THE DETERMINANTS OF AND CHANGES IN THE STRUCTURE OF WAGES AND EMPLOYMENT IN THE MANUFACTURING SECTOR OF THE KENYA ECONOMY, 1967-1972

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William J. House and Henry Rempel

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INSTITUTE FOR DEVELOPMENT STUDIES
UNIVERSITY OF NAIROBI
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ABSTRACT

Using data from the Kenya Ministry of Finance and Planning's Central Bureau of Statistics, the structure of employment and wages in 42 industries in the Kenya manufacturing sector is considered. This includes a description of the structure and an empirical test of several hypotheses which seek to explain the determinants of the existing structure. In addition, the interaction between changes in the wage structure and changes in employment are considered.

The available evidence indicates considerable dispersion among industries in wages paid, especially for skilled employees. These differences in wages paid are explained rather successfully by the hypotheses tested, namely relative differences among industries in their respective abilities to pay wages above the supply price of labour, the extent and nature of skilled labour required and such institutional factors as industry differences in the proportion of the labour force employed in Nairobi and in Government enterprises. These measures were more effective in explaining the structure of wages for skilled employees than for the unskil d.

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INTRODUCTION

In several crucial area economic literature relevant to development issues presupposes the existence of a general wage level in each of the various sectors under consideration. For example, our understanding of the choice of technology starts with the assumed existence of a continuous labour-capital production isoquant, and then the actual choice of technique in a firm, industry or country is postulated as a function of the relati· ·rice of capital and labour. An alternative example is the literature on rural-urban migration. To the extent that economic variables are postulated as determinants of migration, the analysis is based on a differential between a rural earnings level and an urban wage. In growth models for developing countries this reliance on a general wage level is quite explicit. Dual economy models, such as the Lewis and the Fei-Ranis models, are based on a stable level of rural earnings and an urban wage sufficiently above rural earnings to induce an adequate industrial labour supply. (29, pp. 93-5)

If one postulates relatively simple determinants of this general wage level - minimum wage legislation, powerful unions, and government as wage leader - then one can use the above theory to arrive at obvious policy solutions to current employment and development problems. Evidence of this type of diagnosis is evident in a recent Kenya National Assembly Committee report on unemployment.

> The relatively high levels of wage and other incomes in the urban areas has come about partly as a result of increase in labour productivity, but also as a result of the trade union activities. Apart from attracting people from the rural to urban areas, the rapid increase in wages has induced employers to seek more labour-saving and capital-intensive operating techniques. This factor has reduced the ability of the economy to offer adequate number of jobs. (18)

In reality, there exists a wide range of wages paid in Kenya. According to the 1968 Annual Enumeration of Employees, the average wage for Europeans was shs. 2,821 a month which is more than seven times the average monthly wage of shs. 380 for African employees. The occupational range varied from shs. 166 a month for unskilled workers to shs. 2,304 for

executives and managers. The lowest three occupational categories, accounting for 74 per cent of the enumerated employees, received less than the average wage of shs. 402 a month. This wide range of wages paid is indicative of the structure of earnings in Kenya. This wage structure is an important determinant of the distribution of income and of the allocation of labour among occupations, industries and regions. Indirectly, the structure has feedback effects on the productivity of labour and it effects the employment creation capabilities of the economy.

The intent of this research effort is to consider explictly the structure of employment and wages in the manufacturing sector of the Kenya economy. This will include a description of the structure and an empirical test of several hypotheses which seek to explain the determinants of the existing structure. In addition, the interaction between changes in the wage structure and changes in employment will be considered. A study of the structure of total earnings and employment would have been preferred but, because of data constraints, our attention had to be limited to 42 industries in the manufacturing sector. Since analysis of wage changes must be confined to those markets where labour is explicitly bought and sold for a price, the research focus is on modern sector activity.[1] This does not mean the bulk of Kenya's economic activity, located in rural areas and in the informal sector in the towns, is irrelevant; earnings in these parts of the economy determine the supply price of labour available to the modern sector.

THE STRUCTURE OF WAGES IN MANUFACTURING

In general, the dispersion of wages among industries tends to increase in the early stages of development and then to decrease once industrialisation becomes more advanced. In addition, in some cases shifts occur in the ranking of industries by their earnings in early stages of industrialisation. In their study of twenty manufacturing industries at the two-digit level across seventeen countries, Papola and Bharadwaj found a substantial increase in the relative dispersion of earnings in Kenya between 1955 and 1965. Also, they observed the expected shifts in the ranking of the industries over the ten year period.

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1. For Kenya the modern sector is basically the enumerated part of the economy encompassing those establishments with five or more employees. The informal sector would include small-scale non-agricultural activities frequently carried out in the open or in temporary structures.

(28, pp. 76-83) According to their analysis the cause of the rise in dispersion was the considerably above average increase in wages paid by what were initially the low wage industries causing some of them to become high wage industries by the end of the period. (28, p. 81)

In Table 1 the relative levels of earnings for 1967 through 1972 are presented for the industries in the manufacturing sector. Throughout this period money wages increased with the one exception of a substantial decline in the average wage of unskilled employees in 1971 and only a partial recovery in 1972.[2] The measure of relative dispersion, the coefficient of variation, does not show such a consistent pattern. For all employees there is the expected increase from 41.1 per cent 1967 to a peak of 52.5 per cent in 1969, after which it declines to a somewhat lower level in 1970 and 1971 with an increase evident in 1972. For unskilled workers the coefficient of variation is much lower, indicating much smaller differences in inter-industry average wages, but the change during this period follows a similar pattern. There is an increase from 31.4 per cent in 1967 to a peak of 42.9 per cent in 1970, then a substantial decline in 1971 and, again, a partial recovery in 1972.[3]

Papola and Bharadwaj found the Kenya inter-industry coefficient of variation for average wages to be 19.2 per cent in 1955, 26.9 per cent in 1960 and to have risen to 44.9 per cent in 1965. (28, p. 76) In comparing our results, at the three-digit level, with theirs, we find their coefficient of variation for 1965 is only slightly larger than ours for 1967, while ours continues to rise until 1969. While their rank correlation coefficient of industries by earnings for 1955 and 1965 was only 0.3, giving rise to instability in the structure, we find a very high degree of stability between 1968 and 1972 with a rank correlation coefficient of industries by earnings of 0.9.

However, it should be remembered that 'a country's structure may appear to be widening when studied at one level of aggregation, but may be found to be narrowing or unchanged when either broader or more detailed groupings are examined'. (24, p. 27) When the average wages for 29 reasonably comparable three-digit industry classifications from the 'Annual Survey of Large-Scale Firms' are compared, we find the

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2. During this five-year period the Middle Income Index of Consumer Prices for Nairobi increased by 12.1 per cent while the Lower Income Index of Consumer Prices for Nairobi increased by 11.2 per cent. (17, pp. 258-9)

3. For skilled employees, defined as all workers not classified as unskilled, the coefficient of variation follows the same pattern as that for all workers rising from a low of 40.6 per cent in 1967 to a peak of 47.5 per cent in 1969. Across all industries in manufacturing, on average, 38 per cent of the workers were unskilled.

Table 1. The Relative Dispersion and Coefficients of Variation of the Average Earnings per Month in Manufacturing.

Industry (I.S.I.C.)	All Employees						Unskilled Employees					
	1967	1968	1969	1970	1971	1972	1967	1968	1969	1970	1971	1972
201. Meat processing	94	91	96	110	101	101	157	124	144	144	146	147
202. Dairy products	117	105	122	144	119	108	102	108	143	174	146	142
203. Canning	80	81	58	65	80	88	92	64	55	38	79	93
205. Milling	99	94	84	91	90	89	111	118	123	123	132	116
206. Baking	123	83	72	83	75	76	105	117	112	134	116	91
207. Sugar	51	44	55	57	55	58	66	50	54	48	46	40
208. Chocolate	72	65	73	67	98	53	84	74	69	58	80	63
209. Misc. foods	45	63	70	83	73	65	50	92	81	77	78	92
213. Brewing	148	150	149	142	150	135	149	212	154	148	160	288
214. Soft drinks	157	180	179	180	165	172	116	148	167	133	130	109
220. Tobacco	159	136	164	160	159	150	141	136	[illegible]	137	142	126
231. Cotton ginning	59	45	54	42	54	66	61	40	34	26	36	52
232. Knitting mills	58	53	48	49	52	54	97	92	71	75	60	69
233. Cordage	57	54	58	60	50	48	88	89	94	83	96	87
234. Textiles	43	55	50	50	50	53	65	82	79	75	81	69
241. Footwear	94	61	45	95	92	50	96	78	71	99	84	82
243. Clothing	49	58	60	59	66	56	86	81	81	74	81	79
244. Made-up textiles	99	82	77	82	48	50	89	79	77	75	78	80
251. Sawmills	33	33	36	33	33	39	38	42	47	37	39	44
259. Wood products	93	63	56	45	30	29	106	80	60	43	64	63
260. Furniture	73	71	71	68	65	58	81	83	75	77	76	69
272. Pulp and paper	86	103	93	95	100	132	123	126	122	127	134	140
280. Printing	144	133	126	131	132	122	118	109	112	105	149	115
291. Leather	72	76	62	73	73	58	64	76	77	82	96	74
300. Rubber	125	104	109	97	121	144	99	97	115	94	135	120
311. Petroleum	203	241	245	284	271	257	94	118	134	136	136	102
313. Paints	148	163	157	160	167	162	127	100	110	105	115	113
315. Soap	56	144	137	145	134	107	67	124	129	99	115	127
316. Pyrethrum	138	107	135	-	-	132	161	86	90	-	-	131
319. Misc. chemical	141	122	134	135	142	144	100	88	94	98	100	99
331. Glass	80	80	79	92	70	80	95	109	83	112	94	94
334. Cement	174	166	177	177	168	165	207	182	178	183	130	124
339. Non-metalic	48	51	39	66	61	66	71	71	49	90	85	69
350. Metal products	95	96	91	90	95	96	111	117	110	96	110	102
360. Machinery	120	96	92	101	106	106	100	92	86	94	93	85
370. Electrical goods	160	135	117	125	117	130	102	95	88	87	97	117
381. Ships	103	100	93	120	107	108	86	121	105	255	99	103
382. Railway	108	91	96	86	77	57	103	97	85	77	84	62
383. Motor body	88	94	92	90	101	108	94	115	112	86	110	97
384. Motor repairs	99	89	88	103	99	97	102	100	94	114	106	102
386. Aircraft	-	242	276	73	175	248	-	92	118	95	88	148
390. Misc. manufacturing	112	100	85	92	75	80	101	90	83	90	72	80
Mean	100	100	100	100	100	100	100	100	100	100	100	100
Average income (shs.)	568	624	654	669	683	719	256	266	287	315	289	310
Coefficient of variation ($(S/\bar{x})X100$)	41.1	47.7	52.5	47.7	47.9	51.5	31.4	32.5	38.9	42.9	30.8	40.6

Source: Unpublished data from the Annual Enumeration of Employees provided by the Central Bureau of Statistics, Ministry of Finance and Planning.

coefficient of variation to be 34.6 per cent in 1957, 43.8 per cent in 1963 and 41.0 per cent in 1969.[4] The rank correlation coefficient of average industry earnings between 1957 and 1969 was 0.6.

On this evidence, at both the two and three-digit levels of comparison, the inter-industry wage structure in Kenya diverged quite sharply during the 1950's and for most of the 1960's to reach, by international standards, a relatively high level of dispersion. Only in the most recent years for which we have information have both the overall structure and ranks of average industry earnings become stabilised. In contrast, the structure of unskilled earnings still indicates considerable instability with a large decline in both average earnings and the coefficient of variation in 1971. A comparison of those industries which increased employment of unskilled workers by more than 10 per cent from 1970 to 1971 indicates two factors contributed to this decline in the level and variation of earnings. First, some of the low-wage industries increased the average wage paid their unskilled employees. In addition, some of the high-wage industries reduced substantially the average wage for unskilled employees. The latter reflects the impact of the Tripartite Agreement where these firms employed additional unskilled labour at a wage level below that paid to their regular unskilled employees.[5] After the Tripartite Agreement was ended, these high-wage industries again report higher wages for their unskilled employees producing the higher mean and the larger coefficient of variation in 1972. Of the eight industries paying above average wages in 1970 and reflecting this income pattern from 1970 to 1972, five increased employment of unskilled labour in 1971 and then reduced the number employed in 1972. The other three show a continued increase in the number of unskilled employed during this three-year period.

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4. The relevant data from the Annual Survey of Large-Scale Firms are reported in successive issues of Kenya, Statistical Abstract for 1964, 1969 and 1972.

5. The Tripartite Agreement, signed in June 1970, called for a 10 per cent increase in employment between July 1, 1970 and July 1, 1971, in both the private and public sector, in exchange for a wage freeze and a moritorium on strikes and lockouts. Because the agreement allowed filling of normal vacancies during the period to be counted as part of the 10 per cent, the number of new jobs created was less than 10 per cent of existing total employment but larger than 10 per cent of the existing unskilled jobs in a number of industries. (11, pp. 529-543)

THE DETERMINANTS OF THE INDUSTRIAL WAGE STRUCTURE

Under free market conditions the level of wages and employment in an industry would be determined simultaneously by supply and demand forces. The chain of causation is: relative factor prices determine the type of technology used; the technology chosen determines the productivity of labour; the productivity of labour, given the demand for the output, determines the level of employment in the industry. The latter represents the industry demand for labour at each wage level within the range of possible wages. The interaction of labour supply with this demand for labour will determine the particular wage level for that industry at a given point in time. In a dynamic situation both labour supply and demand conditions are changing but the market response need not be instantaneous. For example, new technology cannot be employed immediately, and the labour supply response to a wage change may be delayed because people have to re-locate, obtain additional skills or terminate existing employment obligations. Therefore, for a given wage level there may exist either a labour surplus or a labor shortage, but these will be temporary only because with time market forces will eliminate the problem through adjustments in the wage and price mechanism.

The above picture of the operation of wages in the inter-industry allocation of labour does not reflect accurately the Kenya situation. Excessive urban in-migration into urban unemployment with reported labour shortages in some rural activities, and the great efforts made to obtain education while some graduating school leavers fail to obtain employment indicates, at best, considerable friction in the operation of the labour market. Since problems such as these have been evident in Kenya for at least a decade, the friction cannot be dismissed as a short-run phenomenon. Rather, there appears to be actual market failure in the allocation of labour.

The relevant literature on the subject postulates two basic types of market failure. These two positions differ on where, in the chain of causation described above, the actual market failure occurs. The 'technological determinism' position argues the chain of causation is broken between relative factor prices and the choice of technology.[6] According to this argument the technology essential for industrial growth is imported from more developed countries without much regard for relative factor prices in a country such as Kenya. Therefore,

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6. For an example of this argument, including references to the relevant literature, see 23.

industrialisation in Kenya, based largely on imported technology, will take place under conditions where the quantity of labour demanded by industry is a function of the demand for the output of the industry and is not responsive to wage changes. This position leaves the level of wages rather indeterminate. One would expect wages to be bounded at the upper limit by the firm's ability to pay. How closely wages approximate this upper limit will depend on the market power of the employees, either directly or through government legislation.

The alternative view, 'non-market wage determination', postulates that market failure occurs in the actual determination of wages where wage levels are a function of such institutional factors as minimum wage legislation, government wage leadership and trade union strength. Given these wage levels, firms make such adjustments as employing more capital, improving the organisation and supervision of production and upgrading the skill level of the employees. The result is reduced labour turnover and increased output without a corresponding increase in employment. Both results serve to limit new employment opportunities at wage levels above the market clearing wage, producing the current situation of increasing income disparity and increasing visible unemployment. The high correlation between percentage changes in average productivity and percentage changes in average wages, with rising wages "causing" rising productivity via factor substitution, is cited as support for this position. (5, pp. 29-46)

Because our concern here is with the structure of wages among industries within a sector, rather than the wage level for the whole sector, it is not necessary for us to choose between these alternative wage determination models nor do we need to assess the relative strength of each determinant of average wages. Rather, we can recognise that market forces do operate to some extent and both forms of market failure are present in varying degrees among various industries in manufacturing. Indeed, this variation among industries in the degree and type of market failure can serve as the basic explanation for the wage and employment position of a particular industry relative to other industries in the manufacturing sector. Stated more formally, we argue below that the wage and employment structure among various industries of the enumerated portion of the manufacturing sector in Kenya is a function of the ability of a firm to pay wages above the supply price of labour (technological determinism), the quality of the labour inputs required (operation of free market forces) and various institutional aspects of the labour market (institutional or non-market wage

determination). These three are not mutually exclusive and can exist jointly in any one industry. Our intent is to relate inter-industry wage differences to these three types of forces. In the analysis no explicit decision is made on the direction of causation between average labour and wages although we tend toward the position that wages are a function of productivity.

The Ability to Pay Above the Supply Price of Labour

Within the private sector of the economy a firm's wage paying ability is a function of the value of the marginal products of the various types of labour inputs. For a firm to generate a marginal product of labour in excess of the supply price of the labour available to the firm implies the use of a particular combination of resource inputs that is less labour-intensive than the optimum technology possible. A firm employs such technology either because existing alternative technologies are thought to be uneconomical within any range of socially acceptable wages or the firm cannot adapt to more labour-intensive technology because the firm lacks the ability or authority (branch plants of foreign firms) to do so. (27, pp. 40-1)

The extent of such conditions within firms is difficult to document other than by specific case studies, but the existence of the conditions tends to be highly correlated with certain conditions in the product market First, the extent of the competition in the product market is inadequate to force any one firm to adopt the technology best suited to local input conditions. This involves some form of protection against imports as well as market dominance internally. Second, the market for the product tends to be characterised by low price and high income elasticity of demand. (1, pp. 7-8) Third, the labour cost content, relative to total value added, embodied in the product tends to be low so a sizeable wage change need not have much impact on the per unit cost of production.[7] Evidence of such associated conditions in the product market can be used as proxy measures for a firm's ability to pay wages above the supply price of labour.

The existence of such technological determinism, or of the oligopolistic product market conditions associated with it, merely indicates a firm may have the ability to pay wages above the

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7. Considerable evidence exists of a negative correlation between average wages paid and the ratio of [illegible] to other value added or total costs. For example see 24, p.18 and 26, p. 343.

supply price of labour but it does not explain why a firm would choose to pay high wages. In general such firms do pay higher wages than necessary to attract an adequate supply of labour because they want to appear as good corporate citizens. (33, p. 97) Also, frequently there are returns to the firm from paying above average wages both in the form of increased labour productivity and in the reduction of some labour costs. The existence of high wages in an industry relative to the wages paid in other industries in the area tends to improve labour productivity in the high-wage industry by attracting the best labour available and by boosting employee morale. Such conditions serve to reduce labour turnover which reduces the firm's on-the-job training costs. (4) Wage increases have had such effects in East Africa. (9, p. 120 and 21, pp. 293-4)

Therefore, on the basis of the above, we hypothesise the level of wages among industries varies directly with (i) the marginal productivity of labour in each industry, (ii) the degree of protection against imports and the extent of internal market domination by a few firms, and (iii) the ratio of labour costs to value added in each industry.

Variation in the Quality of the Labour Inputs

In the previous section we argued the structure of wages in manufacturing was partly a function of the variation among industries in the marginal productivity of labour. The available information does indicate the existence of considerable variation in the quality of the different labour inputs. For the civil service in Uganda, Knight found an annual increment in salary of £124 for each additional year of schooling beyond primary education. (20, p. 256) On the basis of Nairobi data, Johnson observed secondary school graduates averaged incomes 169 per cent above those received by primary school graduates. (12, pp. 19-20) Using data on the modern sector in Kenya, Ghai also observed large income differentials between skilled and unskilled labour. (3, p. 3) On the basis of sample data from a labour survey, an I.B.T.D. study found the elasticity of substitution between labour with primary education and secondary education and between labour with secondary education and university education was negative in both cases, indicating these types of labour inputs are complementary rather than substitutes. (10, p. 190)

These differences in earnings for different types of labour inputs can affect the inter-industry wage structure in two ways. First, to the extent that these differences reflect differences in the quality of the labour inputs there will be variations among

skilled the labour inputs and the larger the proportion of skilled labour in the industry's labour force, the higher the average product of the industry's labour force.[8] Second, in those industries where the ability to pay wages exceeds the supply price of labour there may exist variations among different groups of employees in their ability to obtain the actual productivity of their respective contributions. In general, the more skilled the labour, the greater the range of alternative employment opportunities. The ability to obtain the full value of one's contribution varies directly with the extent of such alternative employment options. Weiss cites Slichter, who argues that if employers really believe there are different qualities of labour inputs then the most competitive firms will pay the highest wages to attract the best labour. (33, p. 97) The existence of such competition for skilled labour is evident in the premium paid by private firms in Kenya for the top-level African manpower above the wages paid in the public sector. (9, p. 132)

Therefore, we hypothesise the level of wages among industries will vary directly with the extent of the skill content of the labour force in each industry.

Institutional Wage Determination

Whereas the impact of what we have called the ability to pay wages and the quality-of-labour input variables tends to have broad application across a range of countries, the institutional aspects of the wage structure reflect the parochial dimensions of a specific country. An important dimension in Kenya is the alleged role of the public sector as a pace-setter for wages paid. Although it is recognised that wages in certain technical and professional positions are higher in the private sector than in the public sector, it is difficult to argue that the former sets the pace for the latter. (2, p. 9) The public sector is simply too large relative to the total economy to be affected in this way. Rather, the private sector likely takes its cue from the public sector for general wage levels and then adds premiums deemed necessary to retain key personnel. (20, p. 259) Within the public sector there are considerable differentials between the wages paid to skilled and unskilled employees. In part this reflects the need to attract expatriate

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8. Such effects of the quality of labour on productivity and wage levels have been observed in various countries. See 26, 30 and 32.

staff, but the differential is maintained by a tendency of Kenyans to demand comparable compe sation when they replace expatriates.

A second institutional factor thought to be relevant for the labour market in Kenya is the strength of certain trade unions. On the basis of Nairobi data, Johnson found a 30 per cent union/non-union wage differential in the private sector and an 11 per cent differential in the public sector. (12, pp. 22-23) It has yet to be established what causal relationship, if any, there is between unionisation and wage levels. As Ghai has observed, the high union wages tend to be in industries with high product-market concentration. (1, pp. 9-10) Therefore, the wage increases may well follow productivity increases and the observed elasticity of substitution between labour and capital may be "a distribution (or bargaining) parameter rather than a rigorous production parameter". (27, pp. 48-50) As a result, we tend toward the Ostry position that before unions can pull a rabbit out the hat someone has to put a rabbit into the hat. (26, p. 348) Unfortunately, the available data do not allow us to test any hypothesis on the role of unions in determining the inter-industry wage structure.

An additional institutional factor is the preference for foreign firms to locate in Nairobi and the concentration of Government activity in Nairobi. This means the firms with the largest ability to pay wages and the largest single employer of skilled labour are located in one place. Therefore, we expect the level of wages among industries to vary directly with the proportion of the industry labour force employed in Nairobi. There is a certain cumulative effect here because the nature and extent of the concentration of skilled labour in Nairobi increases the cost of living there relative to the rest of Kenya which, in turn, becomes the justification for higher wages.

Therefore, we hypothesise the level of wages among industries varies directly with (i) the proportion of the industry labour force employed in the public sector and (ii) the proportion of the industry labour force employed in Nairobi.

THE RESPONSIVENESS OF THE STRUCTURE OF WAGES AND EMPLOYMENT TO CHANGES IN THE LABOUR MARKET

Under competitive market conditions, increases in labour demand in excess of the growth of labour supply will result in a change in the structure of wages designed to attract labour to those industries and occupations with growing employment opportunities. Conversely, an excess supply of labour would result in a re-allocation of resource inputs via decreases in relative wages. In practice such shifts in the structure of wages to re-allocate labour do not always occur. An O.E.C.D. study

of various countries found "no evidence of a strong systematic statistical relationship between changes in earnings among individual industries and variations in relative employment". (24, p. 16) The study goes on to conclude, 'in most instances where the data provide evidence of a statistically significant relationship it is clear that the explanatory role of relative wages is over-shadowed by the influence of other factors'. (24, p. 16)

Ulman has put forth several conditions under which the structure of wages tends to be resistant to change, even under labour market disequilibrium conditions:

> The first is that some excess-supply situations may not connote the presence of unstable wage relationships, whether or not they are associated with factor or product substitution. Thus under equilibrium in this broader sense, changes in relative rates of compensation may not constitute a necessary condition for changes in relative employment and that changes in the latter may not generate changes in wage structure. The second proposition, however, holds that, given the stimulus of exceptionally large conditions of demand or supply, the forces of competition might be expected to prevail, and changes in wage structure would then discharge an important allocational function. (31, pp. 73-4)

He goes on to suggest four different reasons why there is built-in resistance within the wage structure to relatively minor changes in the supply and demand for labour. (31, pp. 74-5) First, wage earners and union leaders are influenced by tradition and competitive emulation as well as by competitive market forces. Second, in what we call industries characterised by an ability to pay wages above the supply price of labour, employees have been able to obtain wage increases without conditions of excess demand for labour and they have been able to resist wage reductions under conditions of an excess supply of labour. Third, some employers consistently pay wages above the market clearing level as a matter of policy to maintain a particular prestige image. Finally, employees are somewhat reluctant to quit an existing job, and even if they do, they seek a better job which is not necessarily the optimal job available. Under such conditions of wage structure stability, the allocation of labour occurs through a mechanism of job vacancies. The mere existence of vacancies (new employment opportunities or job openings caused by labour turnover) in the industries which are paying above average wages is adequate to attract the desired labour without a need for further wage increases to induce a labour supply response. Such labour allocation within a stable wage structure is called the 'job vacancy hypothesis'.

The existing wage structure is a product of past supply and demand conditions. Such a structure may well have industry peculiarities because at some point in the past an industry may have found it necessary to pay key rates, above that in other industries, to attract an adequate amount of a particular type of labour. Periodically,

> Market changes could be of sufficient speed or magnitude to destroy the basis of traditional wage relationships, to reverse the usual relationship between employee morale and productivity..., or to overcome both union bargaining power and the lethargy of individual buyers and sellers of labour. In such cases of major change the wage structure might be expected to respond predictably and prove effective as an allocator. (31, p. 77)

The occurrence of such a change in the structure of wages for the purpose of re-allocating labour can be labelled the 'competitive hypothesis'.

To the extent the 'job vacancy hypothesis' is applicable, changes in employment levels within an industry will be positively correlated with the initial level of wages. Such a correlation would reflect the gravitation of labour to the high-wage industries in response to job vacancies in these industries. To the extent that the 'competitive hypothesis' reflects the wage and employment situation in the manufacturing sector in Kenya, we would expect a positive correlation between the changes in wages and changes in employment levels. The increase in wages would be necessary to attract additional labour. Because the supply of labour tends to be more elastic for unskilled labour than for skilled labour, the competitive model, if applicable at all, will be less applicable for unskilled than for skilled labour. If employment changes are not correlated or are negatively correlated with the initial wage levels or changes in wage levels, then it will not be possible to determine the applicability of either of these two hypotheses on the interaction between wage and employment levels. This would indicate such an excess supply of labour available to the manufacturing sector during the period under consideration in this study that the job vacancies occurring could be filled, even in the low-wage industries, without changing wages.

THE VARIABLES USED

The study postulates that the three-digit I.S.I.C. inter-industry wage structure at a point in time is a function of the following:

(1) the occupational mix of the industrial labour force. The report on employment and earnings for 1967 used six categories of occupations, while the reports for 1968 to 1972 used thirteen categories. We have combined some of these categories in order to work with six occupation classifications, five of which enter explicitly in our cross-section equations. In descending order of skill requirements, we have introduced categories A, B, C, D and E, representing the proportion of total employment in each of these occupations. Category F, representing the per cent unskilled, was left out of the equation.[9] This information was available for each of the five years.

In addition, an attempt was made to explain the inter-industry earnings differences of skilled workers, made up of the weighted average of earnings of occupational categories A to E. Then, the average industry earnings of the unskilled workers was used as the dependent variable.[10]

(2) the proportion of total industry employment located in Nairobi. This information was available for each of the five years 1968-1972, but was not available for 1967.

(3) the average product of labour, used as a proxy for an industry's 'ability to pay'. This measure, by three-digit industry, was only available for 1967, obtained from the Census of Industrial Production for that year. (14, pp. ii, iii and 15) It was calculated as 'gross product', defined as the sum of labour costs, interest payments, depreciation (on fixed assets and stocks) and profit before tax, divided by 'number engaged'. These data were used in the explanation of inter-industry earnings differences for all six years.

(4) an index of product market concentration. This variable reflects the effects of oligopoly power, via higher prices, on the derived demand for labour. The more inelastic the demand curve for an industry's product, the easier it if for above average wages - paid for the reasons given above - to be passed on to consumers in the form of higher prices.

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9. For a complete description of the occupational classification see the Appendix.

10. Weiss suggests that overall labour force characteristics, such as the per cent of the labour force that is skilled, would affect industry wage rates. Our hypothesis is that the larger the proportion of an industry's labour force that is skilled, the higher the earnings of the unskilled. (33, p. 97)

Measures of industry concentration usually reflect the proportion of output or employment attributable to the "X" largest firms in the industry. However, for the index to have any meaning in such an open economy as Kenya it was necessary to take account of the level of competitive imports. Hence, our index used the information on the proportion of employment in the largest plants, collected from the 1967 Census of Industrial Production. This index was amended further to take account of competing imports so that the final index of concentration reflects, in some sense, the proportion of total sales attributable to the largest plants in the industry. A detailed account of the building of the concentration index is given in the Appendix. This index for 1967 was used as an indicator of product market imperfections for all six years of the study.

(5) the proportion of employment in Government enterprises. Government is often claimed to be a wage leader and, although Government activities in the manufacturing sector are relatively small, the proportion of an industry's employment in Government-owned enterprises was introduced as an explanatory variable. Once again, the information in the 1967 Census of Industrial Production was used for all six years.

(6) The ratio of labour costs to value added (gross product). The ratio is used here as another aspect of an industry's 'ability to pay' above average earnings. It was calculated from the 1967 Census of Industrial Production as total 'labour costs' divided by 'gross product' and was used for all six years.

EMPIRICAL RESULTS

Table 2 presents the least-squares, multiple regression results for the selected years of 1968 and 1972. The equations attempt to explain the inter-industry earnings differences for skilled, unskilled and all employees using 42 three-digit manufacturing industries.

The explanatory power of our model is reasonably high since it is capable of explaining, according to the coefficient of determination

Table 2. Regression Results: Inter-Industry Earnings Differences for 'Skilled', 'Unskilled', and All Workers*

Dependent Variable: Average Earnings of:	Constant	Proportion of Employment in Occupations: A	B	C	D	Concentration Index	Average productivity	% Employed in Nairobi	% Employed by Government	R^2	Regression Number
1968											
All Workers:	-28.60		26.48[a]		29.17[a]	2.76[a]	0.25[a]	1.52[b]		0.856[a]	(1)
	(0.47)		(5.81)		(3.11)	(3.65)	(7.80)	(2.07)			
	105.84[b]		20.51[a]		28.32[a]		0.29[a]	1.51[c]	2.39[a]	0.850[a]	(2)
	(2.33)		(4.13)		(2.98)		(8.91)	(2.01)	(3.44)		
	138.98[a]		24.40[a]	45.78[a]	6.22					0.728[a]	(3)
	(2.54)		(3.94)	(5.92)	(0.60)						
	173.94[a]						0.34[a]	2.97[a]	3.15[a]	0.752[a]	(4)
	(3.33)						(9.29)	(3.85)	(3.94)		
Skilled Workers:	84.54	22.21[c]		39.78[a]	1.18	3.09[b]	0.24[a]			0.757[a]	(5)
	(0.77)	(1.73)		(3.60)	(0.09)	(2.21)	(4.28)				
	435.85[a]	10.22	39.12[a]		39.79[c]					0.341[a]	(6)
	(3.69)	(0.50)	(3.24)		(1.97)						
	189.60[c]					3.79[a]	0.37[a]	3.16[a]		0.616[a]	(7)
	(1.69)					(2.53)	(6.30)	(2.59)			
Unskilled Workers:	124.14[a]			2.02	4.62	1.17[b]	0.04[c]	0.61	-0.39	0.386[a]	(8)
	(3.38)			(0.51)	(0.77)	(2.09)	(1.91)	(1.40)	(0.81)		
	204.17[a]		-3.17	9.59[a]				0.43		0.240	(9)
	(7.05)		(1.10)	(2.83)				(1.06)			

Table 4, Cont.

1972											
All Workers:	57.72		23.62[a]		29.06[a]	1.56	0.36[a]	1.48[c]		0.850[a]	(10)
	(0.77)		(5.92)		(2.70)	(1.52)	(9.45)	(1.81)			
	123.89[b]		21.92[a]		28.81[a]		0.38[a]	1.47[c]	1.35	0.848[a]	(11)
	(2.29)		(4.59)		(2.65)		(9.89)	(1.77)	(1.30)		
	210.74[a]		19.44[a]	49.66[a]	3.67					0.667[a]	(12)
	(3.04)		(3.37)	(5.32)	(0.22)						
	158.33[b]						0.42[a]	3.37[a]	4.02[a]	0.748[a]	(13)
	(2.39)						(8.90)	(3.72)	(3.98)		
Skilled Workers:	91.73	6.74		42.09[a]	16.24	3.78[b]	0.31[a]			0.745[a]	(14)
	(0.80)	(0.38)		(3.39)	(0.88)	(2.34)	(4.41)				
	321.30[a]	56.76[a]	32.78[a]		48.86[b]					0.557[a]	(15)
	(2.98)	(3.12)	(4.18)		(2.15)						
	76.32					5.61[a]	0.43[a]	4.22[a]		0.640[a]	(16)
	(0.55)					(3.10)	(6.00)	(3.06)			
Unskilled Workers:	107.31[c]			2.17	4.47	1.46[c]	0.04	1.08[c]	0.41	0.341[a]	(17)
	(1.92)			(0.43)	(0.52)	(1.74)	(1.3[illegible]	[illegible]	(0.56)		
	212.78[a]		4.76[c]		9.95		0.06[c]			0.213	(18)
	(5.98)		(1.74)		(1.32)		(2.02)				

*Earnings per worker are measured in shillings per month for the month of June of each year. Average productivity is measured in K£ per year, for the year of 1967. Coefficient signs are positive unless otherwise shown. Numbers in parentheses are student's t - statistics. One-tail tests were used because all regressors are expected to be positively related in each case to the regressand.

a = significant at 1% level.
b = significant at 2½% level.
c = significant at 5% level. The significance of R^2 is tested using the F - test.

(R^2), between 85 per cent in equation (1) and 66 per cent in equation (12) of the variance in inter-industry average earnings per month. When the equations were run for each of the years 1968 to 1972, occupational categories B, C and D were usually highly significant while category A was significant in 1967 but was usually dropped from the equations for later years for two reasons. Category A encompasses directors, including unpaid directors, and therefore did not prove to be a powerful explanatory variable of average industry earnings. In addition, variable A was highly correlated with categories C and D and so, to avoid the problems of multicollinearity in the regression equations, category A was usually dropped.[11]

The coefficients of the occupational categories in the regression equations suggest, for example in equation (1), that a one percentage rise in the proportion of industry employment in category B leads to a shs. 26 rise in average monthly earnings while a one percentage rise in category D increases average earnings by shs. 29 per month.

Because of the relatively high correlation coefficient between the index of concentration and the proportion of industry employment in Government enterprises when both variables are included in the same equation, both fail sometimes to appear significant. Yet if the proportion of employment in Government enterprises is dropped, as in equation (1), the concentration index is highly significant.[12] When the concentration index does not appear, as in equation (4), the percentage employed by Government is significant.

The most consistently significant explanatory variable of the inter-industry earnings structure is average productivity per worker, which never fails to be significant at the one per cent level. Together with the proportions employed in Nairobi and in Government enterprises, average productivity explains 75.2 per cent of the variance in average

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11. Some slight problems of multicollinearity remain. For 1968 the simple correlation coefficient between occupation categories C and D is 0.43, between C and average product per worker it is 0.52 and between D and the proportion of employment in Nairobi it is 0.48. In addition, the concentration index and the proportion of employment in Nairobi have a correlation coefficient of 0.55. For 1972, the correlation coefficient between occupation categories C and D is 0.44 and between C and average product it is 0.45. Between B and proportion of employment in Government enterprises the coefficient is 0.57.

12. The concentration index is not significant for 1972 in equation (10) perhaps because, by 1972, the index based on 1967 data had become obsolete.

industry earnings in equation (4) and 74.8 per cent in equation (13). The occupational categories A, B and C together explain 72.8 per cent of their variance in equation (3) and 66.7 per cent in equation (12).

Average productivity is measured from the 1967 Census of Industrial Production in K£ per annum so that the interpretation given to its coefficient should be, for example from equation (4), that a £1 rise in average industry productivity per year would lead to a shs. 0.34 rise per month or an increase of shs. 4.08 per year in average industry earnings.

The variable measuring the regional concentration of industry in Nairobi is significant for the years of the study, except for 1970.

The power of these same variables to explain inter-industry differences in average earnings of skilled workers is only slightly less than when average earnings of all employees is being explained. However, the occupational categories B, C and D are much less important, as can be seen from equations (6) and (9).

Our model is much less successful in explaining the inter-industry structure of earnings of unskilled workers,[13] as can be seen from the coefficients of determination. There is only slight evidence in equations (9) and (18) that the larger the proportion of industry employed in the higher skilled occupations the larger would be the average earnings of the unskilled, via some demonstration effect.

The index of concentration is significant as is average productivity, but now at a lower level of significance. However, the coefficient of the productivity variable is much lower than for the earnings of skilled workers. Using 1968 and equation (8) as an example, that same £1 increase in average productivity that gave rise to an annual increase of shs. 4.08 in average industry earnings in equation (4) would only imply an increase of shs. 0.04 per month or shs. 0.48 per year in unskilled earnings. Obviously, it is the skilled workers who gain absolutely more from inter-industry differences in 'ability to pay'.[14]

The proportion of industry employment in Nairobi, as an explanation of unskilled earnings differences, is only significant in 1971 and 1972. Of course, this is not a direct test of the hypothesis that unskilled workers in Nairobi receive higher than average earnings because,

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13. As we have already seen the inter-industry earnings differentials for unskilled workers are much less than for skilled workers.

14. From 1968 and equation (7), a K£1 rise in average productivity would lead to a shs. 0.37 per month increase in earnings or a shs. 4.44 annual increase for skilled workers.

for employment in Nairobi, our measure is not confined to the unskilled but refers to all industry employees.

Only in 1967 was the proportion of employment in Government enterprises significant in explaining unskilled earnings differences. However, we should not conclude that, in general, Government is not a wage leader for unskilled labour, because we are not measuring the inter-industry distribution of unskilled labour between Government and private sectors. Our results simply suggest that those industries where total industry employment was relatively more concentrated in Government enterprises, did not pay their unskilled workers significantly differently from other industries where Government representation was less.

The ratio of labour costs to value added was expected to be negatively related to an industry's average earnings per worker. However, this ratio proved to be highly correlated with average productivity, as one might expect (the simple correlation coefficient between them was -0.6), so the equations in which it was included have not been reported here.

The simple correlation coefficient between average industry earnings and the ratio of labour costs to value added ranged from -0.48 in 1970 to -0.25 in 1969 for all employees, from -0.43 in 1967 to -0.22 in 1969 for skilled employees and from -0.35 in 1968 to -0.10 in 1967 for the unskilled. On the whole the ratio of labour costs to value added appeared to play a small, but sometimes significant, role in determining the earnings per worker of all employees and of skilled employees, and a lesser role in the determination of the earnings of the unskilled.[15]

Having examined the determinants of the structure of earnings cross-sectionally, for each of the six years 1967 to 1972, the next task was to assess the role of this structure, and changes in this structure, in reallocating labour in response to changes in the demand for labour. The competitive theory in labour markets:

> associates any changes in the intersectoral distribution of employment -- caused by changes in conditions of either demand or supply -- with either a decline or an increase in relative wages (except where changes in demand and supply are simultaneous, equal, and in the same direction). (31, p. 77)

Because of the short period of time investigated here we would interpret any changes in the earnings structure as a response to differential changes in the demand for labour, since changes in the

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15. The ratio of labour costs to total costs never proved to be a significant factor in the determination of the inter-industry earnings differences.

supply of labour, especially skilled labour, could be expected to be so small as to render their impact on the structure negligible.

An alternative reallocation mechanism suggests: "Given changes in patterns of employment may not 'require' changes in the existing wage structure; if the relevant wages are maintained at excess-supply levels, labour may move from low- to high-wage sectors solely in response to increases in 'job vacancies'." (31, p. 76)

Confirmation of the 'competitive theory' would be suggested by positive and significant correlation coefficients between percentage or absolute changes in earnings and percentage or absolute changes in employment. Those correlations were calculated for the 1, 2, 3, 4 and 5-year intervals in our time period 1968 to 1972.[16]

To substantiate the 'job vacancy' thesis, where labour flows to high-wage industries, we would expect to find positive and significant correlations between the original levels of industry earnings and changes in employment for the sub-periods of our study. Correlation coefficients for selected sub-periods are reported in Tables 3 and 4.

The correlation coefficients in Table 3 do not reveal the positive and significant relationship between changes in earnings and changes in employment that the 'competitive theory' would predict. In fact, for the sub-periods 1968 to 1970 and 1968 to 1971, we find the simple and partial coefficients to be negative and frequently significantly different from zero.[17] This implies that the industries with the fastest growth of employment, especially for skilled workers, paid less than the average increase in earnings, both in percentage and in absolute terms.

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16. The year 1967 was not considered in our analysis of changes over time because some industries, due to reclassification, are not directly comparable for later years.

17. In Table 3 the partial correlation coefficients hold the original level of earnings constant. Therefore the reported partial coefficients are unaffected by the relationships between original level and percentage changes in earnings and between employment changes and original level of earnings. Similarly, the partial coefficients in Table 4 are independent of the relationships between original level of earnings and percent changes in earnings and between percent changes in employment and percent changes in earnings. Only those partial correlation coefficients are reported where the simple correlation coefficient was significant or close to being significant.

Table 3. Correlation Coefficients Relating Percent and Absolute Changes in Average Monthly Earnings to Percent and Absolute Changes in Employment, Selected Years.

Years and Types of Worker	Percent Changes in Earnings and Percent Changes in Employment		Absolute Changes in Earnings and Absolute Changes in Employment	
	Simple	Partial	Simple	Partial
1968 - 1970				
All Workers	-.65[a]	-.61[a]	-.22	
Unskilled	-.18		-.21	
Skilled	-.54[a]	-.43[a]	-.35[a]	-.32[c]
1968 - 1971				
All Workers	-.31[c]	-.26	-.35[c]	-.35[c]
Unskilled	-.08		-.12	
Skilled	-.31[c]	-.22	-.34[c]	-.35[c]
1970 - 1972				
All Workers	-.12		-.10	
Unskilled	-.07		-.08	
Skilled	-.08		-.03	

a = significant at the 1% level.

b = significant at the 2% level.

c = significant at the 5% level.

Table 4. Correlation Coefficients Relating Original Level of Average Monthly Earnings to Percent Changes in Employment and Percent and Absolute Changes in Average Monthly Earnings, Selected Years.

Year and Type of Worker	Original Level of Earnings and Percent Changes in Employment		Original Level of Earnings and Percent Change in Earnings	Original Level of Earnings and Absolute Change in Earnings
	Simple	Partial		
1968 - 1969				
All Workers	.06		.12	.44[a]
Unskilled	-.17		.09	.05
Skilled	.11		-.14	.08
1968 - 1970				
All Workers	.47[a]	.38[b]	-.30	-.20
Unskilled	-.17		.11	.13
Skilled	.46[a]	.29	-.44[a]	-.41[a]
1968 - 1971				
All Workers	.46[a]	.43[a]	-.17	.01
Unskilled	-.15		-.24	-.28
Skilled	.44[a]	.39[b]	-.26	-.16
1969 - 1970				
All Workers	.35[c]	.36[c]	-.39[b]	-.44[a]
Unskilled	-.11		-.13	-.17
Skilled	.40[a]	.42[a]	.44[a]	-.52[a]
1969 - 1971				
All Workers	.37[b]	.42[a]	-.29	-.34[c]
Unskilled	-.01		-.48[a]	-.58[a]
Skilled	.31[c]	.34[c]	-.33[c]	-.36[c]
1970 - 1972				
All Workers	-.12		-.15	-.13
Unskilled	-.14		-.49[a]	-.53[a]
Skilled	-.12		-.16	-.13

a = significant at the 1% level.
b = significant at the 2% level.
c = significant at the 5% level.

Of further interest are the results for what one might expect to be a relatively homogeneous group of unskilled workers. There, no correlation coefficient is significantly different from zero. This result is not unexpected in an economy such as Kenya's where unskilled labour is in surplus. Employers contemplating an expansion of employment did not have to pay above average increases in earnings to attract more labour.[18]

The evidence for the 'job-vacancy' hypothesis for re-allocating labour is reported in Table 4. The correlation coefficients for the categories of 'All Workers' and 'Skilled Workers', although relatively small, carry the predicted positive signs and are significantly different from zero for most of the sub-periods. The high-earnings industries expanded employment fastest and were able to attract skilled labour by their existing earnings levels, without having to pay above average earnings increases to do so. On the whole these results conform to the predictions of the 'job-vacancy' thesis.

Table 4 reveals some of the effects of the Tripartite Agreement on the wages of the unskilled in the later years of our study. The correlation coefficients between original level of unskilled earnings and both percent and absolute changes in earnings are significantly negative for the later sub-periods.[19] This result suggests that the industries paying above average unskilled wages increased their unskilled labour force, to comply with the Tripartite Agreement, by hiring at wages below those paid to their regular unskilled employees. The result was the large fall in inter-industry unskilled earnings differentials reported in Table 1.

In accepting the 'job-vacancy' thesis we should not conclude that competitive forces were not at work. The negative and significant correlation coefficients, especially for skilled labour, between original level of earnings and both percent and absolute

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18. However, we should note that "nonsignificant correlations might possibly signify that only original and terminal equilibrium conditions were compared, leaving no clue to an intervening dynamic process (catch-up) in which a rise in relative wages was followed by an equal reduction". (31, p. 79) However, our comparisons of annual changes should have avoided this problem.

19. These unreported correlation coefficients for the 1970 to 1971 period were - .63 and - .75 respectively, both significant at the 1 per cent level.

changes in earnings suggest that the lower-paying and least-expanding industries tried to retain their skilled labour by than matching the earnings increases of the expanding industries. This is reflected in a falling coefficient of variation for earnings per skilled worker after 1968, on which we commented earlier.

CONCLUSIONS

The available evidence for the manufacturing sector in Kenya indicates considerable dispersion among industries in wages paid. This dispersion is especially evident for skilled employees. These differences in wages paid are explained rather successfully by various measures of relative differences among industries in their respective abilities to pay wages above the supply price of labour, the extent and nature of skilled labour required and such institutional factors as industry differences in the proportion of the labour force employed in Nairobi and in Government enterprises. Again, these measures were more effective in explaining the structure of wages for skilled employees than for the unskilled. The nature of the interaction between wages and employment indicates it was not necessary, in general, for ries to raise wages to fill those vacancies that occurred. The employment opportunities expanded fastest in the high-wage indust. es, and these vacancies were filled without an additional increase in wages. In contrast, the initial low-wage industries responded competitively by granting above average increases to their skilled employees.

APPENDIX

The I.S.I.C. Code for Table 1

The data on earnings and employment used in this paper are based on the economic activity classification of the Kenya Employment and Earnings reports which is a slightly modified version of the United Nations' three-digit International Standard Industrial Classification. For the purpose of this study several industry groups were combined. These are: Misc. Foods - 200, 204 and 209; Brewing - 211 and 213; Pulp and Paper - 271 and 272; Leather - 291 and 299; Petroleum - 311 and 321; Soap - 312 and 315; Misc. Chemicals - 314 and 319; Glass - 311 and 332; and Motor Repairs - 384 and 385.

The Occupational Classifications

Some of the thirteen occupational classifications of the Earnings and Employment reports have been combined for the purpose of this paper. Occupational category A includes the following job categories from the reports:

Directors and Top Level Administrators
Professional
Executive and Managerial.

Occupational category B includes:
Technicians, Work Managers, Workshop Foremen and other Supervisory Personnel.

Occupational category C includes:
Secretaries, Stenographers and Typists/Clerks, Book-Keepers, Cashiers and Bookkeeping Clerks, Operators of Office Machines.

Occupational category D includes:
Technical Sales Representatives and Brokers Shop Assistants.

Occupational category E includes:
Skilled and Semi-Skilled not included above.

Occupational category F includes:
Unskilled Labourers.

Index of Industrial Concentration

The principle and the methodology of building the index of industrial concentration have been described elsewhere (8 and 6) and are based on the information in the 1967 Census of Industrial Production in Kenya.

No data on the proportion of sales, output or employment attributable to the top three or four firms in an industry are available, but it was possible to obtain unpublished information on the numbers employed and number of establishments by size class of establishment for each industry. Therefore it was possible to calculate the percentage of employment attributable to the three largest establishments in each industry and so derive the first part of the concentration index. Since most firms have only one establishment, the index closely approximates the firm concentration index. However for some industries with multi-establishment firms, in order to approximate a firm concentration index, the proportion of employment in a number of establishments than three was used.

In the spirits, beer and malt industry, the largest five establishments were used, in sawn timber the index used the largest four establishments and in the motor vehicle repairs industry six establishments were used in the calculation of the index. The structural clay industry and the glass industry were combined in the Census report the former containing four establishments and the latter, with over two-thirds of the combined employment, having only two establishments. The industries were obviously quite concentrated so the index for the industries combined was calculated by employing the largest two establishments from each industry.

The second part of the concentration index tries to incorporate the influence of foreign competition in the Kenya market since, for some industries this factor is relatively large. The plant concentration index, based on employment, was multiplied by the proportion of total industry sales in Kenya, inclusive of imports, attributable to all the domestic producers.

Ideally, the concentration index might be calculated as:

$$\frac{\text{Sales of Largest Plants}}{\text{Total Sales (Domestic \& Imports)}} = \frac{\text{Sales of Largest Plants}}{\text{Total Domestically Produced Sales}} \times \frac{\text{Total Domestically Produced Sales}}{\text{Total Sales (Domestic \& Imports)}}$$

where the first ratio on the right-hand-side is approximated by employment data.

The information on imports was gathered from the Annual Trade Report of Tanganyika, Uganda and Kenya, 1967; published by the East African Customs and Excise office in Mombasa.

However, only those imported items deemed to be competitive with products produced in Kenya were included. The conceptual problem of what exactly constitutes a competitive import for some industries was encountered. For industries such as beer, soft drinks, paints, tobacco and soap, total imports were taken to be unambiguously competitive. In others, with a large degree of heterogeneity of products, such as furniture and fixtures, paper and products and basic industrial chemicals, the detailed product description information from the 1963 Census of Industrial Production was used, since such product descriptions were missing from the 1967 Census.

Where it was unclear whether a product, described at the I.S.I.C. five-digit level in the Annual Trade Report, should be included as competitive or not, and with no other guide, the decision rested on whether the item constituted an export of Kenya and if so, the corresponding value of imports was taken to be competitive with domestic production.

BIBLIOGRAPHY

1. Ghai, Dharam P. Analytical Aspects of an Incomes Policy for Kenya. Discussion Paper No. 50. Institute for Development Studies, University of Nairobi, 1967.

2. Ghai, Dharam P. Strategy for a Public Sector Wage Policy in Kenya. Discussion Paper No. 65. Institute for Development Studies, University of Nairobi, 1968.

3. Ghai, Dharam P. Incomes Policy in Kenya: Need, Criteria and Machinery. Discussion Paper No. 66. Institute for Development Studies, University of Nairobi, 1968.

4. Harris, John R. Wage Rate Determination with Limited Supplies of Labour in Developing Countries: a Comment. Discussion Paper No. 81. Institute for Development Studies, University of Nairobi, 1969. (Journal of Development Studies. 7 (2) January 1971, pp. 197-200.)

5. Harris, John R. and Todaro, M.P. "Wages, Industrial Employment and Labour Productivity". Eastern Africa Economic Review. June 1969, pp. 29-46.

6. House, William J. Changes in Industrial Performance and Market Structure in Kenya. Department of Economics, University of Nairobi, May 1973, mimeo.

7. House, William J. "Wages, Employment and Productivity in Kenya: Some Further Evidence". Eastern Africa Economic Review. June 1973, pp. 73-77.

8. House, William J. "Market Structure and Industry Performance: The Case of Kenya". Oxford Economic Papers. November 1973.

9. Hunter, J.B.K. "The Development of the Labour Market in Kenya". In I.G. Stewart, ed. Economic Development and Structural Change. Edinburgh, Edinburgh University Press, 1969, pp. 113-137.

10. International Bank for Reconstruction and Development. Cost-Benefit Analysis in Education: A Case Study on Kenya. Washington, D.C., 1969.

11. International Labour Office. Employment, Incomes and Equality: A Strategy for Increasing Productive Employment in Kenya. Geneva, 1972.

12. Johnson, George E. The Determination of Individual Hourly Earnings in Urban Kenya. Discussion Paper No. 115. Institute for Development Studies, University of Nairobi, 1971.

13. Kenya. Statistics Division. Ministry of Finance and Economic Planning. Employment and Earnings 1963-1967. Nairobi, Government Printer, 1971.

14. Kenya. Statistics Division. Ministry of Finance and Economic Planning. Census of Industrial Production, 1967. Nairobi, Government Printer, 1972.

15. Kenya. Central Bureau of Statistics. Ministry of Finance and Planning. Employment and Earnings in the Modern Sector 1968-1970. Nairobi, Government Printer, 1972.

16. Kenya. Central Bureau of Statistics. Ministry of Finance and Planning. Employment and Earnings in the Modern Sector 1971. Nairobi, Government Printer, 1973.

17. Kenya. Central Bureau of Statistics. Ministry of Finance and Planning. Statistical Abstract 1973. Nairobi, Government Printer, 1973.

18. Kenya. National Assembly. Report of the Select Committee on Unemployment. G.N. Mwicigi, chairman. Nairobi, Government Printer, 1970.

19. King, J.R. "Wages, Employment and Productivity in Kenya: a Comment". Eastern Africa Economic Review. June 1972.

20. Knight, J.B. "The Determination of Wages and Salaries in Uganda". Bulletin of the Oxford University Institute of Economics and Statistics. XXIV August 1967, pp. 233-264.

21. Knight, J.B. "Earnings, Employment, Education and Income Distribution in Uganda". Bulletin of the Oxford University Institute of Economics and Statistics. XXX November 1968, pp. 267-297.

22. Maitha, J.K. "Capital - Labour Substitution in Manufacturing in a Developing Economy: the Case of Kenya". Eastern Africa Economic Review. 5 (2) December 1973, pp. 43-52.

23. Mureithi, Leopold P. Demographic and Technological Variables in Kenya's Employment Scene. Discussion Paper No. 201. Institute for Development Studies, University of Nairobi, 1974.

24. Organisation for Economic Co-operation and Development. Wages and Labour Mobility. Paris, 1965.

25. Organisation for Economic Co-operation and Development. Occupational and Educational Structures of the Labour Force and Levels of Economic Development: Possibilities and Limitations of an International Comparison Approach. Paris, 1970.

26. Ostry, Sylvia W. "Interindustry Earnings Differentials in Canada, 1[illegible]-1956". Industrial Labour Relations Review. April 1959.

27. Pack, Howard. Employment and Productivity in Kenyan Manufacturing. Discussion Paper No. 149. Institute for Development Studies, University of Nairobi, 1972. (Eastern Africa Economic Review. 4 (2) December 1972, pp. 29-52.)

28. Papola, T.S. and Bharadwaj, V.P. "Dynamics of Industrial Wage Structure: An Inter-Country Analysis". The Economic Journal. LXXX March 1970, pp. 72-90.

29. Reynolds, Lloyd G. "Economic Development with Surplus Labour: Some Complications". Oxford Economic Papers. New Series. XXI March 1969.

30. Stoiker, Vladimir. "The Structure of Earnings in Japanese Manufacturing Industries: A Human Capital Approach". Journal of Political Economy. LXXXI March/April 1973.

31. Ulman, Lloyd. "Labor Mobility and the Industrial Wage Structure in the Postwar United States". The Quarterly Journal of Economics. LXXIX February 1965.

32. Wachtel, Howard M. Workers' Management and Interindustry Wage Differentials in Yugoslavia". The Journal of Political Economy. LXXX May/June 1972.

33. Weiss, Leonard W. "Concentration and Labour Earnings". The American Economic Review. LVI March 1966.