors. Even within the broad occupational categories used in Table 6, ethnic differences are large. In production, Chinese work in mining and the processing of wood, food, and metal products. Malays, who hold 40 percent of all production jobs, are more commonly employed as machine assemblers or transport equipment operators.

Since this research will focus on career and cohort differences in employment, life-cycle occupation distributions for seven labor market cohorts are listed in Table 7. Within each five-year work cohort, these distributions are evaluated at selected years of market experience. As

Table 6
OCCUPATIONAL DISTRIBUTION, 1976

Occupation	Malay	Chinese	Indian	All
Professional and administrative	7.6	10.5	7.9	8.6
Clerical	3.1	7.5	8.8	5.3
Sales	6.6	26.6	2.6	13.5
Proprietors	3.9	16.6	0.9	8.2
Salesmen	2.0	9.4	1.8	4.7
Service	3.3	2.4	4.4	3.1
Agriculture	49.6	19.4	37.7	37.3
Farmers	15.0	3.0	0.0	9.0
Agricultural workers	31.4	8.5	34.2	22.2
Rubber tappers	16.7	5.2	25.0	13.2
Padi workers	9.4	0.0	2.2	5.0
Fishing	3.9	7.6	0.0	4.6
Other labor	11.3	1.7	18.4	8.4
Production	18.6	31.6	20.2	23.6
Population distribution of male sample by race	50.2	37.1	11.7	100.0

a complement, appendix Table A.1 contains employment by job status for a representative labor market cohort.¹ Since most of the cross-sectional and life-cycle differences in job type are due to agricultural workers and sales, job status categories are also listed for these groups separately.

To understand labor markets in agriculture, it is necessary to distinguish between those men classified as workers² and others employed in farm-related activities. In rural areas, a man typically starts his career-path as an agricultural worker, to a large extent working on the family farm. As Table A.1 indicates, employment on family farms erodes rapidly over careers as workers move into the salaried and self-employed

¹ There being little difference in type of job across labor market cohorts, the 1946-1950 cohort used in Table A.1 is a reasonably accurate summary for all 7 labor market cohorts in Table 7.

² In the retrospective data file, agricultural workers are not separated into rubber tappers, padi workers, etc.

Table 7

LIFE-CYCLE OCCUPATIONAL DISTRIBUTION BY LABOR MARKET COHORTS

A. Initial Year of Market Experience 1971-1975

Years of Market Experience

	<u>1</u>
Professional and administrative	16.6
Clerical	6.7
Sales	3.3
Proprietor	0.0
Salesmen	3.3
Service	0.0
Agriculture	26.6
Farmer	3.3
Agricultural worker	23.3
Fishing-hunting	0.0
Other laborer	16.7
Production	30.0

B. Initial Year of Market Experience 1966-1970

	<u>1</u>	<u>5</u>
Professional and administrative	13.5	13.9
Clerical	6.3	7.9
Sales	3.1	3.0
Proprietor	0.0	1.0
Salesmen	3.1	2.0
Service	3.1	1.0
Agriculture	50.0	46.5
Farmer	4.2	5.0
Agricultural worker	36.5	30.7
Fishing-hunting	8.3	7.9
Other laborer	7.3	4.0
Production	16.7	23.8

C. Initial Year of Market Experience 1961-1965

Professional and administrative	11.7	8.5	9.8
Clerical	9.9	10.3	10.4
Sales	19.1	17.6	14.7
Proprietor	0.6	1.2	6.7
Salesmen	17.9	14.5	6.7
Service	4.3	5.5	4.9
Agriculture	32.1	31.5	30.1
Farmer	2.5	2.4	3.1
Agricultural worker	24.1	23.0	19.0
Fishing-hunting	4.9	5.4	6.7
Other laborer	6.2	7.3	6.1
Production	16.6	19.4	23.9

D. Initial Year of Market Experience 1956-1960

Professional and administrative	10.3	9.9	8.8	9.5
Clerical	3.6	2.4	4.1	4.2
Sales	12.1	11.7	9.4	8.3
Proprietor	1.8	1.7	2.9	2.4
Salesmen	10.3	10.5	6.4	4.7
Service	5.4	2.4	2.9	1.8
Agriculture	48.5	43.9	39.2	0.5
Farmer	1.2	4.1	5.8	4.7
Agricultural worker	33.9	28.1	23.4	25.0
Fishing-hunting	10.3	9.4	9.9	9.5
Other laborer	9.1	10.5	11.7	10.7
Production	10.9	19.3	24.0	25.0

E. Initial Year of Market Experience 1951-1955

Professional and administrative	4.4	4.4	5.0	5.6	4.3
Clerical	10.0	6.9	6.9	5.6	6.7
Sales	13.8	15.0	11.9	12.9	12.2
Proprietor	0.6	1.3	3.2	8.0	9.1
Salesmen	12.5	12.5	7.5	3.7	2.4
Service	11.9	11.3	7.5	8.6	6.7
Agriculture	37.1	38.8	39.3	38.3	37.1
Farmer	0.6	1.3	4.4	6.8	9.8
Agricultural worker	35.8	35.6	31.8	27.1	23.2
Fishing-hunting	0.6	1.9	2.5	3.1	2.4
Other laborer	8.2	8.1	8.8	11.1	14.6
Production	15.1	15.6	20.6	17.9	19.5

F. Initial Year of Market Experience 1946-1950

	<u>1</u>	<u>5</u>	<u>10</u>	<u>15</u>	<u>20</u>	<u>25</u>
Professional and administrative	5.5	6.0	7.9	7.9	7.9	7.8
Clerical	8.3	6.6	5.3	3.9	3.3	2.6
Sales	12.4	7.9	8.7	9.2	11.8	14.3
Proprietor	2.1	1.3	2.6	3.2	5.9	7.1
Salesmen	9.7	6.0	5.3	4.6	5.3	5.8
Service	13.8	14.6	11.9	5.2	3.3	2.6
Agriculture	40.0	39.7	41.7	42.1	39.5	38.3
Farmer	4.1	5.3	7.3	8.6	9.2	11.7
Agricultural worker	30.3	29.8	28.5	27.6	26.4	23.4
Fishing-hunting	4.1	3.3	4.0	4.6	3.3	2.6
Other laborer	5.5	8.7	6.6	7.9	5.9	5.8
Production	14.5	16.6	17.9	23.7	28.3	28.6

G. Initial Year of Market Experience 1941-1945

	<u>1</u>	<u>5</u>	<u>10</u>	<u>15</u>	<u>20</u>	<u>25</u>	<u>30</u>
Professional and administrative	2.6	2.7	4.3	5.9	6.8	5.9	6.9
Clerical	5.2	4.5	3.4	3.4	4.3	3.4	3.4
Sales	15.6	18.8	16.2	13.6	15.4	15.2	17.2
Proprietor	0.0	1.8	3.4	4.2	8.5	7.6	11.2
Salesmen	15.6	16.9	12.8	9.3	6.8	7.6	6.0
Service	3.5	10.7	13.7	10.2	7.7	7.6	6.0
Agriculture	53.9	45.5	39.3	41.5	43.5	44.9	42.2
Farmer	1.7	1.8	4.3	6.0	7.7	8.4	11.2
Agricultural worker	42.6	36.6	27.4	25.4	23.9	26.2	20.7
Fishing-hunting	9.6	6.3	6.6	8.5	8.5	7.6	6.9
Other laborer	7.0	8.0	6.8	5.1	5.2	4.2	5.2
Production	12.2	11.7	16.2	20.3	17.1	18.6	19.9

categories. While this evolution permits a variety of explanations, one reasonable interpretation is that family farms perform an important training function for the next generation of workers. Consistent with this view is the observation that men leave the family farm early to become salaried employees in establishments unrelated to their families. Most withdrawal from the family farm is completed by the tenth year of labor market experience, and those who left reappear mainly as salaried workers rather than as self-employed. Only later in the career does farm ownership become important.

Twenty years into careers, the proportion of the labor force who are agricultural workers averages 75 percent of its initial level at the time of labor market entry. This life-cycle decline does not characterize the entire agricultural work force, however, where at 20 years' experience, employment is 90 percent of entry level. Apparently, most men who start out in agriculture remain there, with career-ladder progression consisting eventually of change of status from worker to farmer.

In contrast to widespread conceptions of the necessary correlates of economic growth, across-cohort changes in agriculture are not large, with the possible exception of the most recent cohorts. Although small sample sizes for individual cohorts suggest caution in interpreting secular changes, a less cautious eye detects little change in agricultural employment across cohorts until 1956. After that date, the secular trend is negative, with the 1966-1970 cohort an unexplained anomaly.

Both life-cycle and time-series patterns are sharper in the production sector. The production work force is 60 percent higher after 10 years of experience relative to initial levels. Similarly, at 10 years' experience, the proportion employed as production workers has grown by 1.7 percent per year. The other large nonagricultural employer--sales--exhibits life-cycle and secular³ patterns quite similar to those in agriculture. Although total employment in sales is stable as experience increases, the entry level position--salesman--drops off sharply, being offset in part by an increased representation by proprietors in wholesale and retail trade. Similar to the worker-farmer progression for Malays in agriculture, many Chinese eventually move up from jobs as assistants and helpers in shops to shop ownership, but the gestation period of working in a family-owned sales business is considerably longer than it is in agriculture.⁴

³ Prior to the 1966-1970 cohort, relative sales employment was relatively stable across cohorts. After that cohort, employment drops off sharply.

⁴ The smaller occupational categories can be summarized briefly. The professional work force has grown over time, but life-cycle change is minor. Forty-eight percent of professionals are teachers. The teaching profession is distributed by race roughly in proportion to the

Multiple job holding is common in the Malaysian labor market, particularly in rural areas, where more than one-third of the work force reports dual employment.⁵ While this phenomenon has changed little over time, the fraction of men who report more than one occupation triples by the time a work cohort has achieved 30 years of experience. (See Table 8.)⁶

During the first year of market experience, 90 percent of second jobs are in agriculture, largely on family-owned farms. (See appendix Table A.2.) As careers proceed, the percentage of second jobs in agriculture declines rapidly, while those in service and production

ethnic distribution of the total population. The service sector exhibits both a strong negative life-cycle and secular trend. These service jobs are primarily protective service (e.g., military for Malays and Indians) so that the life-cycle decline is not surprising. The secular trend may be distorted if those currently in the military are undersampled. Finally, the clerical sector exhibits little life-cycle or secular trend.

⁵ The following two tables list the frequency of multiple jobs by sector, and the proportion of those with second jobs in agriculture by sector.

PROPORTION OF MEN WITH TWO OR MORE JOBS
BY MAIN OCCUPATION CLASSIFICATION

Professional, Administrative, & Clerical	Sales	Service	Agriculture	Other Labor	Production
19.9	15.3	10.0	36.9	23.2	9.6

PROPORTION WITH SECOND JOB IN AGRICULTURE BY SECTOR

14.8	35.0	0.0	70.1	73.7	31.0
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⁶ Virtually all people who reported multiple jobs listed only 2 jobs. These data on multiple jobs do not include the small home plots in vegetables and fruits which are very common in rural areas. It is possible that people forget jobs they held in the more distant past; but the cross-sectional experience profile in 1976 (the main diagonal in Table 8) also indicates a rising experience profile (these responses refer to the same time period in the past in relation to the time of interview). The cross-sectional profile could reflect a cohort effect, but the complete Table 8 makes that seem unlikely. However, the last diagonal elements in Table 8 are numerically the largest. This may reflect the memory effect, with current second jobs more likely to be reported than those in the past.

Table 8
 PROPORTION WITH 2 OR MORE JOBS BY COHORT
 YEARS OF EXPERIENCE

Initial Year of Market Experience	1	5	10	15	20	25	30
1971-1975	6.3						
1966-1970	5.8	10.6					
1961-1965	9.4	9.4	11.1				
1956-1960	8.1	12.6	12.1	17.2			
1951-1955	7.2	8.4	11.4	12.7	17.5		
1946-1950	5.6	8.7	9.3	13.6	18.0	22.3	
1941-1945	10.5	9.7	9.7	10.5	12.1	11.3	19.4

increase. This life-cycle pattern results not from a change in occupation of men who initially held second jobs, but from the fact that men who obtain second jobs later in their careers are less likely to select agricultural work.

Job Mobility

Most well-functioning labor markets are characterized by mobility among firms and occupations--especially by the young--and Malaysia is no exception. Table 9 lists cumulative numbers of job changes within labor market cohorts. Between the time of labor market entry up to 35 years of experience, the typical Malaysian male held more than four distinct jobs. While the extent of inter-job turnover is less than in the highly mobile U.S. labor market,⁷ Table 9 depicts a reasonably fluid market with workers not tied inexorably to their initial or second employers.

The average turnover in Table 9 is not simply due to a few highly mobile workers, with the majority of the labor force inert. While heterogeneity does exist in mobility probabilities, most workers

⁷ Bartel and Boras report that the typical male worker in the U.S. had 7.6 jobs after age 20.

Table 9

CUMULATIVE NUMBER OF JOB CHANGES BY EXPERIENCE

A. Total Sample

Year of Initial Work Experience	Number of Job Changes by x Years of Experience						
	5	10	15	20	25	30	35
1971-1975	.91						
1966-1970	.37	1.38					
1961-1965	.44	1.40	2.32				
1956-1960	.34	1.26	1.85	2.37			
1951-1955	.27	1.05	1.61	2.12	2.53		
1946-1950	.30	1.17	1.74	2.12	2.50	2.84	
1941-1945	.23	1.01	1.48	1.79	2.34	2.73	2.87
All	.35	1.25	1.87	2.35	2.73	2.99	3.13
Changes within experience intervals	.35	.90	.62	.48	.38	.26	.14

B. Sample Separated into Agriculture-Nonagriculture Employment

A = Agriculture; NA = Nonagriculture

1971-1975	A ^a	.50						
	NA	1.31						
1966-1970	A	.31	1.17					
	NA	.41	1.57					
1961-1965	A	.38	1.06	1.83				
	NA	.47	1.55	2.53				
1956-1960	A	.27	.94	1.44	1.78			
	NA	.41	1.53	2.19	2.84			
1951-1955	A	.17	.93	1.31	1.74	2.09		
	NA	.32	1.12	1.77	2.32	2.77		
1946-1950	A	.24	.91	1.33	1.62	2.00	2.24	
	NA	.34	1.31	1.97	2.41	2.78	3.17	
1941-1945	A	.05	.66	1.10	1.43	1.71	2.10	2.29
	NA	.38	1.32	1.82	2.45	2.89	3.27	3.38
All	A	.25	.93	1.43	1.65	1.93	2.17	2.29
	NA	.41	1.39	2.08	2.50	2.80	3.21	3.38

^aAn individual is placed in agriculture if he was employed in agriculture for at least half of his first five years of market experience.

participate in the process.⁸ Evaluated at 10 years of market experience, 7 in 10 Malaysian workers had switched jobs at least once. This proportion increases to 8 in 10 at 20 years' experience and, by the time we stop observing the oldest cohorts fully, 95 percent of men have changed jobs, and 70 percent have done so twice or more.

Over their careers, those who start as agricultural workers average about 1 job change less than their nonagricultural counterparts. The turnover within rural areas is not limited to movement from one farm employer to another. On average, 60 percent of all job changes for the agricultural work force in Table 9 involve transitions between agricultural and nonagricultural employments.⁹ While these figures do

⁸ As illustrated in the following table:

Distribution of Job Changes by Number of Jobs

Number of Jobs Per Person	Years of Experience		
	10	20	35
0	.31	.14	.06
1	.38	.31	.23
2	.18	.23	.19
> 3	.13	.33	.52

⁹ This point is illustrated for the 1946-1950 cohort of agricultural workers:

Cumulative Number of Job Changes

	Years of Experience					
	1	5	10	15	20	25
All job changes	.24	.91	1.33	1.62	2.0	2.24
Job changes not counting those within agriculture	.10	.55	.82	.91	1.26	1.33

not speak directly to the issue of the coexistence of dual labor markets, the two sectors certainly touch each other, at least through a large number of workers who had jobs at some point in both.

The life-cycle patterns are remarkably similar to those reported in industrialized Western economies. In particular, labor market turnover peaks early in the career (between 5 and 10 years of experience,) and declines steadily after that point. Following the dissolution of initial matches, the cementing of the attachment of workers and jobs as the accumulation of specific human capital proceeds and the investment horizon shortens appears pervasive in countries as different as Malaysia and the U.S. Explanations for the mutual attachment of workers and firms that rely primarily on the mature and industrialized nature of the U.S. economy will not find the Malaysian experience comforting. A less conventional pattern in Table 9 is that job mobility appears to increase as we move toward more recent cohorts. Given the rapid rate of economic growth and the dynamic character of the Malaysian economy, this result should not be surprising.

The turnover recorded in Table 9 encompasses all types of job separations from an employer. One-third of these separations are changes within the same detailed occupational code to a different employer, while 60 percent reflect movement between the broad occupational categories we have employed in this report.¹⁰ In the early stages of the career, job changes most commonly involve switches between broad occupational categories. In the mature phases of the career, separations within occupations are as frequent as those between. As

¹⁰ The broad occupational categories do not include changes within either agriculture or sales. Proportions of males who changed jobs within experience intervals are as follows:

Job Changes	Experience Interval		
	1-5	16-20	26-30
Total	.27	.36	.28
Fraction of job changes between:			
Broad occupational categories	.62	.57	.43
Detailed occupation categories	.10	.09	.14
Job changes within detailed occupation	.29	.34	.43

careers mature and skills become more specific to those jobs held in the past, the worker's incentive is to concentrate mobility within ever-more narrow occupational clusters.

Residential Mobility

When they switch jobs, many Malaysian males will simultaneously move to a new place. While location and job mobility are by no means coincident, the two decisions are often intertwined as labor market expansions in booming areas induce net inflows of workers while contractions in other locations impel workers to relocate elsewhere. In addition to evaluating the role of migration within Malaysian labor markets, its implications for the urban-rural distribution of workers over careers and across calendar time are given special emphasis in this summary. Large flows of people from rural to urban areas are increasingly viewed as a necessary consequence of economic development. In addition, wages in urban labor markets are typically far above incomes in rural areas. Therefore, it is often alleged that rural to urban migration is an important reason for both life-cycle and secular increases in wages.

Table 10 lists the proportion of male workers in each labor market cohort who moved¹¹ at least once within each 5-year experience interval. These life-cycle patterns in Table 10 obey the most persistent law of migration--the concentration of migration among the young, and declining migration propensities with age. The proportion of men who migrate peaks before the 10th year of market work and falls to levels one-third of those obtained during the early part of the career. This life-cycle trend reflects diminishing incentives to change, as the time remaining to recoup the costs of a job or location change declines. Perhaps the most remarkable thing about Table 10 is the ability of recall data to pick up this well-established life-cycle shape. For example, those workers in the 1941-1945 cohort were able to remember 2.5 migrations that occurred 25 to 30 years ago for every one recorded during the most recent 5 years. While they constitute the extreme case, all other work

¹¹ Our Malaysian data count moves that last at least 3 months in duration so that short-term circular movement for seasonal and other temporary reasons are not recorded in these data.

cohorts reported more migration events the further back in calendar time they were asked about.

In contrast to these very regular life-cycle patterns, Table 10 gives little evidence of any secular drift in the volume of migration across labor market cohorts. This stability conflicts with the typical characterization of less developed countries, where the coexistence of economic development with large-scale movement of people and relocation of economic activity is dogma.

Table 11 lists the distribution of migration events evaluated after 10, 20, or 30 years of market work. In contrast to the almost universal participation of men in job mobility, many Malaysian males apparently never made any significant long-term move once they started work. Even after 20 years, fully fifty-five percent of men do not report any migration event of more than 3 months duration. However, for those men who do move at least once, the data tell a much different story. On average, we estimate that each male migrant will move more than five times by the time he completes 30 years of market work. Thus, our sample consists of two distinct populations. Half of all men are locationally inert and remain attached to the village or town in which

Table 10
PROPORTION OF MEN WHO MIGRATE
BETWEEN FIVE-YEAR WORK EXPERIENCE INTERVALS

Initial Year of Work Experience	Experience Interval					
	1-5	5-10	10-15	15-20	20-25	26-30
1971-1975	38.5					
1966-1970	21.3	23.6				
1961-1965	27.3	28.6	18.2			
1956-1960	32.7	27.5	18.7	13.5		
1951-1955	27.3	30.0	22.0	16.7	12.7	
1946-1950	26.6	25.3	24.7	16.9	11.0	8.4
1941-1945	24.3	29.7	19.8	19.8	12.6	10.8
All cohorts	27.6	27.6	20.7	16.4	12.0	9.4
All Malays	30.0	27.9	23.0	16.4	11.6	10.9
All Chinese	25.2	27.1	18.5	14.7	11.1	6.9

Table 11

DISTRIBUTION OF MEN BY NUMBER OF MIGRATIONS

Number of Migrations	Number of Years of Market Experience		
	10	20	30
0	62.4	55.8	55.8
1	11.9	7.0	5.7
2	10.6	12.3	7.6
3	5.9	8.2	9.1
4	3.9	5.2	5.6
5	2.7	4.1	4.9
6+	2.7	7.3	17.3
Migrations per male	0.98	1.54	1.85
Migrations per male migrant	2.59	3.48	4.18

they started work. In contrast the other half of the population moves frequently from place to place, with more than 4 in 10 of these men migrating six times or more.

The aspect of migration that has received the most attention in the development literature is the massive rural to urban stream that has taken place in many less developed countries over the last 20 years. In many of these countries, large cities were formed, while the population of other cities doubled or tripled in relatively short periods of time. Indeed, so widely held is this association that the possibility of sustained economic growth without urbanization is never discussed. However, Malaysia turns out to be a dramatic counterexample. Stratifying by the urban-rural nature of place of origin, Table 12 presents the distribution of migrants by the urbanness of their destination.¹² The most common flow is for migrants to move to new

¹² Malaysia is divided into 70 districts and each district was assigned a code indicating the degree of urbanization in 1976. The urbanization divisions we used were: Kuala Lumpur, the capital and principal city; Ipoh and Penang, the next two largest cities; other urban areas; rural areas; and foreign countries. More precisely, for current residence, we also know the primary sampling unit (PSU) (i.e., village or town) that the household lived in at the time of the survey.

Table 12

DESTINATION OF MIGRATION BY PLACE OF ORIGIN
(5 YEAR INTERVALS)

Origin	Destination			
	Large City	Other Urban	Rural	Foreign Country
Large city ^a	50.5	22.2	24.4	3.3
Other urban	17.5	43.9	33.4	1.5
Rural	13.8	23.9	60.9	1.3
Foreign country	18.6	53.4	20.9	7.0

^aIncludes Kuala Lumpur, Ipoh, and Penang.

places that are quite similar in their urbanness to the areas they left.¹³ For example, 60 percent of all rural migrants relocate in another rural district while 40 percent of migrants from other urban areas move to a district also labelled other urban. This partly reflects return migration within the five-year period to the original district or village, or very short-distance moves that stay within

Thus, for the period of time spent in the current PSU, we have a much more precise fix on the urban-rural character of actual places where the respondent lived. In this research we used the PSU codes during the time periods we had them and the district codes for all previous locations. Since districts are much larger and span more heterogeneous areas that often include urban and rural subcomponents, our urbanization codes are less precise at the district than at the PSU level. It must be remembered that the urban-rural codes describe the districts as they were in 1976. The urbanization of districts that occurred over time is a different phenomenon than the migration question discussed in the text.

¹³ The number of migration events that underlie the data summarized in Table 12 are:

Origin	Large City	Other Urban	Rural	Foreign Country	Total
Large city	87	40	44	9	180
Other urban	47	118	90	14	269
Rural	41	71	181	4	297
Foreign country	8	23	9	3	43
Total	183	252	324	30	789

district boundaries. Yet, the most surprising trend occurs among migration flows that do involve a change in urban-rural status. In contrast to the normal assumption, the major direction of people is from urban to rural areas. While a quarter of migrants from rural districts go to more urban districts, one third of all other urban (at origin) migrants move to districts listed as rural. Malaysia, then, is an example of a developing country where the net transfers are from urban to rural areas.¹⁴

Table 13 summarizes the implications of this internal migration for cohort and life-cycle residential distribution of male workers. These distributions are evaluated during their first year of work and for the last that we observe them working. In light of the previous tables, it is not surprising that work cohorts are not becoming more urban over their life cycles. Indeed, if there exists any trend, it may be the reverse. Similarly, we fail to detect much of a secular trend in the urban-rural division of the population. If more recent cohorts of Malaysians live in more urban settings than their more immediate predecessors, the reason must be the increased urbanization of areas rather than the redistribution of people from rural to urban places.

Labor Supply

An increasingly discredited description of labor markets in less developed countries is that they function in a state of chronic labor surplus, particularly in rural areas, with large numbers of the labor force semi-idle. A corollary of this view has been that output could be significantly increased simply by creating productive outlets for the rural labor force. The Malaysian data add to the growing volume of evidence that this description is factually inaccurate.

Table 14 lists reported weekly hours worked stratified by occupation and race. The average workweek is long--50 hours--with little difference in work effort between the agricultural and nonagricultural sectors. Although the means are similar, the two sectors differ in the distribution of hours. Production work is more

¹⁴ The country has, of course, become more urban over time, but this is a result of the urbanization of areas and not net population transfers from rural to urban areas.

Table 13

RESIDENTIAL DISTRIBUTION OF MEN
DURING INITIAL AND FINAL WORK EXPERIENCE YEAR

<i>Location</i>	<i>A. 1971-1975 Cohort</i>		<i>E. 1951-1955 Cohort</i>	
	1 [a]		1 [a]	20 [b]
Kuala Lumpur	12.5		8.1	10.0
Ipoh and Penang	8.3		9.4	12.0
Other urban	20.8		20.8	24.7
Rural	58.3		57.0	53.3
Foreign country	0.0		4.7	0.0
	<i>B. 1966-1970 Cohort</i>		<i>F. 1946-1950 Cohort</i>	
	1 [a]	5 [b]	1 [a]	25 [b]
Kuala Lumpur	12.7	12.4	7.2	9.1
Ipoh and Penang	11.6	8.9	11.8	13.6
Other urban	18.6	23.6	30.9	26.0
Rural	55.8	53.9	48.0	50.1
Foreign country	1.2	1.1	2.0	0.6
	<i>C. 1961-1965 Cohort</i>		<i>E. 1941-1945 Cohort</i>	
	1 [a]	10 [b]	1 [a]	30 [b]
Kuala Lumpur	7.9	7.8	6.3	6.3
Ipoh and Penang	15.1	13.6	9.9	9.0
Other urban	30.9	27.9	29.7	24.3
Rural	42.1	46.1	46.8	59.5
Foreign country	3.9	4.5	7.2	0.9
	<i>D. 1956-1960 Cohort</i>			
	1 [a]	15 [b]		
Kuala Lumpur	7.1	9.9		
Ipoh and Penang	11.3	14.1		
Other urban	26.2	25.1		
Rural	54.1	49.7		
Foreign country	1.2	1.2		

[a] Initial year of work for that cohort.

[b] Final year of work that we observe for that cohort.

Table 14
WEEKLY HOURS WORKED

Occupation and Race	Percentage Who Worked:			
	Average	Less Than 3 Hours	More Than 60 Hours	More Than 41 to 50 Hours
Professional, administrative, and clerical	42.0	21.3	5.1	41.2
Sales	62.6	5.9	50.4	22.9
Services	55.3	0.0	60.0	26.7
Agriculture	49.4	14.4	20.1	32.9
Farmers	49.3	17.0	23.9	34.1
Agricultural workers	46.3	16.7	12.5	37.0
Other labor	48.8	0.0	9.8	69.5
Production	50.8	4.8	17.0	56.1
Malay	48.8			
Chinese	53.8			
Indian	48.6			
All men	50.6			

Years	Cohort						
	1	5	10	15	20	25	30
1971-1975	45.94						
1966-1970	43.06	47.12					
1961-1965	46.98	48.07	49.10				
1956-1960	48.57	48.56	50.55	50.79			
1951-1955	44.53	46.16	50.05	49.75	49.26		
1946-1950	51.39	49.36	49.85	51.31	52.14	52.32	
1941-1945	51.39	51.47	53.63	52.03	50.72	51.63	52.45

standardized, with most workers in the 40-50 hours interval.¹⁵
Agricultural hours exhibit considerably more variance, with a

¹⁵ By far the most common response for hours is 48 (6-day week, 8-hour day--20.7 percent of the sample). The next most common are 42 hours (9.5 percent) and 56 hours (7.2 percent). The Malaysian data only report hours for all jobs, so that it is not possible to provide separate statistics for first (main) job and other jobs.

significant proportion of men working less than 30 or more than 60 hours per week. The two occupations with the longest workweek are services and sales, with sales averaging more than 60 hours per week. These long hours among sales workers are also reflected in ethnic differences, with the Chinese working 5 hours more than the other two ethnic groups.

The second part of Table 14 lists life-cycle hours by work cohort. The workweek tends to lengthen over careers by about 2 to 4 hours. This increase reflects mainly the elimination of weekly hours less than 30, rather than any expansion in the number of men working more than 60 hours. In data not shown here, this life-cycle pattern is concentrated among agricultural workers, consistent with the previously mentioned tendency to take on second jobs over the career.

Complementing this information on weekly hours, respondents were also asked how many weeks they worked during the year (see Table 15). Almost 90 percent of all workers report full-year work, with only slightly lower proportions (85 percent) in agriculture and production. Only five percent of agricultural employees work only half a year or less.

INCOME

It is appropriate to conclude this descriptive summary of Malaysian labor markets by looking at trends in income. Of all the characteristics of labor markets that one can study, the impact of economic development on the earnings of workers is certainly the most critical. This will also serve as a bridge to Sec. IV, which presents our statistical analysis of the determinants of Malaysian male incomes.

Table 16 lists life-cycle profiles of nominal and real¹⁶ monthly¹⁷

¹⁶ With the exception of two episodes, the Malaysian economy experienced remarkable price stability, with a price index no higher in 1970 than it was in 1950. Between 1949 and 1951, prices rose over 30 percent and in the four years after 1972, prices rose by 47 percent. Although these two episodes are short, they may well create problems with this retrospective data. First, the interview took place in 1976, following 4 years of rapid nominal price and wage increases. The late 1940 period is also troublesome since we are surely taxing the respondents' ability to remember such conditions 25 years in the past. In this research, real incomes are expressed in 1970 Malaysian dollars.

¹⁷ Because earnings were reported in different time intervals, it

Table 15
 WORKERS NOT WORKING A FULL YEAR IN 1976, BY OCCUPATION

Occupation	% Who Do Not Work Full Year	% Who Work 3/4 of Year or Less	% Who Work Half Year or Less
Professional, administrative, and clerical	7.4	2.3	0.7
Sales	9.3	1.5	0.0
Services	13.3	0.0	0.0
Agriculture	15.2	7.5	3.9
Farmers	11.3	8.0	4.6
Workers	15.2	8.1	4.3
Other labor	8.6	3.7	1.2
Production	15.0	4.9	0.9
All occupations	12.6	5.0	1.9

income¹⁸ by labor market cohort. Incomes across any row represent the actual life-cycle history of wages for those labor market cohorts indexed in the first column. Reading up any column measures across-cohort wage growth at

was necessary to standardize wage receipts to conform to a common monthly equivalent. Seventy percent of the sample reported their income on a monthly basis. If we add the two next most common intervals, daily and yearly, we account for over 97 percent of the sample. To minimize the number of observations we must adjust, a monthly payment interval was adopted. The following conversions were used to achieve a common reporting time frame:

- (1) Per hour: x hours worked per week x 4.345
- (2) Per day: x appropriate unit^a x 4.345
- (3) Per week: x 4.345
- (4) Per fortnight: x 2.1725
- (5) Per year: /12

^a Appropriate unit depends upon hours worked; if <20, 3 days; 20-29, 3-1/2; 30-39, 4-1/2; 40-50, 5; 50-59, 5-1/2; 60-69, 6; 70+, 6-1/2. Finally, we standardize monthly income by the proportion of weeks worked during the year.

¹⁸ Direct wage payments and the monetary value of all bonus or in-kind income were summed to obtain the total monthly income. Forty-one percent of the sample received either bonus or in-kind payments, most commonly, in the form of a yearly bonus or food and housing payment in kind.

Table 16

MONTHLY INCOME BY LABOR MARKET COHORTS

Initial Years of Market Experience	Years of Experience					
	1-5	6-10	11-15	16-20	21-25	26-30
<i>A. Mean Nominal Monthly Income</i>						
1971-1975	243.0					
1966-1970	129.0	248.8				
1961-1965	123.5	185.9	295.8			
1956-1960	112.6	163.8	229.2	287.0		
1951-1955	96.2	143.6	188.0	231.2	333.4	
1946-1950	100.3	137.6	221.4	207.1	226.3	279.2
<i>B. Mean Real Monthly Income</i>						
1971-1975	196.1					
1966-1970	131.2	203.5				
1961-1965	132.7	190.8	247.0			
1956-1960	122.7	176.2	233.9	242.0		
1951-1955	102.2	156.0	202.6	236.6	281.9	
1946-1950	137.0	141.1	240.2	222.9	231.7	236.7
<i>C. Median Real Monthly Income</i>						
1971-1975	144.5					
1966-1970	106.8	137.8				
1961-1965	96.8	140.4	172.6			
1956-1960	93.9	124.2	175.0	159.7		
1951-1955	77.5	110.4	144.4	152.0	157.5	
1946-1950	85.2	104.4	143.9	160.2	172.2	172.2

given levels of market experience. Finally, beginning with the 1-5 experience column, the numbers arrayed down any diagonal capture the cross-sectional wage profile we presumably would observe in the calendar years attached to the first five years of work.

Consider, first, actual life-cycle paths for individual cohorts. Real monthly income rises with years of experience, but rates of wage growth diminish as time spent in the labor market lengthens. This quadratic-like wage growth mirrors the standard empirical finding for

the U.S. The theoretical rationale in terms of optimal paths of investments is the most straightforward implication of any human capital model. (See Ben-Porath [1967] and Mincer [1974].) Note that the actual experience-related wage growth consistently exceeds that which we would predict from any of the cross-sectional wage profiles. However, the observed life-cycle growth does not reflect only individual investment decisions. Economy-wide productivity growth over time will also increase a cohort's income as time (or experience) accumulates.

Table 16 also demonstrates the existence of cohort effects in these data. More recent labor market cohorts have wage profiles that lie above earlier ones. The noise in the data does not permit one to speculate, based on Table 16 alone, on differential timing of cohort growth or non-neutralities across experience levels. The rather large difference between median and mean monthly income attests to the substantial skewness in the income distribution. The difference between mean and median income tends to expand with experience, reflecting the fanning out of individual wage profiles as experience increases.

IV. COHORT AND LIFE-CYCLE WAGE GROWTH

This section presents our statistical analysis of the determinants of life-cycle and cohort wage growth for male Malaysian workers. The purpose is to quantify the main consequences of economic development for the earnings and employment patterns we observe within labor markets. To achieve this goal, we attempt to detect how the benefits of economic growth were distributed between the young and the old, the more and less educated, rural and urban areas, and among Malaysia's three main ethnic groups. An equally important but more difficult aim of this research is to identify the factors that were the main contributors to Malaysia's success. To that end, we test a number of hypotheses about the underlying determinants of economic development.

To interpret the empirical results that follow, a useful conceptual taxonomy separates the determinants of individual wages into vintage, experience, and time effects. Vintage effects encompass all factors that make generations of workers who start their labor market experiences at different times have different lifetime earnings capacities. Under this rubric, we traditionally place rising levels of education, or improvements in its quality, as well as all family background variables. In part, experience effects encompass all factors--health, migration, job skill acquisition--associated with the life-cycle aging process. Experience effects will partly reflect individual decisions to invest in augmenting skills over the life cycle. In addition to the incentives to concentrate these investments in the early stages of the career, this process depends also upon individual differences in investment efficiency and the availability of complementary inputs and knowledge. Finally, time effects measure alterations in average productivity of workers in the labor market at time t compared with those at a different time t . These time effects derive from short-run business-cycle vagaries as well as from more permanent influences due to advances in technology or knowledge, and from exogenous structural changes that may impinge on the aggregate economy.

Since these effects are likely to be interrelated, this taxonomy should not be interpreted too rigidly. For example, incentives to invest on the job may well be altered by initial human capital stocks.¹ In addition, technological improvements are not costlessly embodied in people or in productive processes. To illustrate, there is some evidence that more educated workers have a comparative advantage in adapting to change in a dynamic environment (see Welch, 1971). If so, at least in timing, incomes of the more educated may be affected first before new knowledge filters down to alter incomes of less educated workers. Similarly, younger workers, with much of their job investment before them, may more easily absorb new technologies. In contrast, the skills of older workers may be tied to the increasingly obsolete old technology.²

The dependent variable we employ for our analysis is the \ln of monthly income. Observations from all years beginning in 1949 are included in these regressions.³ The statistical model we use allows for three error components: an individual-specific, a time-specific, and a standard transitory error component that is uncorrelated over individuals and across time. Maximum likelihood variance components for unbalanced design data⁴ are used to capture persistent unobserved

¹ However, in the most famous of such models--the Ben-Porath variant--investment paths are neutral with respect to levels of initial stocks.

² Some empirical support for these interactions is reported by Weiss and Lillard using U.S. data on scientists. They found that earnings growth rates at a given year of experience were higher for those of more recent vintages (or equivalently, men observed at a later date.)

³ Years prior to 1949 were excluded because a price deflator did not exist before then. More important, the 1940s were obviously dominated by the Japanese occupation and the post World War II recovery--events that distort the more general development lessons we seek.

⁴ The following table summarizes the distribution of the number of employment observations per male:

<i>Number of Observations</i>	<i>Number of Men</i>
1	0
2-4	25
5-9	281
10-14	427
15-19	250
20-24	55
25+	9
Total	1,047

individual effects that are uncorrelated across individuals.⁵ Although a similar specification could have been used for the time component (i.e., a random component correlated across individuals in the labor market at time t , but uncorrelated over time), we opted for simplicity by implicitly treating the time component as a smooth, linear, fixed effect. Given the retrospective design of the data, this statistical specification could be questioned. Retrospective wage data probably have larger variance, the greater the demands on memory. This consideration argues for heterogeneity, an extension that was not yet explored.

Table 17 lists earnings functions that rely principally on time-indexing to measure effects. Since the cohort index is suppressed, the linear experience term measures the difference between experience and cohort, while the time trend captures the sum of cohort and time effects. The first two columns involve a simple comparison using \ln nominal and \ln real monthly incomes as the dependent variable. These estimates imply that nominal income grew at an average rate of 4.1 percent per year, while deflated income grew by 2.4 percent per year. This real income growth compares astonishingly well with a 2.3 percent annual growth in real per-capita Malaysian Gross Domestic Product between 1950 and 1973, as reported in published national accounts data. Ethnic differences in average incomes are enormous. Indians earn 60 percent more than Malays ($e^{.469} - 1$), and Chinese earn 108 percent more than Malays ($e^{.732} - 1$). Finally, the estimate of ρ --the intra-worker correlation coefficient in income--indicates that in this simple specification, 60 percent of residual variance consists of permanent

⁵ Contrary to the assumption inherent in random effects specification, one can, with little difficulty, conjure up reasons why the regressors will be correlated with the unobserved individual component. In addition, research on earnings dynamics suggests that individual components are better approximated by a combination of a purely persistent and an autoregressive error. Correlation in individual earnings do decay over time (unlike the simple permanent transitory scheme), but at a less rapid rate than a first-order autoregressive error implies.

Table 17

WAGE REGRESSIONS--SIMPLE SPECIFICATION

(t statistics in parentheses below coefficient)

Variable	Nominal Monthly Income		Real Monthly Income	
Constant	3.476 (85.8)	3.726 (92.0)	3.323 (69.9)	3.358 (56.0)
Experience	.0452 (14.7)	.0475 (15.4)	.0623 (20.1)	.0592 (12.9)
Experience ²	-.0011 (20.6)	-.0012 (22.3)	-.0013 (22.7)	-.0007 (6.06)
Time	.0406 (16.2)	.0237 (9.49)	.0093 (3.70)	.0153 (3.01)
Indian	.4714 (6.04)	.4691 (6.01)	.3698 (5.16)	.3800 (5.26)
Chinese	.7287 (13.8)	.7321 (13.8)	.6376 (13.1)	.6454 (13.1)
Education			.1008 (13.9)	.0653 (6.60)
Education x time				.00133 (1.96)
Education x experience				.0007 (1.01)
Experience x time				-.0009 (4.89)
P	.592	.600	.552	.559
Log likelihood	-42619	-42591	-42504	-42483
R ²	.29	.17	.19	.19

unobserved individual differences in earnings capacities.

In the third column of Table 17, we move away for the first time from simple time indexing. The estimated rate of return of 10.1 percent per year of additional schooling compares quite favorably with that obtained from micro data in the U.S. More important, if one views education (for the moment) as the vehicle through which cohort effects operate, comparison of Columns 2 and 3 indicates that the time-related growth in earnings can be split roughly in half between the effects of cohort improvement and economy-wide productivity growth with time. Or alternatively, if we condition on education, the combined effect of cohort and time-related growth is reduced by 60 percent.

The last column in Table 17 represents a simple attempt to detect the presence of interactions between cohort, time, and experience effects using education as a simple proxy for cohort.⁶ Given our discussion above, the signs of the three interactive variables agree with a priori expectations. The positive education-time interaction can be interpreted to mean that better educated workers benefit more from the introduction of new knowledge and technology over time. Similarly, the positive (albeit statistically insignificant) experience-education interaction implies that more educated workers enjoy larger earnings growth over their careers (i.e., schooling increases an individual's investment efficiency in on-the-job investments). Finally, the strongly significant negative time-experience interaction is consistent with the

⁶ This match of education with cohort should not be stretched too far. Clearly, the simple interpretation in the text assumes that the specification in column 4 includes all the relevant interactions. As one would expect, the standard identification problem becomes more complicated when one allows for interactions.

$$\text{Let } y = a_1 e + a_2 t + a_3 c + a_4 ec + a_5 tc + a_6 et \\ + a_7 e^2 + a_8 t^2 + a_9 c^2$$

Suppressing the cohort index, this reduces to

$$y = (a_1 - a_3)e + (a_2 + a_3)t + (a_4 + a_6 - a_5 - 2a_9)te \\ + (a_7 + a_9 - a_4)e^2 + (a_8 + a_9 + a_5)t^2$$

There are nine parameters and only five independent variables.

notion that younger workers benefit more from advances in technology and knowledge. In dynamic, growing economies, it apparently is the more educated and young who benefit and contribute the most.

Much of the recent emphasis on growth with equity rests on the presumption that the rewards of growth can be concentrated on the few, leaving the many, particularly the poorest of the poor, unaffected. In Malaysia, as in most developing countries, this concern about the distribution of the benefits of growth touches rawer nerves than does the question of whether the young or more educated gain more than others. We address part of these issues by examining differential trends by urban-rural areas (in Table 18) and among Malaysia's three ethnic groups (in Table 19).

Table 18 expands our basic earnings function by introducing a set of indicator variables for type of location. Following the development in Sec. III, we introduce dummy variables for residence in Kuala Lumpur; Ipoh or Penang; other urban areas; and foreign countries. The left-out group are those living in rural areas.⁷ In the second column of Table 18, we interact these indicators of urban residence with time and the experience quadratic.⁸ On average, residents of urban places earn from 12 to 25 percent more than those in rural areas.⁹ However, column 2 of Table 18 demonstrates that these regional income differentials were not constant over time or over labor market careers. Not surprisingly, income experience profiles grew at a 2 percent more rapid rate in urban areas than in rural ones. The more novel result involves the

⁷ While these locational indicators signify place of residence at the time of our income observation, so that they vary across time and people, the separation of districts into the other urban and rural areas is based on their states in 1970. Thus, we do not allow a given district to change its classification over time.

⁸ For simplicity, time and experience are interacted with residence in any nonrural place. In a more detailed specification, we permitted the effects of time and experience to vary within each of the urban dummies used in Table 18. We did not find any significant differences among the urban places, so the more parsimonious specification of Table 18 is presented in the text.

⁹ This range spans the 25 percent advantage of residents of Kuala Lumpur to the 12 percent premium received in Ipoh and Penang. Most of the foreign residence consists either of Singapore in more recent times, or China in times past.

Table 18

WAGE REGRESSIONS TESTING URBAN GROWTH

(t statistics in parentheses below coefficients)

Variable		
Constant	3.2945 (70.2)	3.398 (68.8)
Experience	.0624 (20.3)	.0563 (17.6)
Experience ²	-.00125 (22.7)	-.00179 (19.3)
Time	.0099 (4.01)	.0074 (2.85)
Indian	.3465 (7.03)	.3349 (4.77)
Chinese	.6017 (12.4)	.6014 (12.5)
Education	.0945 (13.1)	.0940 (13.1)
Kuala Lumpur	.2213 (4.80)	-.0828 (1.45)
Ipoh and Penang	.1158 (2.98)	-.1964 (3.80)
Other urban	.1409 (5.03)	.0502 (1.18)
Foreign country	.1817 (2.74)	-.0423 (.59)
Time x any urban		.0054 (2.76)
Experience x any urban		.0204 (6.32)
Experience ² x any urban		-.00003 (1.29)
p	.5406	.5421
Log likelihood	-42481	-42435
R ²	.19	.20

Table 19

WAGE REGRESSIONS--ETHNIC DIFFERENCES

(t statistics in parentheses below coefficients)

Variable	Chinese		Malays		Indians	
Constant	4.361 (99.5)	3.997 (63.9)	3.803 (73.1)	3.285 (46.0)	4.320 (61.3)	3.790 (41.7)
Experience	.0716 (16.2)	.0842 (18.5)	.0323 (6.67)	.0495 (10.1)	.0249 (3.49)	.0393 (5.87)
Experience ²	-.0017 (19.9)	-.0017 (2.02)	-.0010 (11.8)	-.0010 (12.0)	-.0006 (3.96)	-.0006 (3.97)
Time	.0188 (5.44)	.0068 (1.89)	.0268 (6.74)	.0101 (2.51)	.0232 (4.11)	.0087 (1.70)
Education		.0752 (7.81)		.1267 (9.96)		.1061 (7.90)
ρ	.519	.483	.628	.585	.590	.496
Log likelihood	-15749	-15721	-17446	-17401	-3852	-3826
R ²	.233	.241	.11	.12	.18	.22

differential time trend. Income grew one-half of one percent per year more rapidly in urban places than in rural ones. In 1949, the intercept year in these regressions, income differentials were almost nonexistent between rural and urban areas. However, as the Malaysian economy developed, income differences between urban and rural places emerged and expanded. Although average incomes in urban areas did grow more rapidly, Table 18 demonstrates that rural areas shared in the income benefits from growth. Per capita incomes in rural areas grew at 0.7 percent per year compared with 1.3 percent in urban places.¹⁰

¹⁰ One puzzle emerging from these results is why the increasing income disparity between rural and urban areas did not generate any large net migration from rural to urban places.

Table 19 presents estimates of these simple earnings functions separately for Malays, Chinese, and Indians. The most important comparison involves Malays and Chinese, where ethnic differences exist in both career-related wage growth and time-related wage growth. By far the largest difference is the much more rapid earnings growth for Chinese over their careers than for either Malays or Indians. The differences in intercepts alone predict a 74 percent income premium for Chinese (in 1949). However, we estimated that this income advantage of Chinese over Malays would grow to 186 percent by the time these men had 20 years of work experience. In this dimension of time--the passage of workers through their careers--Chinese advanced much faster than Malays. However, in the other time dimension--the pure passage of a calendar year--Malay incomes increased more than Chinese. We estimate that across calendar time, incomes of Malays actually grew at 0.8 percent faster than incomes of Chinese. These two dimensions of time--career and calendar year--are often confused. As a year passes, individuals move through both time dimensions simultaneously. Chinese progress much faster than Malays as careers unfold, but Malays catch up a little over calendar time if we compare people with the same amount of modest experience. The effect of career passage through time far exceeds that of pure calendar time. The size of the income advantage received by Chinese for another year of experience is five times as large as the relative gain for Malays as another calendar year ticks off. Table 19 also indicates large differences in the rates of return to schooling for Malays and Chinese, with the estimated schooling coefficient 5 percent higher for Malays.

Schooling and Family Background

Because questions concerning the role of schooling in the development process are so widespread, we concentrate in this section on empirical results that relate directly to the income-schooling nexus. Table 20 lists the distribution of school completion by male birth cohorts, while Tables 21 and 22 contain our statistical analysis of schooling.

Table 20

DISTRIBUTION OF SCHOOLING BY YEAR OF BIRTH

Level	Years of Schooling	Percentage in Schooling Interval by Birth Cohort						
		1925-29	1930-34	1935-39	1940-44	1945-49	1950-54	All
No formal schooling	0	20.3	15.2	11.3	7.9	3.2	3.5	10.3
Standards	1-3	20.3	25.0	22.6	15.7	10.1	10.5	17.8
Standards	4-6	44.9	46.3	41.0	48.7	42.9	48.8	45.1
Remove and forms 1-3	7-10	8.0	6.1	12.8	10.5	23.3	22.1	13.4
Forms 4-6	11-14	5.1	6.7	10.3	14.7	16.4	11.6	11.1
University	15+	1.4	0.6	2.1	2.6	4.2	3.5	2.4
Average schooling level		4.18	4.35	5.23	5.96	7.14	6.77	5.59
Percentage illiterate		26.8	30.5	25.1	18.8	8.5	11.6	21.6
Average schooling level of								
Father		1.86	1.82	1.98	1.69	2.50	2.14	1.93
Mother		0.45	0.59	0.59	0.59	0.80	1.30	0.63
Median age of cohort in 1976		49	44	39	34	29	24	

NOTE: In Malaysia, primary school consists of six grades, called standards. There follows a one-year "remove class" for students who change language of instruction between primary and secondary schools. Secondary education begins with lower secondary schooling of three years duration, called forms. To proceed further, a student must pass a country-wide exam, the lower Certificate of Education. At this point, students may follow a vocational track of two years duration leading to the receipt of a Malaysian Certificate of Vocational Education. Other students may follow an academic track of two years, forms four and five. These students may then take the Malaysian Certificate of Education examination. Students may then attend two years of pre-university training, upper and lower sixth forms. The remaining levels of schooling consist of university training.

Table 21

WAGE REGRESSIONS--FAMILY BACKGROUND VARIABLES

(t statistics in parentheses below coefficients)

Variable		
Constant	3.413 (57.0)	3.179 (52.8)
Experience	.0499 (16.7)	.0614 (20.1)
Experience ²	-.0012 (22.4)	-.0013 (22.7)
Time	.0221 (9.28)	.0108 (4.39)
Indian	.4086 (5.56)	.3423 (4.39)
Chinese	.5660 (10.7)	.5349 (10.7)
Kuala Lumpur	.2362 (5.06)	.2053 (4.45)
Ipoh and Penang	.1229 (3.13)	.0976 (2.51)
Other urban	.1519 (5.38)	.1339 (4.79)
Rural	.2046 (5.39)	.1710 (2.57)
Education		.0838 (11.35)
Father's education	.0132 (2.47)	.0123 (2.03)
Mother's education	.0216 (2.03)	.0091 (.90)
Number of siblings	.0020 (.21)	-.0008 (.09)
Father's occupation	.3427 (6.67)	.2264 (4.58)
p	.566	.533
Log likelihood	-42527	-42466
R ²	.18	.20

The twenty years between the late 1920s and the late 1940s witnessed a three-year increase in average schooling. For the earliest cohort presented, 1/5 of the men had no formal schooling, more than 1/4 were illiterate, and less than 15 percent attended school beyond the

primary level. In contrast, 90 percent of the men in the most recent cohort presented were literate, almost all had attended school, and 40 percent went beyond the primary level. University attendance remains quite rare, however. For the men in our sample, the relevant margin for school completion encompasses the decision to attend school at all, to complete the primary level, and, for the most recent cohorts, whether to go on to the secondary level. Table 20 also lists completed schooling of respondents' parents. Fully 88 percent of their mothers and 68 percent of their fathers never attended school. Average schooling was six-tenths of a year for mothers, and slightly less than 2 years for fathers. Where a rise in school-completion levels occurs among parents, it is quite modest.¹¹

Table 21 contains two schooling regressions. Both include family background variables, but the first excludes male education. The second specification measures the total effects of each background variable, including the indirect effect of family background through schools. When male education is included as a regressor, we are measuring only the direct effect of family background independent of all influences that mediate through schools.

¹¹ In appendix Table A.3, average schooling levels are listed for the three ethnic groups and by agricultural and nonagricultural workers. For all groups, education levels have risen as each new cohort of workers entered the labor market. Agricultural workers have about 2 years less schooling than nonagricultural workers, but the trends are similar. The Chinese have overtaken Indians to rank highest in school completion, and schooling levels have risen fastest among the Chinese. Almost all Malays and Indians were schooled in state schools, while the Chinese were split evenly between national and private schools. As the following distribution indicates, each race attended separate schools.

Language	Ethnic Group		
	Malay	Chinese	Indian
Malay	86.3	0.8	0.9
Chinese	0.0	79.0	0.0
Tamil	0.0	0.0	58.1
English	12.3	19.8	41.0
Type of School			
National	94.7	48.0	96.2
Private	2.0	51.7	3.8
Other	3.3	0.3	0.0

Table 22

WAGE REGRESSIONS--TESTING THE EFFECT OF SCHOOLING

(t statistics in parentheses below coefficients)

Variable			
Constant	3.398 60.1)	3.322 (50.1)	3.228 (42.9)
Experience	.0618 (20.2)	.0614 (20.1)	.0497 (10.1)
Experience ²	-.0013 (22.8)	-.0013 (22.8)	-.0007 (5.81)
Time	.0106 (4.31)	.0109 (4.43)	.0339 (6.12)
Indian	.3360 (4.83)	.3383 (4.87)	.3397 (4.84)
Chinese	.5683 (11.5)	.5726 (11.6)	.5764 (11.55)
Kuala Lumpur	.2170 (4.71)	.2133 (4.63)	.2330 (5.07)
Ipoh and Penang	.1051 (2.70)	.1014 (2.61)	.0782 (2.01)
Other urban	.1380 (4.94)	.1350 (4.82)	.1376 (4.94)
Foreign country	.1709 (2.57)	.1684 (2.54)	.2448 (3.67)
Education (0-6)	.0589 (4.97)	.0367 (2.41)	.0436 (2.57)
Education (7-12)	.1162 (7.45)	.1195 (7.64)	.0402 (1.82)
Education (13+)	.1823 (4.27)	.1807 (4.24)	.0096 (.13)
Father's education	.0132 (2.74)	.0125 (2.59)	.0125 (2.57)
Literate		.1953 (2.31)	.1911 (2.24)
Education (0-6) x time			-.0027 (3.28)
Education (7-12) x time			.0028 (2.91)
Education (13+) x time			.0069 (2.50)
Education x experience			-.0026 (3.40)
Time x experience			-.0010 (5.43)
p	.535	.534	.542
Log likelihood	-42469	-42464	-42415
R ²	.20	.20	.21

While the expanded set of background variables perform in the expected manner, they do not alter in any significant way the coefficients on the time and experience variables. Education of both parents, and an income index of father's occupation,¹² raise incomes, but there appears to be no impact of family size. However, when we control for own education, the only family background variable that matters is father's education. One interpretation is that measured family background variables such as mother's schooling mediate through education, but have little direct market payoff.¹³ Therefore, we have not enlarged the aggregate role of family background in Table 21, but merely parcelled out its influence among a more complete set of proxies.

Table 22 shows that the proportionate effect of schooling on income is itself highly nonlinear.¹⁴ Income rates of return are twice as large at the secondary level as they are at the primary level, and are larger still for those few who attended university. The second regression in Table 22 isolates one mechanism through which schools affect incomes. Literacy, a skill largely acquired in school,¹⁵ raises incomes by 20 percent. Literacy affects income benefits only at the primary level, reducing the direct effect of primary schools by almost 40 percent.

¹² This index was constructed from the detailed occupational codes for respondents' fathers. This index scales income relative to production workers, where the income weights were obtained from the 1976 cross-sectional wage by occupation of sons. Clearly, the main problem with this index is that with limited intergenerational occupational mobility, the index also captures wage differences by son's occupation.

¹³ This is consistent with the majority of research on status attainment using U.S. data. Of course, these regressions in Table 18 must not be taken too seriously since they ignore the endogeneity of the schooling decisions. In addition, this same literature reports that unmeasured family background variables have important direct effects (see Griliches, 1979.)

¹⁴ A splined schooling variable is used in Table 22, with the slopes of the linear segments allowed to differ at the primary, secondary, and university levels.

¹⁵ Illiteracy is defined as the inability to either read or write. As the following indicates, illiteracy is sharply reduced with the accumulation of the first few years of school.

This empirical result of rising rates of return with schooling level has a number of possible explanations. It may reflect real supply-side constraints if school construction has not responded rapidly enough to growth-induced demand. Second, it could capture the widely reputed excessive public sector wages for the educated elite. However, this explanation receives little support from ethnic-specific regressions, where the rising pattern with schooling level repeats itself within each ethnic group. No one has argued that the Chinese have had special access to public sector jobs in Malaysia. However, the third column of Table 22 suggests an alternative explanation. We see there that the positive time-education interaction occurs mainly at higher schooling levels. In fact, rates of return at the primary level appear to have fallen over time, while those at the secondary and especially university level have risen. If this interaction does capture a non-neutrality between improving technology and schools, this complementary may be more pronounced than the linear schooling variable indicates.

The Augmented Earnings Functions

Table 23 summarizes results with variables that purport to capture life-cycle wage progression and calendar-time-related productivity growth. The life-cycle variables we add to our simple specification fall into six classes: labor supply,¹⁶ health status,¹⁷ trade union

Proportion Illiterate by School Completion

Years of Schooling	Proportion Illiterate
0	81.8
1-2	60.9
3	28.6
4-6	8.1
7+	1.2

¹⁶ The three labor supply measures are ln weekly hours worked, the number of jobs, and a dummy variable for looking for work (i.e., unemployed). All three variables are retrospective and thus pertain to an individual's observation for each year.

¹⁷ The Health Status variable is derived from two questions: the existence of a physical illness or disability in 1976 and the duration in years of that illness. Therefore, we exclude any illness that did not exist in '976.

Table 23

WAGE REGRESSIONS--AUGMENTED SPECIFICATION

(t-statistics in parentheses below coefficient)

Variable		Variable	
Constant	-.0132 (0.19) -.6553 (.97)	ln weekly hours	.4513 (19.7) .4134 (.1188)
Experience	.0491 (14.9) .0368 (11.6)	Number of jobs	.1040 (4.02) .1141 (4.58)
Experience ²	-.0009 (14.0) -.0007 (11.3)	Looking for work	.1213 (3.13) .1050 (3.72)
Time	.0007 (0.12) -.0008 (.14)	Health disability	-.1213 (3.05) -.0860 (2.26)
Indian	.2963 (4.42) .2156 (3.39)	Trade union member	.1175 (4.27) .1360 (2.65)
Chinese	.5332 (11.6) .5667 (13.0)	Salaried employee	.8902 (29.2)
Education	.0842 (11.7) .0851 (12.5)	Self-employed	.8044 (23.3)
Kuala Lumpur	.2194 (4.92) .1837 (4.30)	Employer	.9904 (19.1)
Ipoh and Penang	.0928 (2.46) .0943 (2.61)	Exp in current job	.0001 (.22) .0007 (2.31)
Other urban	.1272 (2.47) .1243 (4.77)	Exp2 in current job	-.00002 (1.42) -.000003 (2.49)
Foreign country	.1888 (2.91) .1235 (1.98)	Training	.1864 (3.07) .0762 (1.32)
		Training x experience	.0265 (5.67) .0301 (6.71)
		Training x experience ²	-.0006 (3.92) -.0006 (4.16)
		Terms of trade	.1995 (3.85) .2093 (4.21)
		ln average yield per hectare of rubber estate	.2524 (2.16) .2464 (2.19)
		p	.523
		log likelihood	-42202
		R ²	.239
			.514
			-41775
			.301

membership, employment status,¹⁸ length of time spent in current job, and retrospective information on the existence and amount of formal job-related training. The variables in Table 23 seem appropriate since life-cycle wage growth will reflect, in addition to direct job investments, age-related changes in the extent of work, health status, and union membership. Our selection of these variables is also dictated by the description of Malaysian labor markets provided in Sec. III.

Both the possession of multiple jobs and, to a lesser extent, hours worked have a distinct, positive life-cycle trend. Both labor supply variables have a strong positive and statistically significant impact on monthly income, and life-cycle variation in labor supply contributes to career earnings growth. However, the overall contribution of labor supply is relatively modest. Conditioning on labor supply reduces career growth in monthly income by 5 percent. Those men who searched for work between their last two income observations are estimated to have 11 percent higher wages. While this wage premium probably reflects nothing more than selectivity, it is consistent with the spirit of the Harris-Todaro framework, in which wages and unemployment are positively correlated.

Because individuals are likely, as they age, to undergo deterioration in health, to migrate from rural to urban areas, and to become members of trade unions, each variable could alter life-cycle wage profiles. However, in Sec. III we demonstrated that there was in fact little net migration from rural to urban places in Malaysia during this time period. This is supported in Table 23, where it is seen that the introduction of regional controls does not alter the average life-

¹⁸ Employment status variables include three dummy variables indicating employment as salaried employee (full or part time), self-employed, or employer. The left-out group are those in family businesses or in home products for sale.

cycle experience profile. Incomes grow more rapidly for careers in urban areas, but the movement of people from rural to urban areas has little to do with experience-wage profiles in Malaysia. We estimate that poor health reduces monthly earnings by about 10 percent, while membership in a trade union increases income by 14 percent. While both poor health and union membership are more likely to occur later in the career, neither variable accounts for much of the average career growth in incomes.

Participation in formal job training programs is an important reason for the observed experience-related wage growth. Approximately 20 percent of the full sample of men reported participation in training programs, and training and schooling are strongly complementary. While only 7 percent of those with no schooling received formal training, almost half of those with more than 10 years of education were trained.¹⁹ These types of on-the-job training incidents take place after entry into the labor market, but they are concentrated in the early years of the career.²⁰ There does appear to be a slight upward drift over time in the proportion of men who received such training. Formal training is rare among rural agricultural workers, but is common for professional and production workers. The estimates obtained in Table 23 indicate that the direct effect of training is modest but that training does significantly increase income growth with experience. In

¹⁹ The following is the proportion of the sample with training:

	Years of School					
	All	0	1-6	7-9	10-13	14+
	22.2	7.1	16.9	24.8	43.5	69.6

²⁰ The following is the proportion with training by cohort:

Year of First Labor Market Experience	Years of Labor Market Experience						
	1-5	6-10	11-15	16-20	21-25	26-30	31-35
1971-1975	.22						
1966-1970	.16	.18					
1961-1965	.19	.26	.28				
1956-1960	.14	.21	.22	.22			
1951-1955	.14	.19	.21	.24	.26		
1946-1950	.14	.18	.21	.21	.22	.23	
1941-1945	.04	.12	.14	.15	.17	.18	.19

fact, incomes of those with training grow twice as fast over careers as do those of men who report no formal training.

In addition to total time spent in the labor force, we include a variable measuring the length of time spent on the current job. Non-zero coefficients for this variable indicate that wage growth will be faster, the more stable are employment histories. This positive sign on experience in current job found in these data mirrors findings obtained in similar specifications with U.S. data. The interpretation often given in U.S. studies may apply as well here: Longer duration in a current job increases the amount of job-specific human capital, thereby producing larger earnings-experience growth.

Table 23 also includes controls for type of employment status. The principal difference is between those who were salaried, self-employed, or employers, compared with the left-out group--those working in a family business. On average, workers in the first three groups earn more than twice as much as those who work in a family business. We know that work in family-owned businesses serves as an important training ground for each new generation of workers, with initial jobs in family-owned businesses. If we compare regressions in which we control for employment status with those in which we do not, the average experience-related growth in income declines by a third.

If we only included these life-cycle variables in the specifications listed in Table 23, there would remain an unexplained one-percent growth in average male income over time. Our original estimate of time-related real income growth was 2.4 percent per year. Of all the variables we have considered to this point, years of schooling had by far the largest impact on our estimate of real income growth per year. Conditioning on schooling alone reduced our estimate of related growth to 0.9 percent per year. In this quite loose sense, education "explains" 60 percent of growth.

What other factors are likely contributors to the remaining secular growth in Malaysian incomes? Because we only include variables that change with calendar time (27 years) and not within any cross-section, our statistical evidence on this question is necessarily weak. For the pure time-related variables, the statistical work essentially reduces to a time series analysis. Not surprisingly, the estimates we obtain for

the time-related variables are sensitive to the set of calendar-time variables included as well as minor alterations in functional form. Therefore, for calendar-time variables, these regressions are more illustrative than statistical evidence. With this caveat in mind, the equations listed in Table 23 do include two calendar-time variables. The first variable measures Malaysia's commodity terms of trade, which is the best summary measure of external changes in Malaysia's relative economic position. We estimate that a 10 percent increase in export prices relative to import prices increases average real Malaysian wages by 2 percent. However, since terms of trade have generally deteriorated for Malaysia during the post World War II era, secular trends in terms of trade cannot explain Malaysian income growth. Instead, changing world price structures have actually reduced income growth of Malaysian men, raising the remaining income growth that is unexplained.

The other calendar-time variable included in the augmented specification of Table 23 is the \ln of the average yield per hectare in rubber estates. We estimate that a one percent increase in average yield raised male income by one-quarter of one percent. When this productivity variable is included, no time-related real income growth is left unexplained. The real evidence that productivity advances were a key shaper of Malaysia's economic growth really goes beyond these regressions. Throughout its history, Malaysia has placed great emphasis on research and development in its principal productive activities. Because of this, important and continuing technological advances have occurred, particularly in the two most important crops, rubber and rice. Table 24 indicates that productivity in both commodities has risen substantially over time. In rice, Malaysia has successfully adapted technological advances produced in the rest of the world. In particular, the double-cropping of rice, facilitated by the introduction of new varieties, accounts for most of the productivity rise. As Table 24 indicates, improvements in rice have been concentrated in the last 20 years. In contrast, technological change in rubber are indigenous to Malaysia and span most of the twentieth century. Although the production of rubber is a relatively simple process, no aspect of that process has escaped improvement. Early in this century, the Malaysian Rubber Research Institute was assigned the task of conducting and

Table 24
PRODUCTIVITY ADVANCES IN RUBBER AND RICE

Rubber			Rice	
Year	Output per Worker	Output per Planted Acre	Year	Average Productivity Per Acre
1915	0.20	0.07	1934-38	17.2
1929	0.56	0.15	1948-50	18.0
1933	0.89	0.14	1955	19.7
1968	2.71	0.34	1965	25.7
1972	3.31	0.43	1975	30.1

implementing research relating to rubber. Research from that Institute has been responsible for introduction of a series of new varieties, and the development of stimulants has expanded output per worker 15-fold since 1915.

While we have not tested other factors directly, some explanations, frequently offered in the literature, do not appear too promising in the Malaysian context. Developing countries are often advised to industrialize, to diversify the composition of their exports, and not to rely on a few large consumers of its exports. Table 25 lists some simple summary statistics for Malaysia relating to these three areas. Industrialization, as indexed by relative size of manufacturing employment, was and remains too small a part of the aggregate Malaysian economy to have played a central role in its national economic growth. Throughout almost all the period we study, the manufacturing sector accounted for less than 10 percent of total employment. Given its relative size, even enormously high growth within the manufacturing sector would not have translated into significant levels of aggregate economic growth. Moreover, as Table 25 demonstrates, growth in the relative size of the manufacturing sector was relatively modest until the 1970s, but Malaysian real incomes grew long before 1970. More recently, manufacturing has indeed become a more central element in Malaysia's economic performance. In relative terms, manufacturing grew

Table 25

SUMMARY STATISTICS ON TIME RELATED VARIABLES

Year	% of Total Employment in Manufacturing	% of Export Value in Rubber and Tin	% of Export Sales to U.S.A., Japan, U.K.
1947	7.0	59.5 ^a	NA
1957	7.4	62.7	32.1 ^b
1962	7.7	64.3	43.8
1967	8.5	54.5	46.8
1972	10.2	45.6	38.2
1976	10.2	34.4	41.6
1979	13.2	31.9	44.7

^a1949, ^b1958.

as much in the 7 years between 1972 and 1979 as it did in the 25 years before 1972. Malaysia is an excellent illustration that it is unnecessary to mimic the economic structure of developed countries in order to develop.

Another theme given some prominence in the development literature involves the desirability of diversifying a nation's export sector, either in the composition of the goods produced or the nations that are the principal buyers. However, if either were a prerequisite for growth, Malaysia's would be a counterexample. The third column in Table 25 illustrates that exports were highly concentrated, with well over half of Malaysia's total export value accounted for by two goods, tin and rubber. Most important, before 1965, the proportion of exports accounted for by tin and rubber remained remarkably stable, at levels exceeding 60 percent. The heavy reliance on only two commodities apparently did not seriously hamper economic development. With the expansion of palm oil production and the emergence of petroleum, Malaysia did diversify its export sector after the mid-1960s. However, this diversification was more a reaction to significant changes in price structure, particularly for palm oil and petroleum, rather than a

decision to diversify for its own sake. The third column of Table 25 measures the proportion of Malaysia's total exports sold to its three principal national buyers (Japan, U.S., and the U.K.)²¹ Once again, Malaysia appears to have been successful while ignoring one of the most frequently repeated requirements of growth. These three nations account for a significant fraction of Malaysia's export sales, a dependence that if anything may have grown slightly over time. In spite of this dependence on a few nations, Malaysia did develop.

²¹This comparison excludes Singapore because of the special geographic and political proximity of Malaysia and Singapore. However, including Singapore as a further buyer would not change the message contained in Table 25.

VI. CONCLUSIONS

Thirty years ago, one could have argued persuasively that Malaysia was an unlikely location for an economic miracle--that its economy was and would remain primarily agricultural, with more than half the male labor force employed in agriculture. Until the 1970s, even small-scale manufacturing would at best play a modest role. A few key commodities would dominate the economy, making it susceptible to significant price fluctuations in the short run and vulnerable to a deterioration in the prices of a few goods over the long run.

This gloomy perspective would have been partially correct. Rubber prices fell by more than half between 1949 and 1972. As a result, its terms of trade with the rest of the world turned against Malaysia during this period. Moreover, its other historically important commodity, tin, confronted problems. By the 1970s, tin mines appeared to have exhausted their potential as proven reserves were depleted. Compounding these economic difficulties, the country faced some serious political and social differences among its three main ethnic groups. Thus an observer thirty years ago would correctly foresee a country that failed to industrialize, remained highly concentrated in the goods it exported, was dependent on a few countries as consumers of its exports, faced highly unstable world prices for its goods, suffered a sharp deterioration in its terms of trade, and never eliminated ethnic divisions within its population. One could understand pessimism about Malaysia's prospects. In spite of all this, the economic miracle occurred.

This report has documented some of the consequences of this miracle, mainly for its distribution effects on the Malaysian people and the manner in which it altered labor markets. We also shed light on some causes of this particular Southeast Asian success story. The investments made in improving the skills of its people through formal schooling and job training programs, and the emphasis placed on technical advances in its most important commodities, seem the most cogent explanations for Malaysia's growth.

APPENDIX: ADDITIONAL DATA ON JOBS AND SCHOOLING

Table A.2

SUPPLEMENTARY DATA ON SECOND JOBS

A. OCCUPATION DISTRIBUTION OF SECOND JOBS:
1976 CROSS-SECTION

Second Job	Malay	Chinese	Indian	All
Professional and administrative	2.5	8.8	0.0	4.0
Clerical	2.6	3.5	0.0	1.7
Sales	14.4	29.8	14.2	18.5
Service	9.1	1.8	14.2	7.5
Agriculture	60.8	47.3	42.9	56.4
Farmers	15.7	24.6	14.3	17.6
Agricultural workers	40.5	11.1	28.6	35.3
Other laborers	1.3	1.8	7.1	1.7
Production	10.5	7.0	21.4	9.9
Distribution of second jobs by race	32.2	15.7	12.3	

B. DISTRIBUTION OF SECOND JOBS FOR
JOB COHORT 1946-1950

Second Job	Years of Experience					
	1	5	10	15	20	25
Professional, administrative and clerical	----	7.7	7.1	9.5	11.5	9.4
Sales and service	----	----	7.1	14.2	19.2	21.9
All agriculture	88.9	84.6	78.5	57.1	53.7	46.9
Farmers	11.1	15.4	21.4	19.0	15.4	15.6
Agricultural workers	77.8	69.2	57.1	38.1	38.4	28.1
Production and other labor	11.1	7.7	7.1	19.0	15.4	21.9

Table A.3
MEAN SCHOOLING LEVELS BY COHORT

Item	Birth Cohort						All
	1925-29	1930-34	1935-39	1940-44	1945-49	1950-54	
Total sample	4.18	4.35	5.23	5.96	7.14	6.77	5.59
Workers							
Agricultural	2.82	2.96	3.48	4.11	5.10	5.74	3.96
Nonagricultural	5.03	5.10	6.15	6.99	7.90	7.86	6.48
Racial group							
Malay	3.67	4.05	4.32	5.43	6.71	6.36	5.09
Chinese	4.10	4.18	5.97	6.63	7.65	7.54	5.99
Indian ^a	5.91		6.27		6.97		
Median age of cohort in 1976	49	44	39	34	29	24	

^a Because the Indian sample is too small to give 5-year intervals, 10-year intervals are provided.

Table A.4

LIFE-CYCLE RESIDENCE DISTRIBUTION BY LABOR MARKET COHORTS

Residence	A. Initial Year of Market Experience 1971-1975			
	Years of Market Experience			
	1			
Kuala Lumpur	12.5			
Ipoh and Penang	8.3			
Other urban	20.8			
Rural	58.3			
Foreign country	0.0			
	B. Initial Year of Market Experience 1966-1970			
	1	5		
Kuala Lumpur	12.7	12.4		
Ipoh and Penang	11.6	8.9		
Other urban	18.6	23.6		
Rural	55.8	53.9		
Foreign country	1.2	1.1		
	C. Initial Year of Market Experience 1961-1965			
	1	5	10	
Kuala Lumpur	7.9	7.1	7.8	
Ipoh and Penang	15.1	15.5	13.6	
Other urban	30.9	31.2	27.9	
Rural	42.1	42.2	46.1	
Foreign country	3.9	3.9	4.5	
	D. Initial Year of Market Experience 1956-1966			
	1	5	10	15
Kuala Lumpur	7.1	8.8	8.8	9.9
Ipoh and Penang	11.3	11.1	14.7	14.1
Other urban	26.2	24.7	24.1	25.1
Rural	54.1	53.5	51.1	49.7
Foreign country	1.2	1.8	1.2	1.2

E. Initial Year of Market Experience 1951-1955

	1	5	10	15	20
Kuala Lumpur	8.1	10.7	8.7	10.1	10.0
Ipoh and Penang	9.4	9.4	11.4	11.4	12.0
Other urban	20.8	24.0	26.0	25.5	24.7
Rural	57.0	52.0	52.7	52.3	53.3
Foreign country	4.7	3.3	1.3	0.7	0

F. Initial Year of Market Experience 1946-1950

	1	5	10	15	20	25
Kuala Lumpur	7.2	11.0	11.0	9.7	9.7	9.1
Ipoh and Penang	11.8	16.2	11.6	14.3	13.6	13.6
Other urban	30.9	25.3	26.6	27.3	25.3	26.0
Rural	48.6	45.5	48.7	48.1	50.0	50.6
Foreign country	2.0	1.9	1.9	0.6	1.3	0.6

G. Initial Year of Market Experience 1941-1945

	1	5	10	15	20	25	30
Kuala Lumpur	6.3	6.3	7.2	6.3	6.3	7.2	6.3
Ipoh and Penang	9.9	9.0	9.9	9.0	8.1	8.1	9.0
Other urban	29.7	32.4	27.9	31.5	29.7	25.2	24.3
Rural	46.8	49.5	51.4	51.4	55.0	57.7	59.5
Foreign country	7.2	2.7	3.6	1.8	0.9	1.8	0.9

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