

# WORKING PAPERS

AN EXAMINATION OF EARNINGS DIFFERENTIALS  
IN AUSTRALIAN MANUFACTURING INDUSTRY

by

EVAN JONES

with the assistance of Mary MacDonald

No. 26

June 1978

# IN ECONOMICS

DEPARTMENT OF ECONOMICS

UNIVERSITY OF SYDNEY

AN EXAMINATION OF EARNINGS DIFFERENTIALS  
IN AUSTRALIAN MANUFACTURING INDUSTRY

by

EVAN JONES

with the assistance of Mary MacDonald

No. 26

June 1978

National Library of Australia Card Number and ISBN  
0 909426 80 5

The author is indebted to Mary MacDonald whose assistance with research was carried out with commendable competence and imagination. The author is also grateful to Gavan Butler, Viv Hall, Moira Salter and Frank Stilwell for comments on the draft and to Toula Markos for typing the manuscript.

The Reserve Bank of Australia provided the funds to support research assistance and computing work.

## TABLE OF CONTENTS

A. Introduction and Theoretical Background	1
B. Previous Studies	6
C. The Present Study	14
D. State of the Economy - 1968-69 to 1973-74: A Summary	26
E. The Structure of Equations	32
F. Results	
I. Levels of Earnings	35
II. Male and Migrant Ratios	57
III. Change in Earnings	67
G. General Conclusions	
1. Industry Characteristics and Economic Conditions	75
2. The Orthodox Theory of Earnings Differentials	76
3. Labour Market Segmentation?	78
4. The Dual Economy and Labour Market Segmentation	87
5. Worker Bargaining Power	89
6. Dynamics of the Period	91
7. Wage Spillover and Comparative Wage Justice	93
8. Further Work	95

## APPENDICES

A. Data Collection and Suitability	96
B. Australian Standard Industrial Classification Division C: Manufacturing	101
C. Data for Earnings, Productivity and Employment	109
D. Composition of Industry Division	121

TABLES

Table 1.	Regression Estimates: Average Annual Earnings, Manual Workers, Full 4-Digit Data; N = 157	36-37
Table 2.	Regression Estimates: Average Annual Earnings, Manual Workers, Division of 4-Digit Data by Turnover Size	43
Table 3.	Regression Estimates: Average Annual Earnings, Manual Workers, Division of 4-Digit Data by Degree of Capital Intensity	45
Table 4.	Regression Estimates: Average Annual Earnings, Manual Workers, 3-Digit Data; N = 40	49,50
Table 5.	Regression Estimates: Male and Migrant Employment Ratios, Full 4-Digit Data and 3-Digit Data; N = 157 and 40 respectively	58
Table 6.	Regression Estimates: Male and Migrant Employment Ratios, Division of 4-Digit Data by Turnover Size	60
Table 7.	Regression Estimates: Male and Migrant Employment Ratios, Division of 4-Digit Data by Degree of Capital Intensity	61
Table 8.	Regression Estimates: Change in Average Annual Earnings, Manual Workers, 1968-69 to 1973-74, 4-Digit Data; Division of 4-Digit Data by Turnover Size and Degree of Capital Intensity; 3-Digit Data	68,69
Table C1.	Data for Key Variables, 1968-69 and 1968-69 to 1973-74	110-119
Table C2.	Earnings, Productivity, Employment: Average for Manufacturing Sector, 1968-69 to 1973-74	120
Table D1.	Labour Intensive/Capital Intensive Division	121
Table D2.	Small Turnover/Large Turnover Division	123-125
Table D3.	Average Employment Levels of Sub-Groups of the Workforce, All Industry and Industry Divisions	126

AN EXAMINATION OF EARNINGS DIFFERENTIALS  
IN AUSTRALIAN MANUFACTURING INDUSTRY

A. Introduction and Theoretical Background

This paper examines earnings differentials of manual labour in Australian manufacturing industry. We are concerned to investigate the origins of differences in average earnings at an industry level within the manufacturing sector. The period examined covers the years 1968-69 to 1973-74.

A small body of literature in this field has been developed during the last fifteen years and is briefly reviewed in Part B below. The present study is more complex than is typical of this literature. It examines the determinants of the level of earnings and of the change in earnings differentials during the period. It is concerned both with the origins of historically determined differentials and with the question of whether such factors are still influential in recent experience. Two major issues are subject to examination - firstly, the influence of industrial structure on earnings differentials; secondly, the relation between earnings differentials and the segmentation of the manual workforce by the non-skill divisions of sex and nationality. Moreover, the study examines the potential interrelation between industrial structure and workforce segmentation.

The empirical examination of wages has been predominantly within the context of macroeconomic studies of inflation and of the distribution of national income. The issue of the origins of relative earnings, though of fundamental importance, has been largely set aside. Part of the blame must be laid on the lack of integration between theory and empirical studies in the field of wage determination. By 'theory', we mean orthodox or neoclassical theory. Whether it has been explicit or not, the concept of a homogeneous labour market has underpinned such theory, partly because of the desire for theoretical elegance and universality. In the context of competitive market analysis, marginal productivity then provided a theory of the wage for the 'typical' worker. Wage differentials were either ignored or treated as the result of disequilibrium situations (and therefore temporary) or as the result of market imperfections (in particular the action of trade unions). In a broader context, bargaining theory exists to deal with the difficult problem of bargaining power, especially for employer/employee conflict. However, the genre is essentially non-operational and offers no decent

conceptual framework for empirical research. Most of its practitioners appear content to leave bargaining theory at its present level of abstraction.

However the persistence of poverty in the affluent U.S.A. and among the same groups over time, and the observably unequal treatment of some groups, led to new developments in orthodox wage theory. In particular, the 1960s saw the development of both human capital theory and the theory of discrimination providing potential explanations for earnings differentials. The theory of discrimination is probably more conservative in that it sees the origins of discrimination in exogenous forces (psychic 'tastes'). Discrimination, at its worst, is culturally given and, by supposedly liberal standards, we must accept it for the present. At best, it is seen in the guise of another 'market imperfection', which, in principle, ought to be eliminated.

Human capital theory is more adventurous conceptually for a number of reasons. It involves a non-static framework, it broadens considerably the possible sources of labour productivity, and it allows for the possibility of, at least, an initially plausible segmentation of the labour force into non-competing groups.

At the same time, the detailed empirical study of urban ghetto poverty by East coast American economists led to the inference that the labour force was split into at least two quite distinct segments whose special characteristics involved much more than differential levels of education. Dual labour market theorists, as they called themselves, claimed that the primary and secondary segments of the labour force had their origins not only in personal characteristics, such as years of education, but in the nature of jobs themselves. Earnings differentials, and other non-monetary working conditions, were heavily influenced by industrial structure and production techniques. Generally, however, the emphasis has been not on differentials earnings but on non-monetary differences in job types, especially the character of job stability.

Further, some theorists involved in these 'dual labour market' studies who also have Marxist leanings have felt it desirable to put such observations on to a more thorough and radical theoretical foundation. Consequently, they have interpreted the secondary labour market in terms of an industrial 'reserve army', which includes not only the unemployed but also those underemployed and in generally undesirable conditions. This secondary labour market is made up predominantly of groups (distinguished by race and sex) against whom economic discrimination is readily possible because of

discrimination practised against them for other reasons. Moreover, the observed fragmentation of the labour force is interpreted as resulting from the capital owners' need both to contain general wage rises and to maintain control over the production process by means of well defined social hierarchies within the typical large firm. This attempt to prevent the establishment of a homogeneous labour force and the concomitant potential for collective militancy has been in evidence since the beginning of this century.

Those interested in the study of earnings differentials have seen a movement from a dearth to a plethora of theoretical explanations within a short period of time. The problem has changed from one of providing an explanation of differentials to one of choosing among alternative explanations.

The above is meant only as a brief introduction to the theoretical issues. A more detailed, if dated, comparison can be found in Gordon [1972]. The object of this paper is to provide additional insight into the nature and origins of earnings differentials and to contribute towards the resolution of the debate at the theoretical level.

Gordon [1972] and others have already pointed out the difficulties in discriminating between competing theories since much of the evidence which exists is either not sufficiently discriminating to damn one theory or the other, or has been collected for other reasons and is not particularly suitable. Nevertheless, there seem to be two features of orthodox theory which distinguish it from alternative views. The first is the emphasis on human capital as the dominant, if not the sole, source of labour force segmentation. This emphasis is rarely made explicit and must be inferred from the overwhelming attention given to human capital in the writings of orthodox theorists on this subject - see, for example, Thurow [1969] where, even with an atypical attention to other factors, human capital receives major attention. The second feature is the underlying belief in the strength of competitive market forces to gradually eliminate disequilibrium.

These two features offer a basis on which some discrimination between competing theoretical structures seems possible. The first issue hinges on whether earnings differentials can be shown to be dependent on factors other than personal characteristics. In particular, the nature of jobs as manifest in industrial structure provides the possibility for an alternative and independent influence on earnings differentials. The second issue hinges on whether earnings differentials for similar workers are seen to be other than temporary (in particular for reasons other than because of human capital

embodiment). Given some reservations, the net impact of this study is that its findings are against the implications of orthodox wage theory on both these issues.

The subject is important not only for the sake of economic knowledge but for the implications for economic policy. The implication of an emphasis on human capital is a policy which emphasises education and training for the poor and disadvantaged, supplemented by the improvement of job market information and labour mobility.

Lydall [1976] expresses admirably such an attitude towards those workers at the low end of the wage scale:

"There is much public discussion today about the problem of low pay. As a short-term measure, there is perhaps something that can be achieved by imposing a minimum wage or by collective agreements which favour the lower paid. Nevertheless, experience has shown that an artificial squeeze on differentials is usually not permanently effective. In the longer run, therefore, I believe that we must concentrate on measures to improve the education, the training, the self-confidence and the will to succeed of those who would otherwise end up in poorly paid jobs."

Many neoclassical economists have previously emphasised the advantages of the competitive market mechanism and, slipping from its theoretical exposition to the assumption of its existence in practice, have argued for leaving the micro-structure of capitalist economies to its own devices. Given this background, such an emphasis on education, mobility, etc. constitutes a progressive move from a conservative to a liberal stance, as these terms are usually used in the political sphere. Nevertheless, such policies may still be misplaced. Any discovery of earnings differentials of a persistent nature due to the structural characteristics of industry and jobs has important implications for the reduction of income inequalities.

As King and Langley [1976] point out, more and better schooling may be irrelevant if industrial and job structures are prior to the distribution of skills. The perpetuation of the existing structure of industry with its existing technology may necessitate earnings differentials. Marxist economists are particularly emphatic that earnings differentials are desired in their own right for reasons outlined above, and that job structures are not autonomous but are used to serve the end of labour divisiveness.

Granted these possibilities, such earnings differentials must be made acceptable by the segmentation of labour markets and the creation of cultural mores which support such segmentation. The alternative is to restructure production processes and alter our consumption patterns in the interests of greater income equality and more satisfying work processes. Such a policy involves a fundamental intervention in the structure of the economy and is too radical a proposal for most economists to envisage. We think it is implied if industry characteristics can be shown to be important determinants of earnings differentials.

It remains to summarise the approach adopted in this study. The method chosen is the application of ordinary least squares multiple regression techniques to average earnings for production workers across industries in the manufacturing sector. Independent variables are classified into two groups - 'industry characteristic' variables representing market and industrial structure such as concentration and productivity; and 'personal characteristic' variables representing qualities of the workforce such as skill and sex. The intention is to examine two possibilities - that industry characteristic variables exert a systematic and permanent influence on the earnings of manual workers of similar skill; and that the segmentation of the manual workforce by sex and nationality is one means by which such earnings differentials are maintained.

### B. Previous Studies

To the authors' knowledge, there have only been two previous studies of this topic in the Australian context - by Kmenta [1963] and by King and Langley [1976].

Kmenta's study has special relevance as a precedent. The variables used in that study were borrowed from an early article by Dunlop [1948] though they appear to be of fairly general significance. Kmenta's theoretical justification is slim and is based on orthodox labour theory. His earnings equation is only vaguely related to the theory, and strings together a group of 'plausible' variables. Given the poor state of theory in labour economics, one has much sympathy for this low keyed empirical approach. Yet, in this case, the genuflexions to the marginal productivity principle appear somewhat unwarranted.

Kmenta's main equation contains the following variables:

- dependent - the change in the average earnings of male-equivalent unskilled workers over the period 1947-54.
- independent - change in average physical productivity of labour;
- change in the volume of output;
- labour costs as a proportion of total direct costs;
- product market measure of competition (two measures are tried - the industry percentage gross profit margin and the concentration of employment);
- proportion of migrants in the industry workforce.

The change in average earnings is used as the dependent variable, rather than the level of average earnings. The intention is to explain the change in dispersion rather than the dispersion itself. No defence is offered for this choice.<sup>1</sup> The issue of wage changes versus wage levels will be explored below.

The results of Kmenta's study are disappointing. The only two significant variables are the labour cost percentage and the change in labour productivity (though the proxy for the latter variable seems unsatisfactory). However, Kmenta achieves a significantly better fit by splitting his industry sample into

two groups, depending on the value of output. For 'small' industries, only the labour cost percentage and the concentration of employment are significant (highly). Kmenta concludes that most of his group of variables are statistically insignificant, while the influence of the remaining variables differs between small and large industries.

That labour cost percentage and the concentration of employment are significant in the case of large industries seems plausible. Both variables are seen as 'bargaining power' variables. Note that the latter variable, i.e. the percentage of total labour force employed by the largest 10% of factories, is used as a measure of product market power. This measure incorporates both firm concentration and differential employment concentration across industries.

That the change in productivity is significant in the case of small industries is surprising. The particular measure used shows productivity to be increasing faster in small industries during the period considered. No explanation is offered for this unexpected phenomenon. One possible scenario is that small industries are more competitive, and that competitive industries are compelled to pass on productivity increases. But whence came these productivity increases in the first place? The measure used to represent labour productivity is an unusual one: it appears to be reducible to the percentage increase in wage bill per man employed over the period. This measure, discussed below, would seem to involve some circularity; and the surprising feature is that it does not perform even better.

King and Langley suggest a number of demand variables to be regressed against average annual earnings of manual employees. They make no genuflections towards a high level theoretical 'model'. The variables they suggest are as follows:

- |             |   |
|-------------|---|
| dependent   | - average annual earnings of manual workers, unadjusted and adjusted for male 'equivalents' (comments from hereon refer to unadjusted earnings);      |
| independent | - average labour productivity: represented by value added per capita (p.c.);  |
|             | - capital intensity: p.c. expenditures on electricity and fuel, on the assumption that capital intensive techniques entail substantial energy inputs; |
|             | - firm size: the percentage of the industry's work force  |

- employed in enterprises with a payroll of 100 or over;
- product market competition: the Australian Standard Industrial Classification (ASIC);
- modernity of industry technology: proportion of white-collar to total employment;
- proportion of women employed.

In addition, variables for profits and union strength were considered, but eliminated for lack of suitable proxies.

King and Langley do an ordinary least squares (OLS) regression for both 3-digit (40) and 4-digit (153) ASIC industry groups. For the 3-digit industry equation, female employment, average value productivity and capital intensity are significant. For the 4-digit industry equation, female employment, capital intensity, proportional white-collar employment and firm size are significant. Several issues are raised below which take as their starting point the King and Langley paper but which are intended to refer generally to the literature on this subject.

#### 1. Levels versus Changes in Earnings Differentials

King and Langley's equation purports to explain the level of earnings, whereas Kmenta seeks to explain the change in earnings differentials for a particular period. Whether the research in this field should attempt to explain the levels or the changes in wage differentials is an important consideration which is mostly neglected. This neglect is probably a manifestation of the fact that the conceptual framework for understanding wage differentials is poorly developed. Most of the recent studies use wage levels, without expansion, as the dependent variable.

It appears to be asking too much to hope to explain the level of earnings by contemporaneous values of other variables, no matter how plausible the relationship. It is probable that the level of current earnings has been influenced by many factors in the past and that these influences have, to some extent, been cemented into existing relativities. Limiting the study to wages of manual workers would reduce the potential influence of cultural mores and the temporal shortage of particular skills. Nevertheless, historical factors, such as unusually rapid development of particular industries, may have been influential in establishing the currently observed differentials in earnings of

manual workers. A thorough examination of earnings levels requires the supplementing of a contemporaneous study by a systematic account of the influence of historical factors.

The alternative procedure is to examine the influence of the chosen independent variables on the change in earnings differentials, in an effort to eliminate the past influences. Weiss [1966] argues that this approach is undesirable, since it implies testing the hypothesis that wages in concentrated industries (for example) increase continuously relative to those in unconcentrated industries.

Weiss' adverse judgement glosses over a number of issues. Firstly, all historical changes occur in the 'short run'. Marginal adjustments to wage differentials may be due to specific temporal industry characteristics, such as changes in 'value added', or contemporary industry-specific economic conditions. Examining wage differential levels may not adequately expose such potential influence.

Secondly, market power, ceteris paribus, may very well be conducive to continuous increases in earnings differentials. In principle, productivity and profit levels which diverge over time across industries should lead to divergence in wage differentials. Empirical studies will not support this correlation; but the reason is not due to any deficiencies in the conceptual link between market power and wage differentials. The reason is probably due to the powerful notion of comparative wage justice which, as an extraneous influence, modifies the impact of industry-specific variables. This factor also provides an important link with the study of inflation.

The operational impact of comparative wage justice presents a great dilemma for this study. Before the current indexation package was introduced in 1975, the situation existed where upwards of 400 wage awards were tied to the awards determined by the Metal Trades decision. The net impact of wage increases due to market power will be reflected partly in wage inflation due to the operation of the wage justice principle and partly in changes in earnings differentials. Indeed, what is surprising is that earnings differentials for manual workers are of such magnitude and persist over time, in spite of the normal public deference to the strong pressure of the wage justice principle.

Two interpretations are possible. The first is that the differentials are due predominantly to differences in hours worked and/or to skill differences in the manual labour force. The second is that these factors, while influential, are not predominant and that residual differentials exist to which the wage justice principle does not apply. The practice of labour market segmentation creates such differentials. The practice has its own philosophy which exists specifically in order to make the wage justice philosophy inoperative in a particular arena. The philosophy of labour market segmentation involves the claim that segments of the labour force, be they distinguished by the sex, race or country of birth of the individuals involved, do not share the same work capacity and that, therefore, the application of the wage justice principle should be modified.

It is this philosophy which makes the choice between the two interpretations above very difficult and which introduces circularity into arguments to be found in much of the literature. Fundamentally, does the claim that less skill is embodied in the female members of the labour force constitute a factual or an ideological statement? This question is pursued below.

In summary, there is no evident reason why either the level or the changes in earnings differentials should be preferred in principle as the dependent variable. Both variables have conceptual difficulties. Granted this uncertainty, both variables ought to be the subject of empirical examination to clarify their determinants.

## 2. Female Employment and Low Earnings

The variable representing female employment is included in King and Langley's equation with little conceptual justification. The most elementary of empirical enquiries would inform one of the relatively low pay of female employment. One doesn't need a sophisticated regression analysis to discover that female employment is correlated with low wages. Furthermore, it may be inappropriate to regard female employment as a cause of low wages; it may instead be a consequence.

The overseas literature provides little help on this point. The study by Weiss [1966] is nominally a seminal study of this field. Weiss uses data for individuals rather than for industries. The regression given particular emphasis is that for the level of

earnings of semi-skilled males. Weiss does use as an explanatory variable the percentage of the industry labour force that is male. Since the dependent variable refers to male earnings, however, it is not clear what the sex ratio variable refers to. Weiss offers no justification for its inclusion. The variable happens to be significant, but it is possibly a reflection of industry characteristics like size, union strength, productivity, etc., which ought to be included in their own right. If the sex ratio variable has any independent validity, the reasons are not apparent.

Hood and Rees [1974] try the same variable in a similar context. They imply that the joint presence of both sexes in an industry's manual work force makes the sexes competing groups. It is then possible, they argue, that the higher the proportion of female workers in an industry, the lower will be the level of male wages. The interpretation is not immediately inspiring. In any case, the sex ratio variable is insignificant in Hood and Rees' results (while it is significant in Weiss' results). King and Langley attempt the same curious feat, regressing the sex ratio on earnings adjusted for male equivalents. Again the variable is insignificant.

Brown [1962] uses a sex ratio variable in the same context as King and Langley's first equation: it is regressed against average annual earnings. Again the variable is significant in the multiple regression equation.<sup>2</sup> The problem lies in the interpretation of the positive results. Brown acknowledges that the influence might work in either direction. That is, either low 'capacity to pay' requires the employment of females, or the low skill of females invites low pay. Brown concludes vaguely that the influence is in both directions and leaves the matter up in the air.

Presumably it is possible to test the direction of influence by regressing earnings on industry characteristics both with and without a sex ratio variable. Howarth and Rasmussen [1971] add what they call 'labour quality' variables to the equation from Masters [1961] which includes only industry characteristic variables. These additional variables include the sex ratio, but the defence is circular and offers no insight as to the direction of influence. Econometrically, the addition of variables for sex and race makes no difference to the coefficients of a productivity variable (capital/labour ratio) and a

plant concentration variable, but does reduce the significance of the unionisation variable. Howarth and Rasmussen drop the unionisation variable, since it is significant in the combined equation only at the 7% level. Their ultimate conclusion, that unionisation (representing a labour market imperfection) is irrelevant, is not the only interpretation of their evidence. Regardless of the verbal explanation in the text, there is an implicit interpretation involved in the use of the sex ratio - that it is indicative of labour quality.<sup>3</sup> The fact that males earn more than females is not only an explanation of industry earnings differentials but something which in itself is to be explained. The interchangeability of the sex and race variables with the unionisation variable in Howarth and Rasmussen's study may indicate the means by which white males enhance their relative money wages. For that reason, one ought to regress earnings on industry characteristic variables both with and without sex and race variables (in the Australian context, nationality is substituted for race).

In addition, the direction of influence might become clearer if one were to regress the sex and migrant variables themselves on the industry characteristics. A reasonably high coefficient of determination would presumably point to the 'capacity to pay' interpretation. The studies by Hood and Rees and by Brown indicate high correlations between the sex ratio and industry characteristics.

### 3. Productivity Measure

King and Langley's productivity variable is a value measure, incorporating the effect of price changes. A measure of physical productivity is preferable. Kmenta's attempt to provide one is desirable, but the cure may be worse than the disease. Measures of productivity in both value and constant price terms are pursued below.

### 4. Concentration and Market Power

King and Langley's concentration measure fails to render a significant influence in their equation. This failure conforms with some of the overseas findings. Brown finds a significant influence of concentration on wage levels. This is not true of the studies by Weiss, Masters, Howarth and Rasmussen, Sawyer [1973], and Hood and Rees, when other industry characteristics are included in the equation.

The failure of the concentration variable is surprising. Plant size, however, appears prominently in the studies of Masters, Howarth and Rasmussen, and Sawyer. Hood and Rees suggest that plant size is a proxy for barriers to entry but find no influence. Masters' article, in particular, is specifically devoted to the empirical importance of plant size but his conceptual defence is singularly unconvincing. Sawyer recognises that, in itself, plant size offers no explanation of higher wage levels and goes to considerable lengths to find a more basic explanation of this statistical correlation. Of all the factors examined, including type of payment, unionisation, labour quality, only the hours of shift work is significantly related to plant size.

One apparent weakness of the King and Langley concentration measure lies in their presumably using 4-firm percentage turnover figures for the 3-digit equation as well as for the 4-digit equation. 3-digit 4-firm ratios may give some indication of vertical integration and conglomerate power, but they are probably misleading as indicators of market power of industries within that group.<sup>4</sup> This anomaly would have to be corrected for further estimation using 3-digit data.

#### 5. Union Power

King and Langley made no attempt to gauge the significance of union strength on relative earnings. Finding a meaningful proxy for union strength is a difficult task at the best of times. In Australia, the non-existence of disaggregated data for strikes or union membership makes the task doubly difficult. It raises the question of whether a bad proxy is better than none at all. This question is discussed below.

#### 6. Collinearity

In King and Langley's equation, there is a high degree of collinearity between several pairs of variables, notably productivity and capital intensity, productivity and the white-collar ratio, and concentration and firm size. The selective elimination of one of each pair may enhance the explanatory power of the remaining variables.

### C. The Present Study

The present study is an examination of the influence on earnings differentials of manual workers (both levels and changes) of two broad categories of variables - those which characterise industries and those that characterise people. 'Industry characteristic' variables include: market power, plant and enterprise size, union strength, productivity, labour cost ratios, capital intensity, tariff levels, foreign control, profit rates, industry vacancies and employment growth. 'Personal characteristic' variables include those which distinguish the industry workforce by skill, sex and country of origin.

The details and the problems of finding adequate measures are outlined below. This study relies heavily upon the Australian Bureau of Statistics publication Manufacturing Establishments (Ref. 12.29), in which industry-specific detail has been published since 1968-69, depending upon the newly introduced Australian Standard Industrial Classification code (ASIC). Details of the problems involved in obtaining adequate data are discussed in the Data Appendix.

#### 1. Earnings

We seek a measure which refers, ideally, to a work force homogeneous in all respects other than the industry in which individuals are employed. Such a work force is impossible to find in practice, even where the data are better than are to be found in Australia. The only disaggregated data available for earnings are to be found in the A.B.S. publication (Ref: 12.29). The most useful figures reported refer (after manipulation) to average earnings of 'production and all other workers'. These figures hide the variety of skills possessed by members of the manual workforce, and the number of hours worked.

There are little data on the number of hours worked (see Appendix A). Certainly the data permit no modification of the earnings figures. While there may be no marked differences in hours worked (and this is suggested by the data that do exist in regard to 2-digit industries), the absence of any basis on which to adjust for such a factor does weaken the present study to a degree.

In regard to the skill factor, some form of adjustment is possible, but its nature is basically determined by available data.

Kmenta attempted to eliminate the skilled component from the manual workforce by modifying the dependent variable. He estimated the average earnings of unskilled workers in the following steps: estimation of across-the-board average margin for skill from deliberations of the Arbitration Commission; the establishing of the proportion of skilled to unskilled workers for each industry from census figures for the start of the period; and reduction of average earnings to account for the margin for skill, on the assumption that the absolute difference in the average wage of skilled to unskilled workers is equal to the average margin for skill.

The prospect of repeating Kmenta's exercise for the skill margin is a daunting one, especially since the movement towards the total wage concept by the Arbitration Commission in 1967 means that there is not even a base figure from which to make further modification.

Alternatively, one can introduce one or more independent variables representing various dimensions of the skill factor in an attempt to account for the influence of labour 'quality' on earnings. This is the approach pursued in this study; and the issue is discussed below under The Skill Factor, in the context of variables representing personal characteristics.

The variable to be explained, then, is average earnings for manual workers, unadjusted for differences in skill.

## 2. Industry Characteristics

### (a) Market Power: Concentration and Profit Margins

In 1968, for the first time in Australia, the Integrated Economic Census produced figures on industrial concentration in Australia. Figures exist for the years 1968-69 and 1972-73.

The figure for industrial concentration is the obvious choice for a proxy of corporate market power. Such a choice follows a tradition established overseas; but there is no doubt that the proxy has its limitations. One is the understatement of market power involved when transport costs and controlled retail outlets make the relevant spatial area significantly less than the whole country. Beer and bread are obvious examples of products falling within this category. Another is the existence of various degrees of competition from overseas. There appears to be no ready measure of the strength of overseas competition - certainly the level of tariff rates do not supply such a measure.

Despite such limitations, the concentration measure appears to be a superior proxy to other measures used previously in similar studies, namely, the industry concentration of employment, or the estimated profit margin. As we mentioned earlier, the first of

these measures covers both firm concentration and employment concentration. The reasons for the statistical significance of employment concentration are not clear, and its conceptual link with product market power is tenuous. Indeed, it is possible that employment concentration is an alternative measure of union bargaining power, since worker organisation is facilitated if carried out in a few key locations.

The links between profit margins and product market power are also tenuous. There is no doubt that some industries with market power make consistently high profit rates, for example pharmaceutical drugs and cigarettes. But several factors intervene in what could otherwise be a close relationship. Firstly, accounting methods are not consistent across industries, and reported profits may not give the measure of 'operational profitability' that we seek. Secondly, product market power gives a firm the opportunity either to increase its profit margins through aggressive marketing, or to lead the quiet life. It is probable that the steel and automobile industries, at least in the U.S.A., avail themselves of this latter opportunity. Thirdly, some firms may seek rapid growth through regular capital investment programs. The top priority of these firms may be the long term increase in profit mass, even at the expense of profit margins.<sup>5</sup> Finally, some firms, because of militant union action, may be forced to pass on some profits in the form of higher wages. High profit margins therefore imply certain other conditions as well as the possession of product market power.

King and Langley use the typical '4-firm percentage of turnover' figure to represent firm concentration. There may be some value in using the 8-firm turnover percentage. There are a good number of Australian industries for which the 8-firm percentage is very close to 100% and in which industry 'solidarity' is known to be tight, but which would appear only moderately concentrated on the evidence of the 4-firm percentage. Into this category fall such important industries as beverages and malt beer, pharmaceuticals, petroleum refining, motor vehicles and rubber tyres. On the other hand, industries of low concentration show little proportional change in the contribution to turnover of the second four firms. The 8-firm percentage has the effect of narrowing the gap between the industries of extremely high concentration and those of moderately high concentration. We regard this as desirable, given the possibility for interdependent behaviour,

if only tacit, by up to eight firms. Even though there is a high correlation between the 4-firm percentage and the 8-firm percentage, refuting the impressions gained from a casual examination of the figures, nevertheless, in principle, the 8-firm percentage seems the more desirable measure.

The meaning of concentration figures for 3-digit data was discussed above. 3-digit turnover ratios cannot provide a measure of market power in the various industries making up a 3-digit group. One possible measure for the 3-digit level of analysis is an average of the 8-firm percentages for each 4-digit industry within a 3-digit group, weighted by its proportional contribution to total turnover of the group.

Since some figures do exist for industry profit margins, it seems desirable to examine their empirical influence in their own right, on earnings differentials. The Industries Assistance Commission has published a variety of measures of profit rates for the years 1970-71 to 1973-74, for industries roughly comparable to 3-digit ASIC. Some authors, Levinson [1971] for example, have argued that the modern corporation is less concerned with profit than with cash flow. Cash flow represents revenue after all necessary payments have been made to claimants on revenue outside the firm and before depreciation and dividends have been allocated. It is argued that the latter payments are, to a certain extent, discretionary in their size, especially depreciation charges. Thus cash flow is the revenue available to management for discretionary disbursement. Perhaps total cash flow is the ideal figure, but no data exist for such a concept. Cash flow as a percentage of funds employed is calculable from I.A.C. data, and it is this measure which will be used to test for the possible influence of profits on earnings differentials.

#### (b) Plant and Enterprise Size

Given the attention paid to plant size in the overseas literature cited, especially in its relation to the concentration measure of market power, it might be desirable to measure its influence in the Australian context.

Some figures do exist, collected as part of the infrequent manufacturing census. Plant size can thus be represented as the

proportion of employment in establishments employing 100 persons or more.

An alternative measure of employee concentration is enterprise size, which includes the effect of ownership as well as the size of plants. King and Langley use this measure. Since it is significant in their study, it would be useful to employ this measure if for no other reason than to see if this significance holds in conjunction with a broader range of variables.<sup>6</sup>

(c) Union Power

Overseas studies, for all their problems, are not beset by a particularly grave task in the measurement of union power. In Australia there are no figures for the percentage of workers unionised across industries, as there are for the U.S.A. and the U.K. There does exist for Australia a record of industrial disputes during the period beginning 1973. The record is for industry groups at the 2-digit level; but since even at this level the range of 'militancy' is striking, it may be possible to use this information. However, there are some problems in the development of the most suitable proxy for union power. Primarily, revealed militancy is not necessarily synonymous with power. A greater number or a greater length of disputes may be an indication of weakness, not of strength. This may be the character of strike activity seen as a defensive action, which may be correlated with a decrease in earnings. Additional support for a potential inverse relationship between strike statistics and power is the existence of sweetheart agreements, where union compliance is promised for the guarantee of higher earnings. A more detailed study of this subject would involve an examination of the relative extent of sweetheart agreements across industries.

Assuming, as a first approximation, that dispute figures do provide a reasonable representation of union power, there is the second question of which variable is the most fruitful proxy - the number of disputes, the number of workers involved, the number of days lost. The number of disputes omits the duration and, for this reason at least, seems inappropriate as a proxy. Number of days lost per worker involved indicates the intensity of strikes in an industry group. On the other hand, the level of profits threatened by disputes might be relevant in wage determination; and for this the number of workers involved as well

as days lost per worker would be important. The choice between the number of days lost per worker and the total number of days lost is not settled by a priori reasoning; so both proxies are examined alternately.

Despite the limitations, 2-digit data, partly improvised, will be used as a proxy for union power for all industries within a specific 2-digit classification. Although this is an unusual practice, its effect is mid-way between the normal one-to-one configurations and the use of on-off binary dummy variables.

#### (d) Productivity

A prime variable for consideration ought to be the physical productivity of labour. Kmenta shows concern that, while the theoretical concept of marginal product appears to him to be logically superior, average product stands a greater possibility of operational definition. Our opinion is that this concern is misplaced. Average labour productivity is, conceptually, the important variable. There may not be, however, an acceptable empirical measure of it.

Kmenta made a sophisticated attempt to estimate the change in the physical productivity of labour. He divided turnover per man (unskilled male equivalents) in the end period by turnover per man in the base period, adjusted for industry price changes. The limitation of his attempt arises in the construction of an industry price index. This is estimated as the general wholesale price index adjusted by the proportionate change in the ratio of industry value of output to total wages bill. It appears that the overall measure for physical productivity then reduces to the (price adjusted) proportionate change of average wages. If this is so, there is some circularity involved in the use of such a proxy to 'explain' changes in average wages; so there is no strong reason why one should follow Kmenta's example in the use of his index.

King and Langley, as explained above, ignored the problem by using value added figures. This, of course, includes the influence of changes in both average physical productivity and prices. The value measure of productivity, although less satisfactory, does not render the measure useless.

The recently completed Australian Bureau of Statistics publication, Indexes of Manufacturing Production, includes indexes of manufacturing production at constant prices for each year in the period.

1968-69 is the base year. Insofar as the concentration statistics are presumed to be a proxy for market pricing power, one would expect a higher correlation between the concentration variable and value labour productivity, than between concentration and the production index. Consequently, the index would be expected to be the superior measure of labour productivity. Both measures will be examined here, partly because of the more complete data existing for the value measure.

The period of time considered in the analysis of productivity changes is by no means insignificant. Short term changes in labour productivity probably reflect changes in capacity utilisation. Long term changes probably reflect changes in technique. It is the latter variable which economists (in their explanatory capacity) presume to be a possible determinant of wage changes and also (in their prescriptive capacity) claim as a just cause for wage changes. Since wage changes, like everything else, are made in the short term, and specifically in the latter portion of the cyclical upswing, it is possible that changes in capacity utilisation are also responsible for wage changes in practice. This effect could be gauged by using alternatively short and long periods in which the productivity change is measured. Kmenta's period of 7 years could be expected to pick up the influence of changes in technique. Here a five year period, the maximum for which data exist, can be examined for a similar influence. Alternatively, a one year period can be used to test for a possible short term influence.

#### (e) Labour Costs compared to Total Costs

Alfred Marshall laid down four key factors determining the price elasticity of demand for labour. One of these is the ratio of labour costs to total costs. Except in a special case, it is expected that the lower is this ratio, the more inelastic is the demand for particular labour.<sup>7</sup> Extending this to all manual labour, the expectation is that the lower the ratio of manual labour costs to all costs, the higher will be average earnings.

It is ironic that a variable which is so simple conceptually should be so difficult to put into operational form. The difficulties, of course, lie with the measurement of costs of capital. Firstly, there are fundamental problems of allocating costs of capital

equipment in proportion to its use. Secondly, there is the problem that depreciation allowances are used explicitly for eliciting favourable profit figures and not for the purpose of cost allocation, and that the published accounting figures reflect this purpose. Thirdly, figures for value of assets and of depreciation allowances, even though limited, may not be generally available.

Kmenta's variable is a measure of wage costs as a percentage of total direct costs, which include the total wage bill, materials, maintenance and fuel. This variable was significant for Kmenta's large industry group. 4-digit depreciation and interest data exist for 1968-69, which could be added to direct costs to give a measure of total costs. Because of the limited availability of depreciation data and their dubious value, we cannot but examine wage costs in relation to direct costs as well as total costs. The issues are discussed in more detail in Appendix A.

One other qualification to the question of the most desirable ratio is the possible relationship between the earnings of manual workers and the earnings of non-manual workers. If there is a reasonably close relationship between these ~~two~~ groups because of the pressure to maintain wage relativities, then it is illegitimate to treat the earnings of manual workers independently. If one has strong reason to expect interdependence, the variable can be redefined to include the total wages bill in the numerator.

#### (f) Tariff Rates

It is possible that differential tariff rates influence inter-industry earnings differentials. A priori arguments could be used to defend either a positive or a negative relationship. High tariff rates can be a barrier to competition by which higher earnings are achieved. This argument is certainly part of the popular understanding of the consequences of the selective use of tariffs. On the other hand, tariffs can provide partial support to industries which, for other reasons, are subject to low earnings. A cursory examination of the 4-digit industries in the textiles, clothing and footwear groups indicates that the latter explanation is more accurate.

The average effective tariff rate is used as the most appropriate measure of specific protection to test for the possible

influence of tariffs on average earnings.

(g) Foreign Control

The subject of foreign control is an emotional issue which has been the source of much academic conflict; yet its possible connection with differential earnings has received no attention. Data exist for the percentage of foreign control across industries (at the 3-digit level) and it seems desirable to check for a possible connection in the context of this study. No strong a priori reasons exist for either a positive or a negative connection, but this is an opportunity for an ad hoc empirical examination in the hope of some theoretical insight.

It is possible that there is a connection between foreign control and earnings, but that it operates through other variables insofar as foreign control is related to certain industry characteristics. This possibility could also be examined in terms of the correlation of the foreign control percentage with other variables.

(h) Industry-Specific Economic Conditions

It would seem desirable to account for economic conditions at the time under examination, in order to separate the possible influence of the state of demand from 'extra-market' forces like concentration and union power. For this purpose an industry-specific measure of economic conditions is desirable. A figure for industry vacancies would appear to be an appropriate indicator. In this regard, the situation is an extremely frustrating one for the academic, since figures unexpectedly exist for industry vacancies, but they are not strictly comparable (see Appendix A).

An adaptation of C.E.S. vacancy statistics will be used to test for the influence of the strength of excess demand in the labour market.

Each of two other variables could, in principle, be used as a representative proxy for industry-specific demand conditions. Those variables are the growth of investment expenditures, and the growth of employment. The first variable would need to be standardised into, for example, the growth rate of net assets. Unfortunately, this would introduce problems due to the variability in the nature of valuation of assets.<sup>8</sup> The growth of employment is another possibility, and this

variable is readily available.

Hood and Rees use a five year employment growth variable in their study, which is just significant at the 5% level. Weiss also uses an employment growth variable, which is highly significant in his equation before the 'personal' characteristics of race, education, etc., are added. However, Weiss takes the change in employment for a discrete ten year period. One would expect that labour market pressures would be felt in the short term, and that short-period changes would be a more plausible measure of labour market pressure. The longer the period involved, the greater is the possibility of the use of labour saving techniques, or the increase in labour supply.

An employment growth variable will be examined for its potential influence on changes in average earnings in both a short and a long-period context.

### 3. Personal Characteristics

It is important to include variables representing the 'personal' characteristics of the industry-specific workforce, both for their independent influence on earnings and their possible connections with the variables representing industry characteristics. Those who argue that labour markets operate effectively must, on the other hand, attach primary importance to 'personal characteristics'; for them, it must follow that permanent earnings differentials can be explained entirely in terms of personal characteristics and, in particular, by differences in labour quality. In the context of the present study, two possibly related issues arise. The first concerns the question of skill. The second, the question of the possible segmentation of the labour force and its basis.

Collins [1975 & 1977] and Power [1975] claim that important divisions of the labour force exist along lines of sex and birthplace (the Australian analogy for race). Surprisingly, much of the discussion of segmentation in the literature does not revolve around wage differences, but around other conditions of employment, such as job stability, the possibility of upward mobility and working conditions (see, for example, Piore [1975]). In the present study, our concern is with earnings differentials and with the relationship between industrial and job structure. The considerations here are not only the relation

between low pay and the segmentation of the labour force, but the links between such low pay and industrial structure, and the causal relations involved.

(a) The Skill Factor

We have chosen to incorporate the possible influence of the skill factor by including proxies for certain dimensions of skill as independent variables. (Earnings differentials, the dependant variable, necessarily refers to all production workers.) Were skill variables to explain the greater part of the variation in earnings differentials (assuming the reliability of the proxies), the orthodox approach to labour market analysis would be somewhat vindicated.

It is, in principle, possible to estimate the proportion of skilled to unskilled workers from figures collected in the 1971 Population Census. This is a fairly arbitrary exercise since the distinction between 'skilled' and 'unskilled' is not clear cut. The Census classifies individuals across ASIC industries according to both occupations and qualifications. An approximate skilled/unskilled division could be estimated by assuming that certain occupations are in unskilled or semi-skilled categories. Alternatively, the division may be estimated by separating qualified from unqualified workers. Both of these alternatives have their pit-falls, but they appear to be the only available means of eliminating the skill component from the manual worker category. The latter alternative is chosen here.

The ratio of the workforce with trade or technical qualifications is added as an additional explanatory variable, representing labour quality enhanced by formal (technical) education. However, a 'formal qualifications' variable neglects skills acquired on the job, something which has recently been claimed as an important dimension of labour quality by some economists, including the 'dual labour market' group. Some measure of 'on-the-job experience' is, in principle, desirable; but the operational difficulties are immense. Thurow [1969] used personal data for 'years in the work force' as a proxy for on-the-job experience. Such an attractive measure is not available to us. The only available measures which are remotely linked to the desired theoretical concept are those from the 1971 Census published by the Industries Assistance Commission. The first measure is the percentage of the industry workforce over 45 years of age. The second is the percentage over 25 years of age. The former measure will be used as a proxy for on-the-job experience. Of the two 'age' variables, this seems preferable.

There exists a disadvantage in the use of such variables as the percentage of the workforce over a certain age as proxies for labour quality. It is the use of a one-dimensional quantitative measure for a multi-dimensional concept. We are interested not only in the skill proportion in the industry workforce but also the degree of that skill. It is conceivable that one industry can employ relatively less skilled manual workers than another industry, but that the kind of skill involved is such that the group commands higher total earnings than the larger skilled group in the other industry. Theoretically, this would lead to an inverse relation between the skill ratio and average earnings, a relation which is contrary to our expectations for the variable. We are in effect denying the empirical importance of such a theoretical possibility. Unsatisfactory as this may be, no alternative route seems possible. Such limitations are inherent in econometric work, especially with the kind of data which exist for research in Australia.

#### (b) The Sex Factor

Since females observably earn lower wages than males, one has every reason to expect a significant relationship between the sex make-up of the industry workforce and average earnings. The concerns here are the strength of the influence due explicitly to sex, the links between this relationship and other possible influences, and the causal direction between low pay and industrial structure. The male proportion of the industry-specific manual workforce is readily available on an annual basis.

#### (c) Birthplace

The same considerations that are relevant for female participation and earnings are also relevant for migrants. In addition, there is the more fundamental question about whether migrant workers are discriminated against in the workforce specifically in terms of pay. Arguments and figures have been forthcoming to support both points of view. For example Collins [1975] argues that, other things being equal, migrants do receive lower pay than other workers. Blandy [1977] argues that this is not the case.

As explained in the introduction, we are concerned with the possibility that workers differentiated by sex or by birthplace (or both) may form segments of the labour force separated from other, more advantaged

segments. Here we can only be concerned with the dimensions of such segmentation linked to industrial structure.

Unfortunately, figures for the percentage of the industry-specific workforce born overseas do not exist on an annual basis. The 1971 Census provides figures for that year only.

It has also been possible to split up the migrant percentage across two dimensions - according to sex and birthplace (Southern European and 'Others') - see Appendix A. The basic migrant percentage will be seen to produce certain anomalies, making the further disaggregation desirable.

The 1971 figures are used for each year of the study. Clearly, any tendency for migrant percentages to change endogenously with structural change is thereby suppressed. There is a very real possibility of such a change, and an important one, but it can only be ascertained from inter-censal comparisons. As things stand, the 1971 equations are seen as the most reliable in indicating the importance of the migrant percentage.

There is the possibility of a statistical bias arising in the coefficients of all the migrant variables. All the ratios available refer to the total industrial workforce. In principle, we prefer ratios referring to the production workforce. As one expects that relatively more migrants are to be found in production employment (although there may be substantial differences between distributions for different groups<sup>9</sup>) than is the case with Australian workers, the measures used almost certainly understate the percentage of migrants in the production workforce. We infer that this error would impart an upward bias of varying degrees in the coefficients of the variables representing the employment of different migrant groups.

#### D. State of the Economy - 1968-69 to 1973-74: A Summary

The period under discussion was chosen for pragmatic reasons - the availability of detailed and consistent data. Concern is often expressed that periods under study should be systematically linked to reference points in the trade cycle. Fortunately, this is more of a problem for time series analysis than it is for cross-section analysis. Moreover, the period under discussion is interesting in that it marks the period of transition between the reasonably stable era of post-war growth and a period of the coexistence of large scale wage and price rises with unemployment. This study ought to provide some insight into the character, if not the origins, of the latter period.

In a nutshell, the period 1968-69 to 1973-74 begins during the upswing of a short cycle (dating from 1966 in terms of net unemployment figures) which reached its peak in 1969-70. There followed two years of relative decline and recession, bottoming in 1971-72. 1972-73 was a year of rapid expansion, culminating in the classic boom conditions of 1973-74 with bottlenecks both in capacity and in labour markets. The stringent credit squeeze in mid-1974 marks a convenient end point to Australia's last period of high economic activity. In broad aggregate terms, the period includes short-cycle peaks in economic activity, roughly in the years 1969-70 and 1973-74.

It has been claimed that the first of these peaks was selective in its effects.<sup>10</sup> The expansion appeared to be initially located in mining and urban non-residential construction. By 1967-68, it was claimed, manufacturing industry was generally sluggish except for chemicals and industries linked to spending in mining and construction. By 1968-69, however, the boom was fairly generalised. Rates of real output growth for industry sub-divisions ranged from 5% for wood products to 10% for chemicals (see Australian Bureau of Statistics publication ref. 12.36 for these and later figures). Although these rates are not extraordinarily large, growth was reasonably wide-spread and the average rate for all manufacturing industry was 7.3%.

Differing growth rates for the period became established during the slump years of 1970-71 and 1971-72. Chemicals, plastics and, to a certain extent, food products and cement, maintained reasonable growth through the slump. The average growth for the manufacturing sector was reduced to 2.2% and 2.9% respectively, finally rising to 4.9% in 1972-73. By 1973-74, growth was again generalised with the sole exception of food products. Some industries - plastics, chemicals, basic metals, textiles - experienced exceptionally high growth rates. Excepting food products, growth ranged between 5.4% for clothing and footwear and 14% for miscellaneous manufacturing (plastics). The average annual growth rate for the sector was 8%. The following table shows the compound growth rates of real output for the period.

Growth Rates: Industry Sub-Divisions1968-69 to 1973-74

Industry Code	Title	Growth Rates (per cent)
34	Manufacturing n.e.c.	8.4
27	Chemical, petroleum and coal products	7.8
29	Basic metal products	6.5
28	Non-metallic mineral products	6.4
26	Paper and paper products, printing	5.7
23	Textiles	5.3
21/2	Food, beverages and tobacco	4.5
33	Other machinery and equipment	4.1
25	Wood, wood products and furniture	3.9
31	Fabricated metal products	3.8
32	Transport equipment	3.2
24	Clothing and footwear	2.7
	Manufacturing Industry	5.0

Figures for earnings, productivity and employment are summarised in Appendix C, Table C2. Value labour productivity increased by 66% and real labour productivity increased by 21% during the period. The substantial difference indicates the influence of price increases on value productivity. The increase in average earnings outstripped both real productivity and value productivity, at 74%. The growth of earnings was not steady but exceeded the growth of value productivity for the years 1970-72 and 1973-74.

Total employment in manufacturing grew 5.6% from 1,289,000 to 1,361,000 (32% to 23.5% of the total workforce),<sup>11</sup> although it fell by 20,000 during the recession years. Production employment experienced

similar changes, being responsible for the decline in recession employment just mentioned. Overall it rose by 4.2% during the period (administrative employment rose by 10%). The percentage of males employed in the production workforce declined gradually from 74.2% to 72.6%. The percentage of males in administrative employment was stable at 70.5%.

This reasonable stability in production employment and in the relative employment of the sexes in the manufacturing sector as a whole gives a completely misleading impression of relative industry performance. Appendix C, Table C1, shows significant structural changes in production employment which are hidden by the aggregate data. There are also sizeable industry changes in the relative employment of the sexes (not shown).

It might be expected from a number of successes by women in regard to wages awards during the period that female wages would have increased and that the employment of females would have become less attractive for employers. Between 1959 and 1968 (see Ryan and Conlon [1975]) several States passed legislation for equal pay with very stringent restrictions to females doing identifiably similar work (as in teaching) and where the work was not clearly 'women's' work (as in nursing). In June, 1969, a Federal Arbitration Commission decision on certain industries was handed down. It was finally restrictive in the same manner as previous State legislation; but the net was more widely cast. Interpretations of applicability were more favourable, and the conditions of the decision prevented the creation of new classifications designed explicitly to render useless any provisions of 'equal pay for equal work' by their re-defining the nature of women's work. Favourable statements by the Commission during the 1967 hearing on the total wage had provided a catalyst for union submissions for this 1969 decision. In addition, favourable statements regarding women's 'work value' were made by Commissioner Winter during his 1967 investigation into the Metal Trades Award. Consequently in June 1970, Winter granted equal pay to many process workers under the Metal Trades Award. In the meantime, several States had extended the concept of equal pay.

The 1972 equal pay decision was handed down in December after a positive intervention by the newly elected Labor government. The decision eliminated previous restrictions in the granting of male rates of pay to women. It was estimated that only 20% of the female workforce were receiving equal pay at this stage, so the award was to be phased in by June 1975. Only 31% of the female workforce, however, were covered by

Federal awards and it was necessary for similar changes to be made in the States. It appears that the number of successful claims for equal pay under State awards increased substantially and that there was a more rapid growth in the percentage of females receiving equal pay.

Finally, the May 1974 National Wage Case removed the last impediment by making the minimum wage applicable not solely to the male but to the whole workforce. Thus, while the period under examination housed the major legislation and various Commission decisions on the award of equal pay, it was only towards the end of the period that there appeared any substantial impact on female earnings.

Regressions run on the change in earnings differentials will attempt to cast light on the relative gains to females during the period. Casual evidence indicates that females did not lose out in employment. Female production employment increased by 10.8%, and a cursory glance at sex ratio figures indicates that many industries were still substituting female for male employment.<sup>12</sup> Evidently, the contemporary role of female employment is not a simple matter and the more detailed examination of female earnings and employment at the industry level seems eminently defensible.

Information on the role of migrants in manufacturing industry is not as prolific as that regarding the sex composition. However, the 1971 Census provides vitally useful information which must be assumed to be representative of migrant workforce participation for the period as a whole.

Net migration to Australia rose steadily from the 1962 recession<sup>13</sup> to 130,000 in 1969, topping the target rate of a contribution of 1% to population growth. From that point, it fell drastically, following the recession period, to less than 30,000 in 1972; it rose to 40,000 in 1973 and to a more typical average level of 87,000 in 1974. The slump in net migration reflected not only the normal recession cut-back, but also a growing official aversion to large scale immigration because its social costs were presumed to be large. It is quite possible that this substantial drop in net migration enhanced the bargaining power of labour and hence was one factor behind the large scale rise in earnings during the same period (and also behind the rapid reversal to high migration in 1974).

The pattern of immigration was also changing substantially, and in a manner that had some significance for manufacturing industry. After the initial post-war years of heavy refugee migration, migration from Southern Europe and Yugoslavia became substantial. Between 1951 and 1966,

migration from this area comprised over 33% of the total. Between 1966 and 1974, migration from Italy and Greece slowed to a stop, while migration from Yugoslavia increased. In addition, migration from Asia (especially the Middle East) and Latin America increased substantially. Gradually there were increased proportions of migrants who became employees rather than self-employed, who were unskilled [A.B.S. ref. 2.86.9] and who arrived unassisted. These factors were conducive to a more readily available labour supply in the less coveted jobs in manufacturing industry. This is shown partly by the disproportionate employment of certain migrant groups in manufacturing industry evidenced in the 1971 Census. Migrants from Italy, Greece, Yugoslavia and Malta made up 25% of the total migrant population and 5% of the total population. By contrast this group made up 33% of migrant employment and 13% of total employment in manufacturing industry (see Appendix D, Table D3). The percentages are higher in sections of manufacturing like labour intensive industries (41% and 16% respectively), and higher for females than for males. (The 13% of total employment is a weighted average of over 11% for males and 17% for females.) Moreover, as these figures refer to total employment the percentages for production employment would be much higher still.

It is also instructive to examine the proportions of specific migrant groups employed in manufacturing industry vis-a-vis other industries. 34% of Italians, 35% of Greeks and 48% of Yugoslavs were employed in manufacturing industry, compared with 21% of Australians. However, other migrant males were well represented as well - in particular, 31% of British and 35% of German migrants. This latter information shows that it is not merely disproportionate employment in the manufacturing sector which differentiates the role of more recent migrant groups, but the kinds of jobs these latter groups take. Figures are not readily available which cross-reference birthplace against industry and occupation, but a ready indication of the particular role in the work hierarchy of Southern Europeans, etc. is their far greater location in the occupation category 'tradesmen, process workers, labourers, etc....' [A.B.S. ref. 2.86.9], a grouping which still enhances British and German representation because of the skill factor included.

This brief summary of the economic background to the period in terms of output, employment, etc., provides a foundation for a desired perspective on the more detailed and abstract econometric work which is to follow.

### E. The Structure of Equations

The attempt to discern the nature and direction of influence between industry characteristics, low pay and the employment of 'minority' groups will be handled in two ways, as outlined above. Firstly, average earnings (and their change) will be regressed on the list of variables representing industry-specific characteristics and economic conditions (where appropriate); then complementary regressions will be run with the addition of the variables representing personal characteristics. Hopefully, this practice will gauge the inter-dependence of the two sets of variables.

Secondly, the sex ratio and various ratios of migrant employment will be regressed independently against the industry characteristic variables.

The structure of the regression equations is as follows:

#### I. Level of Earnings

1. 4-digit; n = 157 (n = 127 for equations including the real production variable); all years.
2. 4-digit; division by turnover - large turnover group (n = 78), small turnover group (n = 79); 1968-69, 1971-72, 1973-74.
3. 4-digit; division by capital intensity - high intensity (n = 76), low intensity (n = 83); 1971-72, 1973-74.
4. 3-digit; n = 40; all years.

#### II. Male and Migrant Ratios

1. 4-digit; 1971-72.
2. 4-digit; division by turnover; 1971-72.
3. 4-digit; division by capital intensity; 1971-72.
4. 3-digit; 1971-72.

#### III. Change in Earnings

- i. 4-digit; 1968-69 to 1969-70.
1. 4-digit; 1968-69 to 1973-74; absolute and percentage changes.
2. 4-digit; division by turnover; 1968-69 to 1973-74; absolute and percentage changes.
3. 4-digit; division by capital intensity; 1968-69 to 1973-74; absolute and percentage changes.
4. 3-digit; 1968-69 to 1973-74; absolute and percentage changes.

#### IV. Variables and Sources

Variables refer to all years unless otherwise stated.

##### Dependent

AE Wages and salaries of production workers [A.B.S. ref. 12.29, Table 5] divided by total employment of production workers [A.B.S. ref. 12.29, Table 2].

##### Independent - Industry Characteristics

ACF Mean average of cash flow percentage; 1970-71 to 1973-74.

ACONC The mean average of 4-digit 8-firm turnover percentages weighted by the proportional contribution to turnover of the 3-digit industry group by the 4-digit industry class; 1968-69 (7) and 1972-73 (2).

AER Average effective tariff rate [I.A.C. Annual Report, 1973-74, Table 3.4.1]; 1968-69.

ALP Mean average of yearly values of LP; 1968-69 to 1973-74.

AV Mean average of yearly values of V; 1969-70 to 1973-74.

CF Cashflow as a percentage of funds employed; cash flow/sales divided by sales/funds employed [I.A.C. Annual Reports, 1973-74, Table 4.2.3; 1974-75, Table 4.3.3]; 1971-72 to 1973-74 (1971-72 figures are a mean average of figures for 1970-71 and 1971-72).

CONC 8-firm percentage of industry turnover at the 4-digit level; 1968-68 (1) and 1972-73 (2) [A.B.S. ref. 17.14].

CPLP Production index [A.B.S. ref. 12.36] divided by 1000, multiplied by valued added for 1968-69, then divided by total employment; n = 127; all years other than 1968-69.

DL Change in total employment of production workers [A.B.S. ref. 12.29, Table 2]; 1968-69 to 1969-70 (1) to 1973-74 (2).

DLP Change in LP; 1968-69 to 1969-70 (1), 1968-69 to 1973-74 (2).

DRLP Change in CPLP: CPE 1 (1973-74) minus LP (1968-69).

ES Employment in enterprises employing 500 or more workers divided by total employment [A.B.S. ref. 17.15, Table 6, and personal estimates. See Appendix A.]

FC Percentage contribution to industry value added of enterprise groups, within the largest 20 enterprise groups, under foreign control; 1972-73. [Committee to Advise on Policies for Manufacturing Industry. Green Paper. Vol. II, Table 68.]

KLR	Expenditure on electricity and fuels [A.B.S. ref. 12.29, Table 9] divided by total employment [A.B.S. ref. 12.29, Table 2].
LCRD	Wage bill of production workers [A.B.S. ref. 12.29, Table 5] divided by total direct costs. (Direct costs equal total wage bill plus purchases and selected expenses plus rent and leasing expenses [A.B.S. ref. 12.29, Table 1].)
LCRT	Wage bill of production workers divided by total costs; 1968-69. (Total costs equal total direct costs plus depreciation plus interest paid [A.B.S. ref. 17.15, Table 2].)
LP	Value added [A.B.S. ref. 12.29, Table 1] divided by total employment [A.B.S. ref. 12.29, Table 2].
PDL	Percentage change in total employment; 1968-69 to 1973-74.
PDLP	Percentage change in LP; 1968-69 to 1973-74.
PDO	Percentage change in output [A.B.S. ref. 12.36]; 1968-69 to 1973-74.
PDRLP	Percentage change in CPLP; 1968-69 to 1973-74.
PS	Employment in establishments employing 100 or more persons divided by total employment [A.B.S. ref. 12.28, Table 2, and personal estimates]; 1968-69 (1), 1972-73 (2).
UPADL	Average days per worker involved [A.B.S. ref. 6.6, Table 3, interpolated for financial years. See Appendix A.]; 1972-73, 1973-74.
UPDL	Working days lost [A.B.S. ref. 6.6, Table 3, interpolated for financial years. See Appendix A.]; 1972-73, 1973-74.
V	Mean average of total quarterly vacancies unfilled, Australia, September to June [Dept. of Labour and Immigration <u>Monthly Report of Employment Office Transactions</u> , Section 7C; plus conversion table for appropriate industry classification], divided by total employment [A.B.S. ref. 12.29, Table 2].

#### Independent - Personal Characteristics

AGE	Percentage of workforce 45 years of age and over [I.A.C., <u>Annual Report</u> , 1973-74, Table 1.2.10].
DM	Change in M; 1968-69 to 1973-74.
M	Male percentage of production workers [A.B.S. ref. 12.29, Table 2].

- OSB Percentage of workforce born overseas [I.A.C., Annual Report, 1974-75, Table 1.2.10].
- OSF Percentage of female workforce born overseas [I.A.C., Annual Report, 1974-75, Table 1.2.12].
- OSM Percentage of male workforce born overseas [I.A.C., Annual Report, 1974-75, Table 1.2.11].
- OTH Percentage of workforce born in countries other than SEM countries [A.B.S. ref. 2.86.9].
- Q Percentage of workforce with trade or technical qualifications [I.A.C., Annual Report, 1974-75, Table 1.2.10; A.B.S. ref. 2.87.9].
- QAGE Q multiplied by AGE; percentage of workforce over 45 years of age who are qualified workers.
- SEM Percentage of workforce born in Italy, Greece, Yugoslavia and Malta [A.B.S. ref. 2.86.9].
- UAM Unqualified Australian males - percentage of male workforce born locally (100 - OSB), multiplied by percentage of Australian males who are unqualified [I.A.C., Annual Report, 1974-75, Table 1.2.11]; multiplied by M percentage.
- UMM Unqualified migrant males - OSB multiplied by percentage of migrant males who are unqualified [I.A.C., Annual Report, 1974-75, Table 1.2.11], multiplied by M percentage.

## F. Results

### I. Level of Earnings

#### 1. 4-Digit Data

We are interested in the performance of particular variables for a given year, and in the stability of the equations across the five year period. The attempt to judge the latter is hampered somewhat by the necessity of using the same values of the personal variables (from the 1971 Census) for each single-year equation. Although some of the other variables are also year-specific (plant size and enterprise size), the number of personal variables involved implies that the 1971 equations are probably the most reliable.

The most basic equations are the (a) equations linking industry characteristics (IC) to earnings. In 1.a'68 enterprise size and labour productivity are significant, while concentration, the wage ratio and the tariff rate are not. The findings for concentration and enterprise size compare with findings of the King and Langley study, but the significance of labour productivity is new. The relatively small coefficient for

TABLE 1

Regression Estimates: Average Annual Earnings, Manual Workers

Full 4-Digit Data; N = 157

Equation No.	Constant	CONC	ES	PS	LP	CPLP	LCRD	M	OSB	OSM	OSF	Q	AGE	SEM	OTH	AER	R <sup>2</sup>	Autocor- relation
I. 1.a'.68	2088	-	3.8		69.2		-									-	28	Y
1.a.68	1888	-		4.1	75.9		-										27	Y
1.n'.68	822	2.6 <sup>b</sup>	1.8 <sup>b</sup>		21.3		-6.8 <sup>b</sup>	14.1	10.2			12.9				-	74	Y
1.p.68	752	-		3.6	19.2		-	15.2				7.2 <sup>b</sup>			15.7		76	Y
1.o.68	988	-		3.8	22.7		-	13.1	15.6	-10.3		9.4					77	U
1.a.69	1864	3.6 <sup>b</sup>			92.1		13.1									-	40	Y
1.o.69	707	2.3 <sup>b</sup>		2.4	52.5		-	14.2	11.4			7.5				-	81	U
1.q.69 <sup>c</sup>	877	-		3.6 <sup>c</sup>		42.0	-	14.9	14.3								77	N
1.p.69	580	-		2.5	53.7		-	15.1				7.7		8.9	10.1		81	U
1.r.69 <sup>c</sup>	669	-		2.7 <sup>b</sup>		45.0	-	15.7						10.7	9.7 <sup>b</sup>		76	N
1.a.71	2352	-		4.9	89.2		-										36	Y
1.o.71	961	-		4.6	51.5		-	16.3	14.3			13.0					78	U
1.q.71 <sup>c</sup>	1327	-		6.8		41.0	-	17.0	17.8	-9.1 <sup>b</sup>							76	U
1.p.71	685	-		4.1	47.2		-	18.0							30.8		80	U
1.r.71 <sup>c</sup>	891	-		4.5		33.7	-	18.8							27.3		77	U

TABLE 1 (contd)

Regression Estimation: Average Annual Earnings, Manual Workers  
Full 4-Digit Data; N = 157

## Coefficients

Equation No.	Constant	CONC	FS	LP	CPLP	LCRD	M	OSM	OSF	Q	AGE	SEM	OTH	R <sup>2</sup>	Autocor- relation <sup>a</sup>
I. 1.oe.71	1094	-	4.8	51.1	-	-	17.3	15.4	-	29.2	-	-	-	77	N
1.pa.71	1131	-	6.0	53.0	-	-	16.3	-	12.7	-	-	-	2.6 <sup>d</sup>	78	N
1.oq.71	1414	7.1	-	65.4	-	-	18.4	15.5	33.7	16.5	-	-	-	68	N
1.om.71	1060	-	5.6	50.0	-	-	20.1	16.6	-	-	-	-	-	77	N
1.a.72	2431	-	4.8	107.4	-	-	-	-	-	-	-	-	-	44	Y
1.o.72	1007	3.3 <sup>b</sup>	4.0	66.9	-	-	18.2	16.3	-	8.1 <sup>b</sup>	-	-	-	79	Y
1.q.72	1469	-	7.6	36.6	-	-	21.4	16.4	-	-	-	-	-	72	U
1.p.72	799	-	4.0	68.5	-	-	20.0	-	-	-	-	12.5	17.9	79	U
1.r.72	1178	-	4.5	30.7	-	-	21.5	-	-	-	-	10.4 <sup>b</sup>	14.9 <sup>b</sup>	73	Y
1.a.73	2837	5.7 <sup>b</sup>	8.3	103.0	-	-	-	-	-	-	-	-	-	43	Y
1.o.73	1243	4.0 <sup>b</sup>	7.7	46.5	-	-	22.9	20.5	-	-	-	-	-	77	U
1.q.73	1702	-	11.6	31.5	-	-	25.2	27.5	-13.0	-	-	-	-	76	U
1.p.73	1048	-	7.4	42.0	-	-	24.9	-	-	-	-	-	28.9	77	U
1.r.73	1193	-	8.2	31.0	-	-	25.8	-	-	17.1 <sup>b</sup>	16.0	21.2	21.2	76	U

## Notes:

- a D.W. statistic at 5% significance. Y = Yes; N = No; U = Uncertain.  
b t statistic two tailed test significant at 10%. All other coefficients significant at 5% level or less.  
c N = 127.  
d Migrant employment as percentage of production employment.

enterprise size must be attributed to the use of a measure for firms of over 500 employees compared to firms of over 100 employees.

In alternative equations, 1.a, plant size is also significant, with a comparable coefficient which is little affected by the addition of personal variables. For later years, enterprise size is replaced exclusively by plant size as a measure of employment concentration. This is done because the statistical basis of plant size is more comparable with that of other variables, because figures exist for 1972-73 as well as for 1968-69, and because of the problems of estimation of enterprise size.

The wage ratio (LCRT) was presumed to be the more theoretically accurate measure of relative labour costs, since it included the cost of capital in depreciation and interest charges. However, in computation, the LCRT variable turned out to be not too different from LCRD, due to the surprisingly small relative size of the depreciation figures. Because of the discretionary nature of depreciation allocations and their dubious relation to the true cost of capital, the LCRT variable is henceforth dropped.

The 1.a equation is reasonably stable across the five years, apart from the 1969 equation, where plant size is not significant and the wage ratio takes an unusual leap into prominence. Note the secular increase in the influence of labour productivity.

The behaviour of concentration in both the IC and IPC equations is variable. On several occasions it is significant at the 10% level, and has always the right sign. At this level of aggregation, there is no underlying trend.

In the expanded IPC equations, the influence of labour productivity and of plant size remains. This has two important implications. Firstly, there is an inter-dependence between certain industry characteristics and the personal characteristics which requires further investigation; secondly, certain industry characteristics are seen to exert an independent influence on earnings differentials in addition to any influence which may be hidden in the hiring of wage differentiated segments of the labour force.

Equations 1.q and 1.r give the results for extended IPC equations, where constant price labour productivity (CPLP) replaces value productivity. CPLP is also significant, although with coefficients lower than those of the LP variable.

Insofar as value productivity includes both real productivity changes and price changes, one would expect that the CPLP coefficients would be lower. That was the case. In addition, since concentration is assumed to mirror market power, one would also expect a lower correlation between concentration and constant price productivity than between concentration and value productivity. Again, this is actually the case (LP/CONC correlations are .45, .43, .45, .45, and .46; CPLP/CONC correlations are .42, .39, .37, and .35). The difference is relatively minor, however, and it makes no difference to the performance of concentration, which remains insignificant for aggregate 4-digit data.

The IPC equations are also informative as to the effects of personal characteristics. 1.n'.68 indicates a significant positive effect for males, qualified production workers, and migrants. The first two results are predictable. The AGE variable is never significant at this level of aggregation. A variable QAGE combining both formal qualifications and age level (which assumes that qualified workers are represented in the over-45 year old category in the same proportion as in the whole industry) is also examined in lieu of a separate examination of each of the two variables. Thurow [1969] claims that qualified workers do better from on-the-job experience than do non-qualified workers. 1.oe.71 offers an indirect test of this contention, showing a significant QAGE variable and with a substantially greater coefficient than for Q. The coefficient is not significant, however, when QAGE is run with the SEM/OTH split in the 1.p equations (as is typical of the behaviour of Q). The latter link will be discussed below. The positive finding in the 1.oe equation gives some credibility to Thurow's claim.

In order to gain some feeling for the effects of high correlation between 'independent' variables, the male variable and the qualifications variable are independently dropped from the IPC equation, in 1.oq.71 and 1.om.71 respectively. Compared with 1.o.71, the dropping of Q enhances coefficients of plant size, the male ratio and the migrant male ratio, but all only marginally. Apart from the connections with the OTH variable, Q is seen to be reasonably independent in its influence. The dropping of M has more substantial effects. (The various correlations with M are included after the variable.) Concentration (.18) becomes significant and the coefficient of value productivity (.36) is enhanced. Of the personal variables, the migrant female ratio (-.55) and the AGE variables

(.17) become significant, and the coefficient of  $Q$  (.56) is enhanced.

Evidently, the relation between male employment and earnings is a complex one. Concentration may make higher earnings possible; but the higher earnings are achieved only by males, perhaps due to more militant collective action. Part of the productivity influence on earnings appears to go exclusively to males (again for the same reason?); but a significant part of the productivity influence is generalised. The enhanced coefficient of  $Q$  indicates the weakness of that variable in capturing the effect of skill on earnings, when run in conjunction with  $M$ . But the inevitable high correlation between the two variables means that accurate representations of both influences cannot be easily obtained. The  $M$  variable coefficient must obviously be interpreted as partly a premium for skill, although not wholly. Insofar as it is a premium for skill, it deserves to be run in conjunction with  $Q$ . A similar argument applies to the AGE variable, indicating that males appear to be the dominant beneficiaries of unusually high earnings over the age of 45.

The positive migrant coefficient in 1.0.68 does not appear to tally with the opinion that migrants form an exploited component of the workforce. A breakdown of migrant workers into smaller categories might disclose the reasons for this positive influence. Two further breakdowns are desirable - between males and females; and between Northern and Southern Europeans. This last breakdown is defended by the argument that migrants do not form a **homogeneous group**: rather, migrants from Northern European countries are more likely to be skilled and are reasonably interchangeable with Australian workers. It is the workers from Mediterranean countries, particularly Italy, Greece and Yugoslavia, who become part of a second class workforce. On this point see Collins [1975].

Breaking down the migrant ratio into 'Southern Europeans' and 'others' means that equations 1.0 and 1.p replace equations 1.n. The positive influence of the total migrant ratio is seen to be predominantly due to the 'Other' category. The SEM variable also records a positive influence in some years. At first glance, this would tend to argue against the 'segmentation' thesis of Collins and others. However, the influence is only for two years out of five, although in 1.r.73 (for a subset of the data) the influence persists into a third. These years - 1969, 1972 and 1973 - were the three in which the manufacturing sector was experiencing boom conditions. The positive influence of the SEM variable in these years may well have been due to such migrants working both overtime and shift work.

Casual evidence lends support to this thesis, but there is no systematic means of checking it (see Appendix A on the issue of adjusting industry earnings for hours worked).

Note also that the coefficient of the qualifications variable is reduced or eliminated when the migrant variable is disaggregated by area. Clearly, there is some justification in assuming that the OTH category includes a substantial proportion of skilled workers, and that part of the positive influence of this variable is due to the premium for skill. The correlation of OTH with  $Q$  is positive but only moderate - .20. This may indicate a weakness in  $Q$  as a non-qualitative measure of skill. The consistent influence that the OTH variable has on the coefficient of  $Q$  in regressions, including those under I.2 and I.3 below, indicates that the OTH variable should also serve as an indirect measure of the influence of skill on earnings.

The migrant influence is split between males and females in the 'o' and 'q' equations. 1.o.69 indicates that the positive influence of the migrant variable is due to male migrants. This result carries over into future years. For 1968, 1971 and 1973 (the latter two for the data subset,  $n = 127$ ), the variable for migrant females is negatively related to earnings, in contrast with the variable for other females. The coefficient is always negative but is not significant in other years. In 1.o.q.71, however, the coefficient is significantly negative in the full-data equation when the  $M$  variable is dropped. This feature is due to the high correlation between  $M$  and  $OSF$  of  $-.55$ ; that is, those industries in which males are poorly represented are also predominantly the industries in which migrant females are highly represented. This is an interesting discovery, and not a relationship that one would expect a priori. It indicates that where the  $OSF$  variable is significant in conjunction with the  $M$  variable, then the influence in the former case is especially strong.

There are two notable changes in the 4-digit results over the period. The quantitative influence of males increases secularly, while that of qualifications declines until it is no longer significant in 1973. This could, of course, imply that the 1971 Census figures very quickly cease to be relevant over a period of two years. The alternative is that qualifications (as measured here) cease to have an influence on industry earnings differentials. As unlikely as the first possibility appears to be, given that the space of time is so short, we find it more plausible than

the second possibility. In other words, we are inclined to infer that significant changes in technique have taken place in general in the period under study. This issue is taken up below.

In regard to the 'explanatory power' of the equations, the IC equations account for between 27% and 44% of the variation in manual earnings (although the effect of the constant is large). Note that the variance in  $R^2$  roughly parallels movement in the cycle, with the IC equations performing best in boom years. The coefficient of labour productivity moves accordingly. This finding suggests that boom conditions are favourable to industry-specific differentials. The set of IPC equations account for between 76% and 81% of variation in the level of average earnings, a not unfavourable result for cross-section data.

## 2. 4-Digit Data: Large (l) and Small (s) Turnover Groups

Following Kmenta, the data were divided into industries according to size of turnover, with the expectation that different variables might be significant for each group. For 1971, 79 industries had a turnover of \$85m and 78 industries had above that figure. (See Appendix D.)

Comparison of the IC equations 2.a.68 shows that the value productivity influence is restricted to the large turnover group. Concentration also becomes a significant factor for this group. There is a notable difference in the performance of the tariff rate variable in the small industry group, but the coefficient is still not significant.<sup>14</sup> The wage ratio becomes significant and quantitatively important in the large group IC equation, albeit with a positive sign. This influence disappears in the corresponding IPC equation, due possibly to its correlation of .46 with qualifications. This correlation may provide an explanation of the unexpected sign of the wage ratio in the IC equation. It may be that the wage ratio is significantly influenced by the skill factor, as well as by technique.

For 1968-69, the argument that industry characteristics affect differentials independently has no foundation for small turnover industries. On the other hand, the argument is strongly supported by the results for the large group. The order of magnitude of the productivity coefficient is such that, a difference of (say) \$8,000 in average productivity in this group, a realistic sum, would alone account for a \$500 difference in yearly earnings, and a 30% difference in the concentration ratio would account for another \$200. These are substantial sums for 1968-69, when the figure for average earnings of manual workers was \$2,800.

TABLE 2

Regression Estimates: Average Annual Earnings, Manual Workers  
 Division of 4-Digit Data by Turnover Size

Equation No.	Coefficients													Autocor- relation		
	Constant	CONC	ES	PS	LP	LCRD	M	OSB	OSM	OSF	Q	AGE	SEM		OTH	R <sup>2</sup>
1.2s.a'.68	2422	-	-	-	31.2 <sup>b</sup>	-	-	-	-	-	-	-	-	-	11	N
21.a'.68	1579	-	-	-	111.5	15.8	-	-	-	-	-	-	-	-	48	Y
2s.n'.68	631 <sup>b</sup>	-	-	-	-	-	14.3	14.5	-	17.6	-	-	-	-	74	U
21.n'.68	799	6.5	-	63.6	-	-	13.5	-	-	9.5	-	-	-	-	83	N
2s.o'.68	825	-	-	-	-	-	14.6	-	18.2	16.1	-	-	-	-	76	N
21.o'.68	1011	6.2	-	58.1	-	-	12.0	-	12.8	9.0	-	-	-	-	84	N
2s.p'.68	-	-	-	-	-	-	14.6	-	-	16.1	-	-	11.8	16.6	75	U
21.p'.68	898	6.7	-	47.4	-	-	13.7	-	-	-	-	-	-	14.1	83	N
2s.a.71	2343	-	-	-	83.3	-	-	-	-	-	-	-	-	-	21	Y
21.a.71	1972	7.8 <sup>b</sup>	-	126.3	22.2	-	-	-	-	-	-	-	-	-	54	U
2s.o.71	-	5.0 <sup>b</sup>	-	32.2	-	-	17.1	-	14.7	15.6	-	-	-	-	78	N
21.o.71	1209	-	-	78.7	-	-	13.7	-	17.3	12.2	-	-	-	-	83	N
2s.p.71	-	-	-	34.2	-	-	18.5	-	-	-	14.3	-	-	33.0	80	N
21.p.71	1064	5.6	-	65.9	-	-	14.7	-	-	-	-	-	-	26.7	84	N
2s.p.73	-	-	-	-	-	-	26.0	-	-	-	21.8	15.9 <sup>b</sup>	-	38.0	69	N
21.p.73	1250	-	-	8.4	75.4	-	26.8	-	-	-	-	-	-	21.0	86	N

Notes: a } See Table 1  
 b }

Regarding the personal variables, the influence of both males and qualified workers extends across both groups, although qualifications are quantitatively more important for the small turnover industries. The positive migrant influence, in gross terms, is to be found only in the small turnover group. However, a breakdown according to sex indicates that a positive male migrant influence extends across both groups, but that female migrants have a negative influence in the large group.

By 1971-72, there is a strong increase in the influence of labour productivity. The coefficient becomes significant in the s group and increases for the l group. The significance of concentration, previously linked to the large turnover group, becomes erratic. The qualifications variable is significant across both groups although, as previously noted, this significance occurs only when the variable is not run in conjunction with the SEM/OTH migrant division. For the first time, the AGE variable becomes significant, producing a positive effect on earnings in the small turnover group.

By 1973-74, the productivity influence in the s group has disappeared again, and plant size becomes significant in the L group. There is also a substantial difference between the coefficients of other migrants in the two groups: higher earnings are associated with the employment of 'Other' migrants in small turnover industries.

In general, the explanatory power of the pure industry characteristic equations is significantly larger for the large turnover group. In the full equations, the gap is less but widens for the later year 1973-74.

### 3. 4-Digit Data; Capital and Labour Intensive Groups

Autocorrelation of the disturbances was a persistent feature of many of the equations examined in this study. Predominantly a problem in time series analysis, autocorrelation appears here because the observations are bunched according to industry groups. Even in the full IPC equations, residuals exhibited a tendency to be bunched into negative or positive quantities. This seemed to indicate that the specification was omitting some significant influence on earnings.

Within reasonable bounds, the clustering of the residuals took place approximately according to 2-digit industry groups. Those 2-digit industry groups for which the residuals were persistently positive, tended to be for industries which one would normally call capital intensive, and vice versa. In all probability, some positive influence on earnings is

TABLE 3

Regression Estimates: Average Annual Earnings, Manual Workers  
 Division of 4-Digit Data by Degree of Capital Intensity

Equation No.	Coefficients													Autocor- relation <sup>a</sup>
	Constant	CONC	PS	LP	LCRD	M	OSM	OSF	Q	AGE	SEM	OTH	R <sup>2</sup>	
I.3L.a.71	2862	-	-	51.2	-	-	-	-	-	-	-	-	32	U
3C.a.71	2846	-	-	76.1	-	-	-	-	-	-	-	-	42	N
3L.o.71	-	-	4.4	34.7	-	15.1	11.1	-	-	21.6	-	-	75	U
3C.o.71	1635	-	3.7 <sup>b</sup>	62.0	-	20.9	-	-	16.4	-19.1	-	-	77	N
3L.p.71	-	-	4.1	29.1	-	16.8	-	-	-	21.9	-	30.9	77	Y
3C.p.71	1204	-	-	57.8	-	20.7	-	-	-	-	-18.6	27.7	81	N
3L.o.73	-	-	8.6	-	-	22.8	25.3	-	-	35.6	-	-	75	U
3C.o.73	2270	-	9.1	67.7	-	33.4	-	-	-	-32.3	-	-	81	U
3L.p.73	-	-	8.4	-	-16.2 <sup>b</sup>	24.7	-	-	-	37.3	24.6	35.7	82	U
3C.p.73	2190	-	8.0	58.3	-	33.3	-	-	-11.8	-27.4	-	17.3	82	U

Notes: a } See Table 1  
 b }

associated with capital intensive techniques, and it is not being registered through the labour productivity or the wage ratio variables.

Because capital intensity is notoriously difficult to encapsulate in a proxy of proxies, this data split is seen as an alternative means of establishing its influence, albeit in a more generalised way. Accordingly, the 4-digit data was split into 2 groups closely linked to 2-digit sub-divisions in the hope of improving the fit of the specified equation (see Appendix D for detail on this division).

For 1971 data, the split results in a less drastic division than could have been expected. Nevertheless, some insight is possible. The higher  $R^2$  and the absence of autocorrelation in the 'capital intensive' C group indicates that the hypotheses formulated in this study are more appropriate to the subset of industries within this group. The coefficients for labour productivity are higher for the C group than for the 'labour intensive' L group, as might have been predicted. In the full IPC equations, 3C.o and 3C.p, the coefficients, around 60, are of about the same order of magnitude as in the large turnover group. Nevertheless, the influence of labour productivity remains in the L group as well. In addition, plant size is significant in the full equations. This variable covers the full range from 0 to 100%, with a positive skewness towards the upper end of the range. A not unrealistic difference between two industries of 50% in this variable would account for \$200 difference in average earnings.

Of the personal variables, male migrants vis-a-vis males as a whole have a positive influence only in the L group. However, Northern European migrants have a positive influence in both groups (and with a substantial coefficient even greater than the male coefficient). By contrast, there is a large negative coefficient for the Southern European migrant variable in the C group. This offers a substantial justification for the splitting of the migrant variable by area of origin. The present disaggregation indicates that the Southern European group is **disadvantaged** in both industry groups, but that the degree of disadvantage is greater in capital intensive industries.

The strong negative coefficient for SEM in the C group must refer to both males and females (unfortunately, our data do not allow a breakdown of the Southern European group explicitly into males and females). This does suggest that the coefficient of male migrants is affected by two

conflicting influences - a strong positive influence due to the Northern European component, and a weaker negative influence from the Southern European component.

Qualifications have a positive influence on earnings only in the C group. There is no apparent explanation for this phenomenon. The other surprising feature of this split is the different influence of the AGE variable as between the two groups. An older workforce (aged 45 and over) has a strong positive influence on earnings in the L group, and a strong negative influence on earnings in the C group. Seniority evidently counts for something in the L group, and the positive influence is consistent with our use of the age measure as a proxy for 'on-the-job' experience. The result in the C group has no obvious interpretation.

By 1973, certain changes are evident. Firstly, the labour productivity influence on earnings in the L group has disappeared, while the coefficient in the C group remains stable. This could mean that the bargaining power of workers in the L group has diminished relative to productivity. It could also mean that wage flow-on in 1973 had become so significant, that earnings ceased to be influenced by industry-specific productivity and became influenced instead by productivity established elsewhere, notably in the C group. Although the latter alternative seems plausible, it implies that L group earnings did better during the period than did those in the C group. This is contradicted by the results on earnings changes for the C/L division, given below under III.3. Hence the drop in influence of productivity in the L group remains to be explained.

Secondly, the qualifications coefficient in the C group equations (when the variable is run with the SEM/OTH division) is significantly negative. This mirrors the drop in significance reported under I.1, indicating that the C group is the 'culprit' in this case.

Thirdly, the SEM coefficient is now strongly positive in the L group. Results in I.1 indicated that the SEM coefficients varied strongly, following a cyclical pattern. The present division indicates that boom conditions bring the SEM coefficient from minus values up to 'scratch' in the C group, and from insignificance to positive values in the L group.

#### 4. 3-Digit Industry Groups

The same variables have also been examined on the 3-digit ASIC level. Compared with the 4-digit regressions, this aggregation would have the effect of reducing the differences within the industry group and heightening the difference across industry groups. In addition, it was thought desirable to examine possible influences on earnings at this level because profit figures exist only at 3-digit level and the statistics for vacancies and for union disputes are likely to be more reliable if used at the 3-digit level.

At this level of aggregation, the influence of value productivity within the industry characteristic equations is overwhelming. Even with the addition of the personal variables the influence of value productivity does not wane significantly. It is conceivable that there is a simple and economically meaningful explanation for this together with two other features, namely the higher coefficient of determination at the 3-digit level and the autocorrelation of the 4-digit regressions. The possible explanation is that the same or closely related unions operate across 4-digit industries within some industry groups and act to achieve similar wage rises, dependent upon some level of productivity determined within the industry group, perhaps the average level of value productivity in the industry group. The demands of comparative wage justice link wage gains, then, not to specific value productivity but to average value productivity for that industry group.

When the value productivity variable is replaced by constant price productivity in the 3-digit data, the results are similar to those from the 4-digit data. CPLP still exerts a strong positive influence and, as with value productivity, the coefficients are larger for 3-digit data.

The 1972 and 1973 equations include the new figures for concentration published for 1972-73. This variable tends to show up frequently as significant, though mostly at the 10% level. However, its coefficient is fairly stable and fairly substantial - approximately 11. A difference in concentration of 30% would tend, on average, to be responsible for an earnings differential of over \$300.

The wage ratio appears much more frequently in the 3-digit equations (for the first three years of the period), usually significant only at the 10% level, but often at the 5% level. On these occasions, the

TABLE 4

## Regression Estimates: Average Annual Earnings, Manual Workers

3-Digit Data; N = 40

## Coefficients

Equation No.	Constant	ACONC	PS	LP	CPLP	LCRD	KLR	M	OSM	CSF	Q	AGE	SEM	OTH	CF	R <sup>2</sup>	Autocor- relation
I.4.a.68	1573	-	-	145.4		14.6 <sup>b</sup>										62	U
4.d.68	2346	-	-	57.5 <sup>b</sup>			400.0									74	U
4.o.68	665 <sup>b</sup>	-	-	105.1				11.6	18.2	-12.9 <sup>b</sup>	-	-				90	N
4.p.68	-	-	-	112.0				14.5			-	-	13.9 <sup>b</sup>	-		89	U
4.s.68	1255	-	-	50.5			239.4	8.9	14.6	-13.7	-	-				94	N
4.a.69	1720	-	-	133.2		16.9 <sup>b</sup>										61	Y
4.b.69	1737	-	-		129.6	15.2 <sup>b</sup>										60	Y
4.d.69	2071	-	-		71.0	-	318.9									69	U
4.o.69	989	-	-	93.7		11.0		15.4	16.2	-10.9 <sup>b</sup>	-	-				91	Y
4.s.69	882	-	-		70.1	-	151.4	13.4	16.8	-	-	-				93	U
4.q.69	718	-	-		95.4	9.8 <sup>b</sup>		15.8	18.9	-	-	-				92	U
4.x.69	-	-	-		99.6	-		18.2					14.8	-		91	U
4.b.71	2041	-	-		96.5	19.2 <sup>b</sup>										56	Y
4.ac.71	3508	-	-	116.5		-										60	Y
4.bc.71	2826	-	-		150.6	19.8 <sup>b</sup>										67	Y
4.oc.71	1827	-	7.0	100.0		14.5		15.0	28.2	-27.9	-	-				93	U
4.qc.71	1740	-	6.8		108.1	15.7		17.1	24.2	-20.7	-	-				93	U
4.rc.71	1494	-	5.6		98.7	13.4		21.3						17.0 <sup>b</sup>		92	U

TABLE 4 (contd)

Regression Estimates: Average Annual Earnings, Manual Workers

3-Digit Data; N = 40

Coefficients

Equation No.	Constant	ACCNC	PS	LP	CPLP	LCED	M	OSM	OSF	Q	AGE	SEM	OTH	CF	UP	FC	R <sup>2</sup>	Autocor- relation <sup>a</sup>
I. a. b. 72	2111	-	-	-	85.2	-	-	-	-	-	-	-	-	-	-	-	54	U
4. au. 72	2013	13.4	-	112.1	-	-	-	-	-	-	-	-	-	-	c	-	58	U
4. au'. 72	2044	-	-	122.0	-	-	-	-	-	-	-	-	-	-	d	-	58	U
4. af. 72	2106	-	-	130.0	-	-	-	-	-	-	-	-	-	-	-	-	59	Y
4. ac. 72	3172	-	-	-	140.2	-	-	-	-	-	-	-	-62.7	-	-	-	67	Y
4. qc. 72	937	-	-	-	101.4	-	22.0	22.1 <sup>b</sup>	-	-	-	-	-	-	-	-	85	N
4. r'c. 72	-	-	-	-	102.3	-	25.3	-	-	-	-	-	-	-	-	-	85	N
4. u. 72	4310	-	-	-	-	-	-	-	-	-	-	-	-	-	c	0	0	Y
4. u'. 72	3910	-	-	-	-	-	-	-	-	-	-	-	-	-	4.1 <sup>d</sup>	13	U	
4. b. 73	3733	12.2	-	-	115.5	-	-	-	-	-	-	-	-	-	-	-	65	U
4. bc. 73	3900	14.8 <sup>b</sup>	-	-	78.8	-	-	-	-	-	-	-	-	-	-	-	63	U
4. au'. 73	3161	12.5 <sup>b</sup>	-	95.3	-	-	-	-	-	-	-	-	-	-	d	-	61	Y
4. au. 73	3002	11.8 <sup>b</sup>	-	98.8	-	-	-	-	-	-	-	-	-	-	c	-	61	U
4. qc. 73	1750	-	8.7	-	74.6	-	25.0	22.6	-	-15.9	-	-	-	-	-	-	91	N
4. rc. 73	1280	-	9.6	-	79.8	-	28.8	-	-	-	-	19.8 <sup>b</sup>	-	-	-	-	91	N
4. bf. 73	3696	13.8	-	-	133.7	-	-	-	-	-	-	-	-	-	-	-8.8 <sup>b</sup>	68	Y
4. f. 73	4770	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14.6	17	U

Notes: a } See Table 1  
 b }  
 c Average number of days lost.  
 d Total number of days lost.

coefficient is always positive, contrary to expectations. This influence has no obvious explanation.

Even though there seemed little point in continuing with LCRT (wage bill of production workers divided by total costs, including depreciation etc.) because of the dubious nature of depreciation data, there is a continuing dissatisfaction with LCRD (wage bill of production workers divided by total direct costs) as a measure of relative labour costs, since only direct costs are included. An alternative measure, KLR (expenditure on electricity and fuels divided by total employment) was tried as a potential substitute. The KLR ratio is taken from King and Langley and modified by the replacement of total employment with production employment.<sup>15</sup> Equation 4.d.68 shows the outcome of including KLR in the IC equation. The coefficient of KLR is significant and reduces the influence of value productivity. In the expanded IPC equation, 4.s.68, there is a similar effect on value productivity, and the coefficient of the male ratio variable is also reduced.

It appears that, to a certain extent, KLR is a substitute variable for labour productivity. The total quantitative impact of the two variables, KLR and LP, whether used singly or together, appears to be fairly stable. It is conceivable that the extent to which the KLR inclusion detracts from the LP coefficient gives some indication of that part of the LP coefficient which is due to the degree of capital intensity, the remaining part of the LP coefficient being due to pricing power. If that were the case, the relation between KLR and constant-price productivity CPLP would be still closer, since this latter variable excludes the effects of price changes since 1968. The correlation between KLR and LP and CPLP is about the same - .80, - and the effect of the inclusion of KLR on the CPLP coefficient in 4.d.69 is relatively less than its effect on LP. So this interpretation of the relation of the KLR and LP variables, plausible as it may seem, remains dubious.

The high correlation between KLR and value productivity is probably the reason for the poor showing of the latter variable in the King and Langley study. Despite the strong performance of KLR by normal statistical criteria, we are more inclined to continue to use the LP variable as it is more economically meaningful. The meaningfulness of the KLR variable depends on the assumption that there is a stable ratio between fuel costs and total capital costs, an assumption which has no strong a priori appeal.

The 3-digit analysis offered the opportunity to test for the influence of a profitability variable. As explained above, a cash flow ratio was used as the most desirable measure of profitability. Most of the 3-digit equations from 1971-72 to 1973-74 are run with the cash flow variable. These show the coefficient to be strongly negative for 1970-72 but tending to insignificance by 1973-74.

Cash flow rates for the two year period 1970-72 averaged from 8% (preserved fruit and vegetables; margarine) to 18% (tobacco) with the median around 12%. On 1971-72 figures, an increase of five percentage points in the rate of cash flow would be associated with a decrease of \$350 in average earnings (average production earnings for manufacturing industry being \$3,800).

Needless to say, this negative influence is contrary to expectations. It is possible that the use of the current cash flow rate for each year under examination is responsible for this negative influence, the true influence being a positive and lagged one. However, we suspect that the influence does not lie in the failure to specify a correct lag but, rather, that two quite separate factors give rise to the negative influence. The first is that some extremely (and reasonably) profitable industries have relatively low earnings - for example, tobacco, other chemicals, photographic, footwear. The second factor is that some highly productive industries have high earnings, but only fair to middling cash flow rates - for example, oil refining, plastics, glass, rubber.<sup>16</sup> In this second case, we suspect that it is the variable used to represent profits which is to 'blame' - that is, cash flow rate instead of total cash flow. Many of these latter industries are known to be highly profitable in the sense of profit levels, and it is, possibly, this variable which is relevant as a potential determinant of higher earnings. This is certainly a plausible conjecture, but not one which can be tested in the absence of appropriate data. It is noticeable that cash flow rate is negatively correlated with concentration, plant size and the male ratio (although not strongly for the latter), and only weakly correlated with value productivity.

Plant size appears intermittently as significant in the last three years of the period (when the 1972 plant size data are mostly used), especially in 1971 and 1973. There appears to be no obvious explanation for its occasional erratic appearance. This occasional performance contrasts

with the persistent performance of plant size for the 4-digit aggregate data. Presumably, a positive conclusion can be drawn from this difference - that plant size is a more significant determinant of earnings differentials at the industry level. Note that, compared with concentration which performs better in the IC equations, plant size performs better in conjunction with the personal variables.

The last of the industry characteristics to be examined is the extent of foreign control. Equations 4.af.72 and 4.bf.73 include the extent of foreign control in IC equations for 1972-73 and 1973-74. The coefficient is insignificant for the first year but is significant (and negative) at the 10% level for 1973-74. The foreign control variable ranges evenly from 1% (glass) to 100% (tobacco). A 50% difference in foreign control would predict over \$400 less in average earnings (1973 average earnings were \$5,000). Note that, compared with 4.bc.73 (the same equation without the FC variable),  $R^2$  is increased from 61 to 68 but, more significantly, the coefficient of CPLP is enhanced substantially. The implication is that foreign control dampens the effect that productivity would otherwise have on earnings.

Equation 4.f.73 examines the foreign control variable by itself, returning a significant and positive relationship. We think that the 1973 correlations of foreign control with the other variables are informative. They are - concentration (.53), cash flow rate (.17)<sup>17</sup>, plant size (.14), the wage ratio (-.47) and real labour productivity (.66). We conclude tentatively that the positive relationship in the simple regressions is due to the indirect link between foreign control and other industry characteristics which have been shown to exert a positive influence on earnings. There is however, an independent influence on earnings which is marginally negative.

Regarding the personal variables, similar patterns are established as for the 4-digit data, although there are some more striking results in this case. Male employment and migrant male employment are positively related to earnings. The coefficients of migrant male employment, in the 4.o equations for example, are higher than their counterparts in the 4-digit data (in the range 18 to 24) and are consistently higher than the coefficients of male employment in the same equations. That is, the relative advantage that migrant males have over other males is greater than the relative advantage which all males have over females. As with the 4-digit data, the coefficients of both males and migrant males show a slight

tendency to increase (in the 4.0 equations) over the five-year period.

As in some equations using the 4-digit aggregate data, the female migrant coefficient is significantly and strongly negative, but only for the non-boom years 1968 and 1971. In the other three years, the coefficients are consistently negative, but not significant. As for 4-digit data, the trade cycle has an influence on the earnings of female migrants: female migrants appear to be an important part of the overtime and shift workforce in boom conditions, even vis-a-vis other females.

The SEM/OTH division at the 3-digit level produces some mysterious results. The SEM coefficient is significantly positive for the first two years and for the last year, 1973-74 (albeit at the 10% level in the first and last years). That is, in 1968-69, SEM is significant only for 3-digit data, and in 1972-73 it is significant only for 4-digit data. The OTH coefficient fails to be significant for any year other than in 1971-72 when it is significant at the 10% level. This is in strong contrast with the results at the 4-digit level.

The qualifications variable is also not significant at the 3-digit level, except that in 1973-74 it returns a negative coefficient. Differences, in regard to the qualifications variable as well as the SEM/OTH division as between 3-digit and 4-digit equations indicate a different set of influences on earnings between industries and between industry groups.

The union power variable returns disappointing results. In the 4.au equations for 1972 and 1973, the two measures of union power (average days lost and total days lost) are added to the usual IC equation. In neither year is either measure significant (although the coefficients have the right sign). The assumption that dispute length and worker strength are positively related may be poor. Alternatively, the 2-digit data, from which the variable was constructed, may not be sufficiently discriminating; and the aggregation involved may hide significant variations within 2-digit categories. However, the substantial variation within the 2-digit data implies that the measures ought to have been given sufficient opportunity to 'prove themselves'

As an alternative, days lost was run by itself against earnings to examine the potential influence (equations 4.u). The variable is positive and significant for 1972, but not for 1973. Days lost for 1972 vary evenly between 0.2 and 240. A plausible difference of 100 days lost would account for a difference of \$400 in earnings.

The significance of days lost in the simple regression

equation implies that strike action plays some role in the achievement of higher pay. However, the influence of strike action per se is eliminated in the full equations. This does not imply that union power (or worker bargaining power, to be more accurate) is non-existent, but that it is represented through the influence of certain industry and personal characteristics. Indeed, the very source of the elusive element of bargaining power may be in these various characteristics.

The one year significance of days lost in 1972 has one possible interpretation. It is that the stronger unions achieve an initially substantial earnings differentials, through militancy, in the early part of the boom. Thence, the principle of comparative justice (manifest, for example, in the 400 awards informally based on the Metal Trades awards) may have operated in 1973 to sever the connection between militancy and earnings.

Note that the 1972 correlations between days lost and concentration, value productivity and the wage ratio are, respectively, .45, .34, and -.34. By contrast, the 1973 correlations of the first two are reduced to .20 and .13. Insofar as these two variables have a positive influence on earnings in these years, the falls in correlation coefficients tend to support the above interpretation.

##### 5. Summary of Sub-Section I

The results in this section support two major theses. The first is that industry characteristics do exert an influence on the differential earnings of manual workers, independent of the personal characteristics of workers, especially their acquired skills. Such influence is particularly strong in large turnover industries and in capital intensive industries. In orthodox language, industry characteristics are associated with substantial and long standing labour market imperfections which deter the tendency to equalisation of earnings of workers of equal skill.

In particular, industry productivity (value added per head) exerts a systematic and substantial influence on earnings differentials. This finding differs from the intermittent performance of productivity in the King and Langley study (limited to 3-digit data). The large turnover influence of productivity differs from Kmenta's finding of influence in the small turnover group of industries. Finally, this is in strong contrast with a major work on the subject in the American context by Eckstein and Wilson [1962], who claim no influence for productivity on earnings

differentials. They acknowledge the importance of 'product market' factors (which are a subset of industry characteristics) on earnings, but see these factors operating predominantly through profitability (average profitability of a key group of industries). Here, industry specific profit rates are negatively related to earnings for the years 1970-73, and retreat into insignificance in 1973-74.

The variables representing skill produce an indifferent performance. The qualifications variable produces a positive effect on earnings differentials (at the 4-digit level), but the quantitative influence is not very great. Moreover, the quantitative influence is contained only in the capital intensive industry group, and it disappears by the end of the period (the coefficient becomes negative). It is, however, acknowledged that some of the premium for skill enters through the coefficients of the male variable and the 'Other' migrants variable.

The variable representing on-the-job experience (workforce percentage over 45 years of age) produces interesting results. The over 45 group is not inconsequential, as it represents 34% of male employment and 25% of female employment (average 32%) in manufacturing industry (see A.B.S. ref. 2.87.9). In the labour intensive industry group it has a strong positive effect on earnings (predominantly in small turnover industries), whereas in the capital intensive group it has a strong negative influence. The difference in earnings for the over 45 group, as between capital and labour intensive industries, widens over the period.

The second thesis which gains support is that earnings are generally related to the employment makeup of the industrial (manual) workforce. The employment of females is, as predicted, linked with lower average earnings. In addition, the employment of certain (but not all) categories of migrants is linked to lower earnings, especially in periods of recession across the trade cycle. Female migrants and migrants from Southern European countries are two such categories. One can generalise that these groups form 'disadvantaged' segments of the industrial workforce, with respect to earnings. By contrast, Australian males and migrants (especially skilled males) from other than Southern European countries form 'privileged' segments of the industrial workforce. Section II is devoted to an examination of the extent to which this segmentation is linked to industrial characteristics, and, hence, is seen to be a means by which the monetary rewards due to industry characteristics may be transmitted through the labour market into long standing differentials in earnings.

## II. Male and Migrant Ratios

### 1. 4-Digit Data: All Years

As a means of assisting the determination of the causal link between various industry characteristics and personal characteristics of the industry workforce, it was decided to run male and migrant ratios against the industry characteristics.<sup>18</sup>

II.1.M indicates that male employment is linked to value productivity. Those industries employing a high proportion of males also enjoy high labour productivity. Still, there is no necessary causation implied in the equation. It is theoretically possible that males are more highly skilled (indeed a higher proportion of males are skilled), and therefore contribute positively to labour productivity. It is just as likely, however, that capital intensity is also responsible for the high labour productivity, and males are the major recipients of these benefits in monetary terms.

A further attempt to deal with this causal link is made by modifying the dependent variable to take account of the skill factor. Qualifications ratios by sex are available both for Australian males and migrant males. Accordingly, the unqualified male ratio (to total production employment) for both male groups is also tried as the dependent variable. We are really interested in unqualified Australian males, to act as a 'control' group. The hypothesis is that this group has higher earnings, partially because it benefits from disproportionate employment in those industries with characteristics conducive to higher earnings. Equation 1.UAM shows that value productivity is still significant, although with a reduced coefficient. This finding lends support to the notion that part of the Australian male's pay differential results from his favoured employment in more productive industries, and that this differential is apart from any increment due to formal qualifications. 1.UAM also indicates a negative coefficient for plant size. This issue is discussed below.

In equations run for 1969 (not reported), migrant ratios were positively linked to concentration and negatively linked to value productivity. This finding lends additional support to the notion of the segmentation of the workforce - that is, that both females and migrants are abnormally employed in low productivity industries.

A breakdown of migrants into males and females - 1.OSM and 1.OSF - indicates that it is more common for each group to be employed in

TABLE 5

Regression Estimates: Male and Migrant Employment Ratios  
 Full 4-Digit and 3-Digit Data; N = 157 and 40 respectively

Coefficients										
Equation No.	Constant	CONC	PS	ALP	LCRD	CF	R <sup>2</sup>	Autocor- relation <sup>a</sup>		
II.1. M	45.8	-	-	2.8	-	-	17	Y		
UAM	29.4	-	-.17	1.0	-	-	25	Y		
UMM	8.4	.14	-	-	-	-	20	Y		
OSM	29.0	-	.1	-.4	-	-	17	Y		
OSF	30.9	.1	.1	-1.0	-	-	20	Y		
SEM	13.1	.1	-	-.8	-	-	21	Y		
OTH	15.7	-	.1	.3 <sup>b</sup>	-	-	18	Y		
ACONC										
4.UAM	47	-	-.24	-	-	-	19	Y		
UMM	-	.25	-	-	-	-	40	Y		
OSM	17	.2 <sup>b</sup>	-	-	.4 <sup>b</sup>	-	31	Y		
OSF	25	-	.2 <sup>b</sup>	-	-	-	22	Y		
SEM	13	-	-	-.9	-	-	27	Y		
OTH	7	-	.1	.7	.2	-	44	Y		

Notes: a) See Table 1.  
 b)

low productivity industries than is the case with Australian born males and females. The relationship is stronger for females. Furthermore, it is stronger in the case of Southern European migrants than in the case of other migrants; so here is yet another dimension to the segmentation of the work-force. Quantitatively, \$8,000 negative difference in labour productivity would, on average, result in the employment of 6.5% more Southern Europeans and 8% more migrant females (not mutually exclusive groups) than Australian females.<sup>19</sup>

### 2. 4-Digit Data: Large and Small Turnover Groups

Similar patterns emerge for this data division as for the aggregate data. The positive connection between more productive industries and the greater employment of unskilled Australian males exists across both small and large turnover groups, although the coefficient is greater for the small turnover group (see equations 2.UAM(s) and 2.UAM(l) - note that the  $R^2$  for equation 2.UAM(s) is .42, a fairly high value in the context of the values for the other equations). A negative plant size coefficient appears for both groups, but is higher for the large turnover group.

The negative relationship between productive industries and employment of female and Southern European migrants also appears for both groups, but the connection is stronger in large turnover industries. Further, the link between plant size and female migrant employment is restricted to large turnover industries.

The coefficients of the concentration variable, however, for the year 1971 seem confusing. The coefficients are positive for unskilled males (both Australian and migrants) and across both groups, but for no other equation.

### 3. 4-Digit Data: Capital and Labour Intensive Groups

The first observation is that for many of the equations in this breakdown there is a substantial increase in  $R^2$ . This would indicate that the split is meaningful in economic terms.

For unqualified Australian males, labour productivity and plant size are important in both groups, although the former is quantitatively more significant for the 'labour intensive' (L) group. A concentration link appears in the 'capital intensive' (C) group, where the coefficient is fairly substantial. - .21.

The aggregate data showed that SEM and OSF migrants were

TABLE 6

Regression Estimates: Male and Migrant Employment Ratios

Division of 4-Digit Data by Turnover Size

Equation No.	Constant	Coefficients				LCRD	R <sup>2</sup>	Autocor- relation <sup>a</sup>
		CONC	PS	ALP	ALP			
II.2.UAM (s)	18	.13 <sup>b</sup>	-.17	1.52	-	-	42	Y
UAM (l)	33	.18 <sup>b</sup>	-.29	.8 <sup>b</sup>	-	-	19	U
UMM (s)	-	.17	-	-	-	-	21	U
UMM (l)	11	.13	-	-	-	-	21	Y
OSM (s)	29	-	.15	-	-	-	23	N
OSM (l)	30	-	.14	-	-	-	15	Y
OSF (s)	28	-	-	-.85	-	-	21	Y
OSF (l)	36	-	.22	-1.16	-	-	24	U
SEM (s)	-	-	.07 <sup>b</sup>	-.51 <sup>b</sup>	-	-	20	Y
SEM (l)	18	-	-	-1.0	-	-	25	Y
OTH (s)	22	-	.06	-	-	-	8	U
OTH (l)	13	-	.15	.4 <sup>b</sup>	-	-	29	Y

Notes: a } See Table 1  
b }

TABLE 7

Regression Estimates: Male and Migrant Employment Ratios  
 Division of 4-Digit Data by Degree of Capital Intensity

Equation No.	Constant	CONC	PS	ALP	ICRD	R <sup>2</sup>	Coefficients		Autocor- relation <sup>a</sup>
							CMC	ALP	
II.3.M(L)	79	-	-	1.83	-1.10	29			Y
M(C)	57	.21	-	1.21	.52	13			U
UAM(L)	47	-	-.16	1.35	-.76	37			Y
UAM(C)	20	.21	-.16	.72	-	26			N
UMM(L)	12	.12	-	-	-.25 <sup>b</sup>	30			U
UMM(C)	13	.16	-	-	-	17			Y
OSM(L)	21	-	.14	-	.37	24			Y
OSM(C)	35	-	.08 <sup>b</sup>	-.51 <sup>b</sup>	-	10			U
OSF(L)	18	.14	.11	-	.63	33			Y
OSF(C)	28	-	.09 <sup>b</sup>	-.63 <sup>b</sup>	-	12			N
SEM(L)	9 <sup>b</sup>	-	.07	-.53 <sup>b</sup>	-	22			Y
SEM(C)	7 <sup>b</sup>	.09	-	-.57 <sup>b</sup>	.16	21			N
OTH(L)	10	-	.06	-	.30	20			Y
OTH(C)	26	-	.11	-	-.13 <sup>b</sup>	23			U

Notes: a } See Table 1  
 b }

disproportionately employed in highly concentrated industries and low productivity industries. The present breakdown shows that such influences on the SEM variable are contained in the C group. For migrant females the reverse productivity influence is in the C group, while the concentration influence is in the L group.

There is one interesting new phenomenon - the regular appearance of the wage ratio as a significant variable. In the L group, the higher are wage costs relative to other costs, the less are unskilled males - especially Australian males - employed and the more are migrants employed.

The greater tendency to employ migrants is true for both male and females. This would suggest that as the wage bill becomes more onerous in size, males become less attractive, and females and migrants are employed. The SEM and OTH equations, however, indicate that it is not the 'second class' migrant group, SEM, which is over-represented in high wage bill L industries, but the OTH group. By contrast, Southern Europeans are over represented in high wage bill C industries.

#### 4. 3-Digit Industry Groups

The male and migrant employment equations are examined for 1971. Labour productivity ceases to be influential at this level in favouring unqualified males or discriminating against migrant females. It remains significant for the breakdown of migrants by birthplace: OTH migrants benefit from employment in high labour productivity industry groups, while SEM migrants are discriminated against. The values of  $R^2$  are higher here than for the 4-digit data and are fairly substantial.

Concentration is important for the employment of migrant males and the coefficient is substantial. Equation 4.UMM shows that the link is for unskilled migrant males. The plant size influence is the same as for 4-digit data - negative for Australian males and positive for OSF and OTH migrants. The wage ratio shows a positive link with the employment of 'Other' migrants. The cash flow ratio was also examined for its potential influence on the employment of special groups. The coefficient was at no time significant, so the majority of the equations are not reproduced here.

#### 5. Summary of Sub-Section II

The work attempted in this section is perhaps the most adventurous part of the study. The results, while far from definitive, are reasonably satisfying, with the possibility of economically meaningful

interpretations. Certain industry characteristics are seen as having systematic and often substantial connections with the employment of particular groups. The coefficients of determination are never large, which is to be expected from the nature of the subject. The historical importance of the male (at least in the twentieth century) as the major breadwinner, and the stabilising effect of conventions developed about this factor would make for employment patterns different from those that would be considered economically rational at this time. Nevertheless, we feel that the coefficients of determination are often substantial enough to warrant the claim that an important determinant of the composition of employment is to be found in industry characteristics.

It appeared from Sub-section I that there is some justification in treating Australian males and OTH (male) migrants as privileged groups, and Australian females, migrant females and SEM migrants as disadvantaged groups. Within Subsection II, this distinction is used to interpret the coefficients of the industry characteristics. In particular, there is a reasonable correspondence between more productive industries and the employment of privileged groups, predominantly that of the 'control group', the unskilled Australian male. There is also the peculiar performance of the plant size variable, in general, favouring the employment of the disadvantaged group.

The role of the plant size variable is one of the mysteries of this study. From Sub-section I we learn that it is associated with higher earnings. In this Sub-Section we discover that unqualified Australian males are under-represented in large plant industries, and that, not only females, but migrant females in particular and migrants in general, are over-represented in large plant industries. The positive link with female employment (and doubly so for migrant females) is especially strong for large turnover industries. The migrant female link is also stronger in labour intensive industries, where the link with Southern European migrant employment is also evident.

It seems plausible to assume that employment concentration, ceteris paribus, favours the bargaining power of the wage earner through the greater ease of co-ordination of bargaining activities and potential militancy. The relationship between the employment of disadvantaged groups and plant size would then imply the conscious use of less organised and disorganised groups to dissolve the potential effects of close working conditions on earnings increases. If this is the case, however, then from

whence comes the positive link between plant size and earnings unless a small privileged group is achieving unusually high earnings?

Certainly one would expect that employment concentration is associated with certain production techniques and probably process forms of manufacture. This would explain the disproportionate employment of females. It is also possible that plant size, via the nature of production, is associated with greater use of overtime and shift work. If there were a connection between larger plants and longer hours and penalty rates, the paradox of higher earnings in larger plants would be resolved. Although there is no strong a priori reason for this connection, Sawyer [1973] actually discovered such links existing in British industry. A more detailed study might reveal such links in Australia. A further complication is the positive connection between plant size and the employment of 'Other' migrants, labelled by us as a privileged group. This influence is pervasive, but is stronger in the large turnover and capital intensive groups. We have no explanation for this anomaly in our terms. It may be that the influence is due to the female component of the OTH group, but evidence from other equations would tend to discount this interpretation as the whole story. On the whole, a relation between plant size and potential militancy seems to us to be an important possibility, even if a connection is proved to exist between plant size and shift work, for one still must explain why disadvantaged groups are employed for shift work.

The pattern of significance of the wage ratio coefficient is related to the 'plant size' problem. When the relative wage bill is high, there is more to be gained from hiring lower paid workers. This is to be seen especially in the labour intensive group with the disproportionate employment of females. Support for this argument is gained from the consistently negative correlations between LCRD and M, especially in labour intensive industries. In particular, the M/LCRD correlation for the L group (1971) is  $-.46$ . High wage bills are obviously bad for bargaining power.

A plausible difference in the wage ratio of 15% would predict 16% less male employment (11% less unqualified Australian male employment) in the L group; moreover, the same difference of 15% would predict a 9% higher migrant composition of female employment. In addition, capital intensive industries show a greater propensity to hire Southern Europeans when the wage ratio is high.

Again, the qualification to this generalisation comes with the disproportionate employment of OTH migrants in the high wage ratio labour intensive group, part of which must include the privileged OTH males. The suggested interpretation is that the higher wage ratio may be partly due to the higher earnings from skills, and that these skills are attributable to OTH males.<sup>20</sup> This interpretation is consistent with the positive coefficients of the wage ratio in some earnings equations in Sub-Section I (especially large turnover industries). It suggests, with regard to the positive LCRD coefficients in Sub-Section I regressions, that the causation is in the opposite direction to that normally implied. High average earnings due to skill cause high wage ratios and not the other way around. As stated above, high wage bills, ceteris paribus, are bad for bargaining power and hence for higher average earnings.

An examination of the various correlations between the qualifications and the wage ratio variables is instructive. The 4-digit Q/LCRD correlation varies around .30. The division between the capital and labour groups produces correlations of around .45 and .12 respectively. The division between large and small turnover industries produces correlations of around .45 and .20 respectively.

We infer that, in general, premiums for skill are an important factor in determining the size of the wage ratio. The correlation is less in the L group because we suspect the wage bill is relatively more important and steps have been taken to lessen the impact of skilled workers on the wage bill. Hence the positive connection between LCRD and female employment (especially migrants). We assume that the positive link between LCRD and OTH males is due to the remaining skilled component of a de-skilled workforce.

We can offer no plausible reason why the large turnover industry group should exhibit a substantially larger Q/LCRD correlation. Whatever the reasons, the correlation provides further support for the 'reverse causation' thesis linking average earnings positively to the wage ratio, since it is in that group that the positive influence is predominantly to be found. The only significant LCRD coefficient in the capital/labour division in Sub-Section I is a negative coefficient for the labour group (1973). Again, this is consistent with the positive connection between LCRD and female employment. In this case, the causation is in the expected direction - high wage bills lead to lower earnings. The implication is the same, and the alternate signs of the LCRD variable do not imply alternative explanations.

From near irrelevance in the equations of Sub-Section I, concentration becomes a relevant variable, but one with confusing results. Concentration is also typically linked with the employment of the 'disadvantaged' groups. The positive influence on migrant female employment is confined to the L group. The positive influence on SEM employment is confined to the C group. The qualification is that the influence tends to disappear by the end of the period. In addition, unskilled males are also disproportionately employed in more highly concentrated industries in the C group.

Becker [1957] offered a theory of discrimination against minority groups which has its implications partly in terms of actual hiring policies rather than in earnings differentials. One of the acknowledged predictions of his theory is that competitive industries, *ceteris paribus*, will hire relatively more of the minority group(s) because they can less afford to discriminate than can monopolistic industries. That is, Becker predicts an inverse relation between the degree of competition and the percentage of minority groups employed. In principle, this thesis can be applied to both females and migrants in the Australian context. Our results do not support Becker's prediction. If anything, they point to an opposite relation. Evidently, the situation is more complex than is implied by this particular prediction of the Becker theory of discrimination.

In this study, there is a double presumption that concentration is a measure of market power and hence a source of higher earnings. The second presumption - that concentration is a source of higher earnings - has already been questioned in Sub-Section I. The links between concentration and the employment of disadvantaged groups perhaps give greater reason for rejecting the second link. We are inclined to conclude that concentration bears no direct relationship with labour market variables such as the structure of employment and levels of earnings. The variable itself may be open to question as a suitable proxy for market power, in particular for some intermediate goods industries and small turnover industries. Moreover, even if the measure is sound, a key factor would seem to be the nature of the production process involved. Highly concentrated industries such as drugs, cosmetics and cigarettes avoid passing on the fruits of market power to higher earnings by the use of process forms of manufacture and female employment. A more detailed examination of the range of concentrated industries would seem to be in order.

### III. Change in Earnings

The literature on earnings differentials is devoted either to absolute levels or to changes in levels. As no strong a priori reasons exist on which to choose between the levels, both have been examined in this study. We think the results justified this decision, since different variables proved significant in each case.

Identical equations, run for each of the five years in Sub-Section I, indicated the lack of stability in the influences of some variables on earnings. Regressions in this section serve to encapsulate the quantitative changes in influence of these variables.

Initially, a one year period - 1968-69 to 1969-70 - was examined. The results were paltry in terms of insignificant variables and trivial coefficients of determination but two findings are relevant. The only significant variables in explaining the one year earnings changes were the change in production employment (negative) and the value productivity change (negative). The unexpected latter result is due to the influence of a handful of industries, where productivity changes of substantial amounts were not mirrored in earnings changes until the following year. The industries concerned were cotton ginning, nickel smelting and refining, and food products not elsewhere classified. A casual examination of the annual changes in earnings and productivity in these and other industries does provide support for the proposition that value productivity influences earnings positively, albeit with a short lag in some cases.

The negative link between employment change and earnings negates the proposition of Weiss [1966] that employment change is a proxy for labour market pressure even in the short run. If this had been so, the sign would have been positive.

The rest of this Sub-Section is devoted to earnings changes examined over the five year period.

#### 1. 4-Digit: 1968-69 to 1973-74.

Equations 1.v, 1.w and 1.y show the influences on the five-year absolute changes in earnings. The size of earnings changes involved ranges fairly evenly from \$1,000 to \$3,500 for the period. Specific industry values of the dependent variable are shown in Appendix C, Table C1. Certain changes in the list of independent variables are made from the regression for earnings levels in Sub-Section I. The male ratio and the wage ratio have 1968-69 values. The productivity variable represents the change in

TABLE 8

Regression Estimates: Change in Average Annual Earnings, Manual Workers, 1968-69 to 1973-74

4-Digit Data: Division of 4-Digit Data by Turnover Size and Degree of

Capital Intensity: 3-Digit Data

Equation No.	Constant	CONC	PS	DLP or DRIP or ICRD		PDRIP	ICRD (68)	Coefficients		AV	PDL	M(68)	OSM	OSF	Q	AGE	SEM	OTH	DM	R <sup>2</sup>	Autocor- relation <sup>a</sup>
				PDLF	DRIP			DL or	DL or												
III.1.w.	756	-	4.3	24.6	-	-	-	-	-	-	11.4	-	-	-	-	-	-	19.5	-	51	U
1.u.	869	-	4.9	29.7	-	-	-	-	-	-	11.1	-	-	-	-	-	-	-	-	49	U
1.y. <sup>c</sup>	1015	-	5.4	-	62.3	-7.9 <sup>b</sup>	-	-	-	-	10.3	-	-	-	-	10.4	-	-	-	54	N
1.w'p. <sup>d</sup>	91	.04	-	- <sup>e</sup>	-	-	-	-	-	-	.17 <sup>e</sup>	-	-	-	-	.35 <sup>b</sup>	-	.48	-	31	U
1.gp. <sup>d</sup>	76	-	-	-	.13 <sup>e</sup>	-.34	-	-	-	-	.13 <sup>e</sup>	-	-	-	-	-	-	-	-	15	N
1.y.p. <sup>c,d</sup>	97	.04	-	-	-	-	-	-	-	-	.26 <sup>e</sup>	-	-	-	-	.4 <sup>b</sup>	-	-	-	37	N
2s.y.	-	5.7 <sup>b</sup>	-	-	-	-	-	-	-	-	.21	9.8	-	-	-	-	-	29.7	-	47	N
2l.y.	969	-	5.2	26.4 <sup>b</sup>	-	-	-	-	-	-	-	12.0	-	-	-	-	-	13.8	-	59	N
2s.y.p. <sup>d</sup>	74	-	-	-	-	-	-	-	-	-	.24 <sup>e</sup>	-	-	-	-	-	-	.85	-	39	U
2l.y.p. <sup>d</sup>	85	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25	N
3l.y.	-	-	5.0	49.9 <sup>b</sup>	-	-	-	-	-	-	-	11.2	-	-	-	-	-	20.5	-	50	U
3c.y.	1551	-	5.0	-	-	-67.0 <sup>b</sup>	-	-	-	-	-	12.7	-	-	-	-	-	-	-	59	N
3l.y.p. <sup>d</sup>	78	-	-	- <sup>e</sup>	-	-	-	-	-	-	.17 <sup>e</sup>	-	-	-	-	-	-	-	-	21	U
3c.y.p. <sup>d</sup>	95	.04	-	- <sup>e</sup>	-	-	-	-	-	-	1.86 <sup>b</sup>	-.18	-	-	-	-	-	-	-	50	N

TABLE 8 (contd)

Regression Estimates: Change in Average Annual Earnings, Manual Workers, 1968-69 to 1973-74

4-Digit Data; Division of 4-Digit Data by Turnover Size and Degree of

Capital Intensity; 3-Digit Data

Equation No.	Constant	ACONC	PS	Coefficients										Autocor- relation <sup>a</sup>					
				DLP or PDLP	DRLP or PDRLP	PDO	LCRD	AV	PDL	M	OSM	OSF	Q		AGE	SEM	OTH	CF	R <sup>2</sup>
III.4.9	1416	8.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	49	N
4.YC. <sup>d</sup>	-	-	8.0	-	-	-	-	-	-	-	-	15.4	-	-	-	-	-	72	N
4.G'P. <sup>d</sup>	61	-	-	.2	-	-	-	-	-	-	-.4 <sup>e</sup>	-	-	-	-	-	-	29	U
4.Y'P. <sup>d</sup>	80	-	.2 <sup>b</sup>	.2	-	-	-	-	-	-	-.2 <sup>e</sup>	-	-	-	-	-	-	47	N
4.WP. <sup>d</sup>	87	-	-	-	-	-	-	-	-	-	-	-	-	-	-.62 <sup>b</sup>	-	-	38	N

Notes: a }  
b }  
c }

See Table 1

d Percentage change in average annual earnings

e Percentage change in PDLP, PDRLP or PDL

productivity for the period. In addition, average vacancies for the period and the change in production employment are also included as potential explanatory variables.

Plant size is significant in each of these equations. The change in productivity also has a significant influence, but this is not quantitatively large.

Male employment is positively associated and qualifications negatively associated with earnings changes. 'Other' migrant employment is also positively associated with earnings changes. These findings support the discovery in Sub-Section I.1 above that the coefficients of males and other migrants were increasing secularly over the period (the latter erratically) and the coefficients of qualifications declining.

These results are rather surprising. Males appear to have increased their earnings differential during the period, an ironic finding given that the period was one of strong lobbying for equal pay. However, the achievement of equal pay is a lengthy process and the success of the female workforce in the period may be better gauged by examination of changes in percentage differentials. The relatively low increase in earnings in industries with a high proportion of skilled workers presents a problem of interpretation due to the limitation of data to 1971 only. If the assumption implied in the regressions is correct - that the qualifications ratio remained stable - the implication is that a reduction in relativities has occurred over the period. Indeed, the reductions would be serious as these refer to absolute losses of earnings.

The alternative interpretation is that qualifications ratios have changed over the period, presumably declining relatively in those industries in which the ratio was relatively high.<sup>21</sup> This need not necessarily mean a decline in relativities due to skill, but could imply a change in job structures - a 'deskilling' process. It is feasible that techniques could have been changed with the purpose of reducing the average level of skill required for a particular process, as one of the consequences would be a relative reduction in average earnings. In a number of industries, average earnings declined absolutely over particular sub-periods (for example, rigid plastic sheeting ASIC 3432) and this decline offers strong grounds for inferring that such structural changes could have occurred.

We can offer little explanation of the positive link of earnings changes with 'Other' migrant employment. However, this positive

coefficient offers support for the continued treatment of the 'Other' migrant group as a privileged group similar to 'Males'.

Finally, the change in production employment is negatively associated with earnings changes. This was also observed for the one year change between 1968-69 and 1969-70. Evidently, employment change is not a proxy for labour market pressure, either in the short or medium period.

Most discussions of earnings differentials or relativities are couched in percentage terms. It is, therefore, appropriate that we seek to explain the variation in percentage earnings changes (values of the dependent variable are shown in Appendix C, Table C1). In the 'p' percentage equations, percentage change in productivity (value and constant price) and percentage change in production employment replace their absolute counterparts.

In the industry characteristics equation 1.gp, the productivity influence continues to the point of enhancing earnings differentials percentage-wise. Workers in (relatively) high wage bill and expanding employment industries have, on average, become worse off. A 20% greater increase in productivity would predict a 2.6% rise in differentials. A wage ratio higher by 15% would predict a 5% drop in average earnings growth; and a 30% employment rise would predict a 4% drop in average earnings growth. Note that the correlation between percentage productivity change and percentage employment change is  $-.13$  for the labour intensive group and  $-.25$  for the capital intensive group. In general, the industries expanding fastest in productivity were laying off manual workers.

In the enlarged equations 1.w'p, concentration becomes positively significant. Plant size exerts no influence. This latter finding is not inconsistent with the interpretation that the contribution of plant size to higher earnings is by way of penalty rates from overtime and shift work. The influence of plant size on absolute levels might be interpreted as arising from the maintenance of relativities on penalty rates. The influence of production employment change remains. Among the personal variables, the positive influence of 'Other' migrant employment persists, even in percentage terms. Both skill variables are negatively significant (albeit the AGE variable at the 10% level). The insignificance of the male ratio variable suggests that the absolute rise in differentials implied in the previous set of equations could be the means by which relative differentials were held constant.

Neither the wage ratio nor productivity change is significant in the enlarged IPC equation. This indicates that the influence manifested through these variables in the IC equations is now manifested through personal characteristic variables.<sup>23</sup>

## 2. 4-Digit: Large and Small Turnover Groups; 1968-69 to 1973-74

The division according to turnover produces some interesting differences, and locates some of the changes shown in the aggregate data.

Equation 2s.y shows that the employment change influence is restricted to the s group, where the coefficient is substantial. Concentration also has an influence on s group earnings. (The influence of 'Other' migrants, while transcending the data division, is much stronger for small turnover industries.)

By contrast, the influence of plant size, productivity change and qualifications are all restricted to the l group. Large turnover industries, in general, appear to be more 'generous' in handing over some of the fruits of high productivity, yet at the same time more 'ruthless' in reducing the costs of skilled labour.

The percentage versions of the above equations support some of the preceding conclusions, but others require modification - see 2s.y<sub>p</sub> and 2l.y<sub>p</sub>. 2s.y<sub>p</sub> shows that the positive association between 'Other' migrant employment and percentage earnings change exposed in the aggregate data is located in small turnover industries. Qualifications have an adverse influence percentage-wise for small as well as for large turnover industries. R<sup>2</sup> is higher in the small turnover equation.

## 3. 4-Digit: Capital and Labour Intensive Groups; 1968-69 to 1973-74

Applying the C/L breakdown to the earnings change equations provides additional insight. Plant size is relevant in both groups. The change in labour productivity has a positive influence on earnings only in the L group (at the 10% level). This seems peculiar, given the absence of influence of productivity in this group on earnings levels in 1973-74 (see I.3L.p.73). The only logical possibility is that productivity exerted a negative influence at the beginning of the period.

The qualifications and age (10%) variables are significantly negative in the C group. On the other hand, the positive link of OTH migrants with earnings changes is contained within the i group. Qualifications have the expected positive sign but are not significant in the L group, and the

reasonable correlation of Q with OTH (+ .24) indicates that OTH is detracting somewhat from the Q influence, which makes the different performance of qualifications in the two groups all the more emphatic.

For the first time in the study, the vacancies variable shows a significant influence in 3C.y. Average vacancies are significant at the 10% level, yet are not of the expected sign. Average vacancies (for the C group) varied in the range between .3% (3111 fabricated structural steel) and 3.7% (much of 333 industrial machinery). 2% greater average vacancies over the period would predict a smaller earnings increment of \$130. A casual examination of the industry location of high and low vacancies in general would have predicted the negative relationship. Many of the high vacancy industries are low earnings industries, in particular the textiles and clothing group. This indicates, firstly, that the undesirability of some jobs might be largely the reason for continuing high vacancies. Secondly, many of the productive, high earnings industries do not appear to advertise vacancies so intensely. Plum jobs do not get advertised - a key manifestation, perhaps, of 'internal labour markets' at work.

The percentage change equations show the markedly superior performance of the capital intensive group over the labour intensive group. In 3L.y.p, the inverse association with employment change is shown to be predominantly in labour intensive industries. In addition, there is a negative association with the AGE variable in this group (at the 10% level). The AGE had a positive influence on earnings only in the L group, so this 'advantage' has suffered some attrition over the period. In 3C.y.p, the concentration influence from the aggregate data is shown to be in the C group. Moreover, the peculiar behaviour of the qualifications variable is in the C group (which was expected from the results in Sub-Section I). Finally, the male employment ratio returns a negative coefficient. This is the first indication that males, per se, might have suffered an attrition of their privileged position.

#### 4. 3-Digit: 1968-69 to 1973-74

The 3-digit results are something of an anti-climax. Productivity change fails to be significant even in the industry characteristic equation, 4.g. Qualifications, with its predictable negative association, is the only variable of significance in the extended equation 4.wp.

Because of the failure of the productivity change variable to 'perform' at this level, an 'output change' variable was substituted in the

percentage change equations. 4.g'p and 4.y'p show the results. The output change variable is significant. Peculiarly, employment change appears as significant at this level also. It is possible that the labour productivity variable hides conflicting pressures - a tendency to higher earnings due to higher output and a tendency to lower earnings due to higher employment.

Note the quantitative impact of both these variables. Real output changes went from -2% to plus 112%, with the typical change in the range of 15% to 35%. A 25% increase in real output would predict a 5.5% greater increase in earnings. Production employment changes (at 3-digit level) went from -29% to plus 40%, and were fairly evenly distributed within that range. A 20% increase in employment would predict an 8.6% relative decline in earnings.

##### 5. Summary of Sub-Section III

This section attempted to offer some explanation of the change in earnings differentials over the five year period, both in absolute and percentage terms. As far as industry characteristics were concerned, plant size, concentration, and productivity change appeared intermittently as significant, but none were consistently so. In general, industry characteristics performed poorly in explaining changes over the period. They performed worse in explaining percentage changes than they did in explaining absolute monetary changes.

No doubt, our equations miss an important influence on the general rise in earnings due to price rises in the cost of living. This influence would be embodied in the constant term in our equations. Given this foundation, industry characteristics failed to explain the wide variation in percentage earnings changes across industry. The increases ranged from 44% to 125%, the mean being 74% - see Appendix C, Table C1. However, it would seem inappropriate to conclude that the reason lay in the tight maintenance of acceptable earnings relativities, and that the specific performance of an industry was irrelevant. Assuming stability in internal job structures, such a conclusion would imply a narrow range of dispersion about the mean. The problem is that the range of variation is greater and not less than that predicted.

Given the absence of the influence of industry characteristic variables, the important and unexpected discovery was the consistent negative relationships between the size of earnings increases and industries with high proportions of skilled workers and industries with the most substantial

increase in employment. Data divisions indicate that the first link is found in the capital intensive industry group (the source of the positive influence in the first place - Sub-Section I) and that the second link is predominantly in labour intensive industries and/or small turnover industries.

The direction of causation involved in the relation between earnings and employment changes, however, is uncertain. It may be that the causation lies partly in the opposite direction to that implied in Sub-Section III equations. The classic argument is that high average earnings would lead to a pressure to introduce labour saving techniques and to the eventual decline in employment. The employment change influence was confined to the group labelled 'labour intensive'<sup>24</sup> and it is not clear to what extent the substitution of labour saving techniques is possible. Clearly, this uncertainty highlights two limitations of the present approach. The first, that it was inevitably conducted at too high a level of abstraction. The second is more an indictment of econometric method per se in that it is profoundly difficult for the method to accurately model the dynamic interactions of economic variables in any detail. For both reasons, the approach used in this study needs to be supplemented by a more detailed study of the changing patterns of industrial techniques and work structures.

#### G. General Conclusion

##### 1. Industry Characteristics and Economic Conditions

The most important conclusion of this study is that certain industry specific characteristics exert a systematic and independent influence on the earnings differentials of manual workers. The characteristics of importance are industry productivity (whether in value or constant price terms), plant size, and, to a lesser extent, concentration. In terms of average earnings, these industry specific influences have been established historically (manifested in regressions on earnings levels) and maintained during the period under study (manifested in regressions on earnings changes).

Assuming that our modifications for the skill factor in the manual workforce have been reasonably successful, the implication is that the monetary returns to manual workers of similar skills vary by industry. The significance of this monetary difference is larger in industries which are capital intensive and/or large turnover. We conclude that the distribution of income among wage earners is partly determined by technique and by the job structures imposed by that body of techniques.

Our attempt to capture a positive influence on earnings due to economic conditions was not successful. Our measure for labour market tightness in average vacancies failed to perform, except in the capital intensive group where it returned the wrong sign. We are agnostic about this result and, of course, cannot rule out the possible weakness of our vacancy statistics. In addition, employment change, suggested in the literature as an alternative measure of labour market pressure and industry expansion, pointed to conditions unfavourable rather than favourable to labour.

## 2. The Orthodox Theory of Earnings Differentials

This study did not set out to 'test' orthodox theories of earnings differentials. It was structured on industry and not on personal data, which, presumably, are the more desirable bases for an examination of human capital theory. Personal characteristics were included only indirectly as characteristics of the industry-specific workforce.

Nevertheless, we think that the present findings are not sympathetic to human capital theory. Substantial and long standing differentials linked to industry-specific qualities constitute permanent imperfections in labour markets. Although labour economists recognise the existence of market imperfections, we feel it desirable that the imperfections should be treated as integral aspects of the operations of modern labour markets and not as ancillary to other more 'flexible' aspects of these operations. Indeed, as the work on 'internal labour markets' implies, the very concept of a 'market' may be an inadequate concept in the understanding of contemporary job structures. The free mobility of similar labour as an ideal form may serve to confuse rather than to elucidate the nature of work and earnings.

More specifically, market imperfections aside, we interpret human capital theory as placing the dominant explanation of (personal) earnings differentials on the differential embodiment of (widely defined) skills. In the words of Thurow [1967, p.66]:

"Human capital (the skills and the knowledge of the individual) is one of the key determinants of the distribution of income. Individuals with little education, training and skills have low marginal productivity and earn low incomes. With very little human capital, they earn poverty incomes."

Broadly speaking, workers get what they deserve. The approach is even more strongly expressed by Fuchs<sup>25</sup> who acknowledges close links between productivity and wages, but presumes that the connection is entirely due to human

qualities, without acknowledging the possibility of an inverse connection. Competition in the labour market demands that this be the case.

The findings of this study show that the 'skill' variables are influential in earnings differentials but are only one factor among several.

It has been admitted already that our numerical representations of skill are imperfect. On-the-job experience is not the exclusive possession of workers over 45 years of age; the proportion with formal qualifications is a quantitative measure hiding degrees of skill but such data are available for only one year, 1971. The variable 'Other' migrant employment obviously includes a substantial proportion of skilled workers, and its positive influence could be interpreted partially as indicating a return to skill not measured elsewhere (especially as the presence of this variable often eliminated the significance of the formal qualifications variable, Q).

Taking the "Other migrant" influence into account, we still feel it is stretching the bounds of credibility to expect that more refined measures of skill could 'steal' from the substantial coefficients of other variables shown to be significant.

Perhaps the most controversial issue is the justification of the continuing differential associated with male employment and, we assume, being paid to male workers. We would not claim to have proved conclusively that the differential is not justified in terms of skill, but we feel that the evidence from Sub-Section II above and summarised in point 3 below suggests that it is partly based on other factors. It is ironic that one reason given by the Arbitration Commission in 1969 to delay the introduction of equal pay was that the male wage includes a 'family' component linked to the male's presumed role as the sole bread-winner. It was an argument which also kept the minimum wage as a male preserve until 1974. This argument not only vitiates the male differential as being purely skill-based (or in wage determination parlance - based solely on work value) it also provides an alternative non-economic explanation for the existence and perpetuation of sex-based earnings differentials.

More fundamentally, the skill variables themselves perform unexpectedly over the period. The fact that those industries with proportionally more skilled workers are paying relatively lower average earnings at the end of the period requires explanation. Since the measure is average rather than individual earnings, this state of affairs may still be compatible

with a positive monetary return to investments in skill. But perhaps the questions being asked by human capital theorists are not the most useful. We are of the opinion that the more important questions relate to the demand side of labour markets - what kinds of skills are presently in demand, and in what proportions; what kinds of changes in these demanded proportions are taking place and why.

### 3. Labour Market Segmentation?

Are labour markets segmented in Australian manufacturing industry, creating barriers to entry and restricting mobility? If so, does such segmentation exist along observable lines of ethnicity and sex? Is such segmentation linked to industrial structure and technique? Other authors have already documented differential wages, occupations and conditions for females (e.g. Power [1975], Ryan & Conlon [1975]) and migrants (e.g. Collins [1975]). We assume an affirmative answer to the first two questions, although we acknowledge that there are contrary opinions on the position of migrants (e.g. Blandy [1977]).

In this study we have been concerned to gauge the extent of such segmentation from data on average earnings and, in particular, to clarify the role of migrants in the manufacturing labour force. The main aim has been to contribute an answer to the third question.

Given the existence of segmentation, labour markets cannot be examined in the aggregate without overlooking some essential ingredient of their operation. In this study, the data base is an industrial classification. The corollary here is that industry specific workforce characteristics cannot be understood sufficiently without a division of the manual workforce into non-competing segments. In particular, the vast difference in average earnings across industry, and the existence and nature of connections between industrial and workforce characteristics are linked to hierarchically arranged, non-competing segments of the manual labour force.

#### (a) Sex

In Sub-Section I regressions, male employment per se is associated with higher average earnings. The 4-digit coefficients for the five years range from 14 to 25 (and similarly for 3-digit data).<sup>26</sup> Taking the 1968 coefficient of 14, a 1% positive difference in male employment would predict average earnings to be \$14 greater. For example, flour (ASIC 2151) has 96% male employment; sweaters (ASIC 2412) has 17% male employment. This

variable alone would predict average earnings for flour to be \$1,100 greater (the actual 1968 difference was \$740).

It is not immediately clear how one interprets the positive coefficient of the male employment variable. There is firstly the consideration that males on average work longer hours than females (10% in 1972). In 1968-69 (with average earnings of \$2,890) this factor alone might have accounted for a male differential of the order of \$200. However, there are historical conventions that have institutionalised a male differential, not the least being the basic wage for males under the Arbitration Commission's jurisdiction. We suspect that there is also a premium for militancy embodied in this positive coefficient as, historically, males have taken more advantage of the possibilities of collective action for wage increases.

The period under study witnessed an increase in the monetary differentials going to males and, in most respects, a maintenance of the male percentage differential. This is inferred from the observation that those industries with greater male employment experienced more rapid increases in (absolute) earnings. The exception is the capital intensive group at the 4-digit level, where the male employment variable (1968-69) had a negative influence on percentage earnings change. Given that male employment is over 85% for most of this group and the variation between industries consequently slight, the negative influence does not amount to very much - perhaps a predicted 2.5% loss in earnings relativities at the most.

Collinearity with other variables prevents a more accurate picture of the extent of the pecuniary differential going to males. By regressing male employment against the set of industrial characteristics, one hopes to expose, directly, the connections between male employment and industrial structure and, indirectly, the means by which male earnings are enhanced through the favourable impact of industrial structure.

Unqualified Australian males become our control group.<sup>27</sup> Sub-Section II equations show that the connections of this group with industrial characteristics are different from the connections of other segments of the workforce. Such males are disproportionately employed in industries with higher productivity (incorporating physical productivity and profits), with lower concentration of employment, and where wage costs, compared to other costs are relatively low. Since productivity is a source of higher earnings, it appears that unqualified Australian males benefit monetarily from disproportionate employment in more highly productive industries.

On the other hand, plant size has been shown to be a source of

higher earnings, and the negative link with employment would seem to counteract the positive monetary advantage of the connection between productivity and employment. One British author (Sawyer [1973]), discovered a positive connection between plant size and the extent of shift work. It is possible that this also applies here and that the positive plant size/earnings connection is due to longer hours and penalty rates. While not disputing this, we are inclined to believe that employment concentration is a source of potential bargaining power which is realisable through militant action. The negative relation with plant size represents the result of strategies by employers to minimise this potential and thus avoid a significantly larger wage bill arising from the existing differentials paid to Australian males.

This argument gains support from the negative relation with the wage ratio. The higher wage bill associated with male employment is more than offset by the lower proportion of males hired. Of course, it is possible that it is not solely the threat of potential militancy which reduces the relative proportion of Australian males employed in these industries, but also the manifestation of past militancy in the form of higher wages paid by these industries.

Industry divisions provide further insight into the relationships between industry characteristics and Australian male employment. The negative plant size influence is widespread, but is more significant in large turnover industries. The positive productivity influence is also widespread but greater (per unit of productivity) in labour intensive and small turnover industries. On the other hand, labour productivity, on the average, is higher in capital intensive and large turnover industries (see Appendix D, Table D3). So the overall influence of productivity differences on the employment of unqualified Australian males is not clear. Finally, the negative wage bill influence is contained in labour intensive industries. From the evidence, it would appear that it is the large scale and/or labour intensive industries which 'cannot afford' to hire unskilled Australian males. The relatively high female employment in the textile, cigarette, pharmaceutical etc. industries would support this claim.

#### (b) Ethnicity

Generalizations about migrants employed in manufacturing industry are complicated for several reasons. Migrants are not a homogeneous group, such as U.S. blacks about whom much of the relevant discrimination literature has been developed. Migrant males and females require separate

treatment and areas of migrant origin must also be distinguished. During the post-war period the dominant source of migrants has shifted from North West (Central) Europe (the source of many skilled workers) to Southern Europe and from thence to the Middle East, Asia and Latin America. Unfortunately, statistical data do not exist in the detail and form which would permit a suitable examination of all these several migrant groups.

The breakdown of the migrant population in this study was, firstly, by sex. Male migrants as a percentage of total male employment was the variable used to determine the significance of being a migrant among male workers, *viz.*, within the male workforce, how did migrants fare as a group? The general answer was, very well indeed. Coefficients were consistently positive - the higher the migrant percentage, the higher were industry average earnings. We infer that males qua migrants are recipients of higher earnings. Why do migrant males do so well? One industry division locates the influence solely (in 1971) in the labour intensive industry group, although the influence is sufficiently widespread to be significant at the 4-digit aggregate level.

The second migrant division was into a 'SEM' group - those born in Italy, Greece, Yugoslavia and Malta and a 'OTH' group - all others - as a percentage of total employment. No distinction by sex was made. The OTH group performed extraordinarily well with high coefficients (generally higher than those for all migrant males), especially in labour intensive and/or small turnover industries. We believe that this result was due in large part to a premium for skill.<sup>28</sup>

Southern Europeans are generally presumed to be a disadvantaged migrant group in terms of wages and working conditions, but in this study the position was not completely clear cut. The variable representing this group mostly appeared, not with negative coefficients, but as insignificant or with positive coefficients (although never as substantial as for 'Other' migrants). Were any migrant groups doing better than their Australian workmates? The years of positive coefficients fell within the boom years in this study - 1969-70, 1972-73 and 1973-74. We infer that this erratic performance was due to the payment of overtime and penalty rates compared to other groups, Southern Europeans (including women) appeared to work the bulk of overtime hours during boom conditions. There was also a marked difference between Southern Europeans in capital intensive and labour intensive industries, although the boom period improvement occurred in

both groups. In the labour intensive industries, boom period conditions improved the Southern European variable from insignificance to positive coefficients. In capital intensive industries, boom period conditions brought the variable from substantially negative to insignificance. It was in the capital intensive industries, then, that the Southern European migrant group appeared disadvantaged. Longer hours were required to bring their earnings up to normal levels.

The position of migrant women was examined vis-a-vis all women workers rather than the total workforce. Again, the question was, within the female workforce how do migrants fare? The answer was, about the same but often worse. The years in which the female migrant variable returned negative coefficients were non-boom years, which suggests the same interpretation as for Southern Europeans in general. Migrant females received similar earnings to other females only in boom years and the apparent cause was longer hours and overtime payments. It must be inferred that, otherwise, earnings would have been lower. In either case, the inference is that migrant females were doubly disadvantaged in terms of earnings - first as females and second as migrants.

Finally, an attempt was made to interpret the consistently favourable performance of migrant male workers relative to male workers in general. By examining the position of Southern European and 'Other' migrants separately, it was seen that the dominant part of this favourable performance came from the latter group which we interpret as due to a premium for skill.<sup>29</sup> This advantage was backed up by the longer hours/overtime earnings of Southern Europeans. The fact that the male migrant advantage appeared predominantly in labour intensive industries was due to the fact that, in the capital intensive industries, the positive advantage of 'Other' migrants was counterbalanced by the disadvantage of Southern Europeans.

The 'Other' migrant group included females, shown to be a disadvantaged group. It also included migrants from countries other than in North-Western Europe who would have been better placed with the disadvantaged migrant group had this been statistically possible. The relative advantages attributed to the 'Other' group from the substantial positive coefficients of the variable attested to the economic strength of some part of the migrant workforce, notably males from Northern European nations.

More generally, it is possible that the coefficients of migrant variables used to show the degree of advantage/disadvantage of such groups,

may have been biased. As already explained, migrant ratios refer to total employment rather than to production employment. The ratios probably understate the role of migrants in production employment, and the coefficients are probably biased upwards, imputing a more favourable degree of monetary advantage to manual workers than is actually the case. An attempt to evaluate this possible bias was made by adjusting migrant ratios by the total/production employment ratio (see Sub-Section I, equations 1.p.71 and 1.pa.71). This left the Southern European group's coefficient unchanged and insignificant. However, it severely reduced the coefficient of the 'Other' migrant group, creating the impression that the inferred benefits were actually going to non-manual workers in the 'Other' migrant group. This gave some support to the notion that the coefficients of migrant variables were biased upwards. However, the adjustment was not entirely legitimate, so the issue of the extent of the benefit going to the privileged migrant group must remain unsettled here.

As with females, it was hoped that an examination of the links between ethnic groups and industrial structure would provide more insight into the reasons for differing proportions of migrant employment. Two key differences were immediately apparent. Migrants were more strongly represented in industries of lower productivity and industries with greater employment concentration, in direct contrast with unskilled Australian males. The only sub-group which differed from this generalisation, perhaps predictably, was the 'Other' migrant group, whose employment was positively linked with more productive industries (although the connection is not as strong). We presume that males were the beneficiaries of this latter connection. Only in 1973-74, when rapid wage rises were widespread, did there exist a positive link between productive industries and the employment of unskilled migrant males.

Migrant females vis-a-vis females in general shared the same links attributed to migrants in general - that is, they were more strongly represented in industries of lower productivity and industries with greater employment concentration. Insofar as female employment (compared to male employment) had already been shown to exhibit these same links, the connections were stronger for migrant females. The links were most substantial in large turnover industries, although there were no strong negative links between productivity and migrant female employment in labour intensive industries, per se, as might have been expected. Presumably, that was one

ground on which migrant females and Australian females were treated as equals (truly sisters in misfortune!).

The other industry characteristic worthy of note was the production wage bill relative to other (direct) costs. A high wage bill was shown to be 'detrimental' to the employment of males (ergo, favourable to females in general), predominantly so in labour intensive industries. It is more important for the employment of migrant females in this industry group. That is, where the wage bill was relatively high in labour intensive industries, females were disproportionately employed, migrant females even more so than Australian females.

We have come to believe that there are associations between certain industry characteristics and the employment of different groups within the production workforce. In particular, a group which is positively advantaged in terms of earnings levels will be disproportionately employed in industries which are more productive, industries which are less concentrated employment-wise, and industries with relatively high wage costs. Australian males and male migrants from 'Other' countries are seen as advantaged groups; females, migrants females in particular, and Southern European migrants are seen as disadvantaged groups.

The qualification to this generalisation may lie in the 'Other' migrant group, whose employment is positively linked with plant size and with high wage cost industries in the labour intensive group. We infer that these links refer to the males of this group. The positive employment/wage bill link is almost certainly due to the higher earnings from the skill factor, so that a high wage bill in certain cases is a reflection of a high skill component in the workforce (which accounts for the positive link between relative wage costs and earnings in the early years of this study). The employment/plant size link we assume to be due to the privileged position of those 'Other' migrant males in large plants who are skilled workers, and who may be party to the benefits of higher earnings linked to greater plant size. The reasons given as causing this link are conjectural, but there is no means of clarifying the connection in this study.

In general, this paper's contribution to the issue of labour market segmentation is twofold. Firstly, it supports existing work in the claim that there are systematic differences in the average earnings paid to specific groups within the workforce. Three points are worth noting:

(i) Females, readily acknowledged as a disadvantaged group in terms of earnings, did not generally improve their relative position during the period.

(ii) The migrant workforce per se cannot be seen as a disadvantaged group in any way analogous to American blacks. Northern Europeans (males) are a high earnings group, even to the point of consistently out-performing Australian males. By contrast, there is a sub-group of overseas born population which is disadvantaged, and in this period it falls to the lot of those born in Southern European countries. The earnings gap is most significant in capital intensive industries but, in general, it is a gap which is made up in boom years by the working of longer hours. (iii) Migrant females are doubly disadvantaged in terms of earnings, both as females and as migrants. During boom periods, migrant females make up the gap between their earnings and those of other females by working longer hours.

Secondly, the paper makes a novel contribution in the establishment of differential links between various qualities of industrial structure and the employment of specific groups, segmented by sex and country of origin. We conjecture that industrial structure exerts a causal influence in such differential employment and that this factor is a partial influence in differential earnings.

It is desirable to conclude this section with some comments on the subject of 'dual labour markets'. What relationship do the above observations have with the work on dual labour markets? Authors in this field constantly place the duality in qualities of the job per se - the rate of turnover, working conditions, promotion possibilities, decision structures and the barriers to job competition. We are not well suited to comment on these things as the object of the study was not jobs but industries. However, several relevant matters may be clarified.

The dominant separation in the literature has traditionally been 'primary' and 'secondary' markets where the latter houses the jobs of the sub-working class. This distinction is not as important for Australian manufacturing industry. Piore [1975] distinguishes an upper and lower tier of primary markets (those with desirable work qualities), but this separation is primarily linked to a manual/non-manual association and is poorly articulated in the article. Our concern is with distinctions within manual employment which are more subtle than those which pervade the American literature. Clearly, there is a need for authors outside the U.S. to create labour market categories more suitable to the specific institutions of their own countries.<sup>30</sup>

In particular, certain differences seem important. The disadvantaged group in Australian manufacturing industry does not exhibit exactly the same traits as the American 'secondary' market. While there appears evidence

of greater job instability, it is an instability predominantly caused by the trade cycle, and not reinforced in worker behavioural traits to the extent that such personal characteristics become a dominant independent force in job instability, regardless of economic conditions. Australian females, who have traditionally borne some of the brunt of cyclical unemployment, appear to have accepted this role, with their family role seen as the more dominant responsibility (even if the family role is not dominant in practice for many working women). In addition, migrant females and Southern Europeans who make up other parts of our disadvantaged group do not generally exhibit the undesirable behavioural qualities of the American secondary market. Rather, they exhibit a strong discipline and, often, a ferocious capacity for work, in the face of long hours and undesirable working conditions. An increasing proportion of recent migrants arrived unassisted (Price [1975]) and so the accumulated debt would be one factor making for disciplined work habits.

It appears that the worst aspects of the American secondary markets, self-defeating behavioural traits and self-imposed job instability, derive from the very stability of the secondary workforce at the bottom of the socio-economic ladder. Although this quality may be common to the Australian Aboriginal urban community, it is not necessarily common to any specific group of overseas born workers.

Another difference which is relevant is that our advantaged workers comprise at least two distinct groups, unqualified Australian males and skilled workers generally (including Northern Europeans). The American divisions are too crude to deal adequately with the distinctions between the more advantaged workers in manual employment. If we are to use the American distinctions for Australian labour markets, then even the present evidence indicates that the classifications need to be redefined. In particular, the characteristics of the disadvantaged 'secondary' labour markets must be differently defined, and much greater attention needs to be paid to distinctions within the advantaged 'primary' market.

In general, the 'dual labour market' writers have probably laid too much emphasis on job characteristics such as job stability, and not enough on industrial structure and productive techniques whose causal influence on segmentation appear to be paramount, and on the differential earnings which result.

#### 4. The Dual Economic and Labour Market Segmentation

Given that industrial characteristics have some influence on the employment of different work groups, can any substantial generalisations be made about the relationship between market structure and labour segmentation? Galbraith [1973] and others have created a strong image of a major division in the market economy, between the 'planning system' comprising the large, market dominating firms of the corporate sector, and the market system, comprising smaller, more competitive firms/industries. Is this a useful division in understanding labour segmentation?

There is a good deal of vagueness concerning the relationship between job types and industrial characteristics. Piore suggests that the key relation comes from the choice between alternative production techniques - especially capital-using, task-specific versus low capital, generalised tasks - which ultimately depends upon product demand stability and certainty. This involves an association between capital intensive techniques and semi-skilled workers (lower-tier primary in Piore's classification); and between labour intensive techniques and both unskilled and skilled/professional workers (secondary and upper-tier primary).

However, these techniques are presumed to be found within the same industry and even within the same firm, so there is no necessary connection between job type and market structure by this interpretation. Piore's argument is highly abstract and without supporting examples, but it would seem that such flexibility of technique is only possible with large firms. At least, the implication that the 'planning' system is associated with a whole variety of job types has some merit.

Edwards, in Edwards et al [1975, Ch. 1] posits another argument which does involve a simpler connection, presumably influenced by the Galbraithian division. For Edwards and others, there is a tight link between primary labour markets and large monopolistic firms. Simply, the large powerful firm, with its more stable demand and its larger workforce, has created labour institutions with different qualities - internal labour markets with greater job stability and enhanced promotion possibilities, etc. If we interpret these writers correctly, the general implication is that the large powerful firms/industries are mostly responsible for the primary market of advantaged workers. This means that the factors responsible for eliminating competition in the product market are generally favourable to labour.

We think that this generalisation is too simple to be useful.

Evidence from the two dimensional industrial division in this study partly supports this simple relation but it also shows a more complex picture.

The division between small and large turnover industries would seem to be closely associated with the Galbraithian planning/market sector division. Large turnover industries were overwhelmingly responsible for the link discovered between industry characteristics and earnings, predominantly through productivity.<sup>31</sup> These monetary benefits, which we could class as extraordinary (literally), appeared to go to qualified workers and to unskilled Australian males.

On the other hand, those variables which we associated with skill (qualifications, age, 'Other' migrant employment) have higher coefficients in the small turnover group. That is, skill per se is better rewarded in these industries. We conclude tentatively that the small turnover industries exhibit a classic form of primary labour market - higher returns to qualified workers, perhaps through loyalty, and higher returns to age through on-the-job experience and/or seniority.

By contrast, it is probably unqualified Australian males who are the special beneficiaries of employment in high productivity, large turnover industries. Such monetary rewards may have been achieved through collective action. Moreover, as such rewards must be protected from general dissemination, it is highly probable that the disproportionately greater employment of easily distinguishable disadvantaged groups (females and Southern Europeans as observed in this study) facilitates this protection. Unqualified workers (and their employers) may not resort easily to readily discernible skills as barriers to labour market entry, so barriers along sex or ethnic lines become more necessary.

The industry division by turnover highlights the difference within the primary market of advantaged workers. Distinctions brought out by the capital/labour intensity industry division further complicate the picture,<sup>32</sup> complexities not recognised in the relationships posited by Piore and Edwards.

Capital intensive industries pass on their productivity gains to average earnings in greater proportion (with the gap between labour intensive industries being quite substantial in later years). They also reward the formally qualified worker more substantially (at least this was so at the beginning of the period). Australian males benefit disproportionately in these rewards. Southern European migrants appear to be a specially disadvantaged group in terms of earnings, and they are employed disproportionately in low productivity industries (in the capital intensive group).

Labour intensive industries reward older workers, whether for on-the-job experience or merely seniority, in substantial contrast with the capital intensive group, which penalises them. They also appear to reward migrant males (including Southern European) more substantially. It is, however, the group which depends on female employment - 40% of the production workforce (1971) compared to 13% for capital intensive industries. Moreover, within this group, the higher the relative wage bill, the more significant does female employment become (with migrant female employment doubly significant), making lower average earnings possible.

The response to change for each group is different. In labour intensive industries, earnings are maintained (or increased) at the expense of employment. In capital intensive industries, the monetary advantage to males and qualified workers has been whittled down (see point 6 below).

The general impression is that particular industry sub-divisions do not exhibit a close connection with any particular labour group but each industry sub-division exhibits its own peculiar combination of advantaged and disadvantaged workers. Different forms of workforce hierarchies suit different kinds of industries. Clearly, this conclusion is far from ideal in its lack of precision. The connection between industrial structure and workforce groups must be pursued more directly in industry studies, but the present study does indicate the complexity of the relationship.

#### 5. Worker Bargaining Power

The subject of this study is ultimately the bargaining power of the workforce. That is, we are concerned not merely with earnings per se but with the means by which differential earnings were achieved. Our adventurous attempt to use a direct measure of worker power in the guise of the militancy manifest in strike statistics was limited, both because of the uncertain link between strikes and bargaining power and because of the aggregated nature of the statistics.

The measure failed in grand style - both total days lost and average days lost were tried - but the former had a minor success when run by itself. In 1972-73, when average production earnings were \$4,100, the 'total days lost' variable (ranging between zero and 240) returned a positive coefficient of 4, which seems a tolerable performance. Its insignificance in the following year also seems plausible, in that substantial flow-ons were achieved which would break any immediate connection between militancy and increased earnings.

Other authors have rejected 'union power' as an explanatory variable with less justification than exists here. Nevertheless, we do not think it is appropriate to conclude that worker militancy is irrelevant to earnings differentials. Quantifying such an elusive concept is the crux of the problem. We are of the opinion that the results of successful collective action are manifest partly through other variables. In particular, the significant influence of productivity (both value and real) on earnings in certain industries we infer to be due to no automatic process but partly to the conscious attempt of workers to 'appropriate' a larger share of the industry surplus. Higher productivity appears to be an important foundation for high earnings, but it is not a sufficient condition. A cursory examination of industries like tobacco, pharmaceuticals, cosmetics and photographic processing indicate the co-existence of high productivity and low earnings. It does not take a great leap of the imagination to connect the significant employment of females in these industries with the low level of earnings. We infer that the lack of a connection in these cases is due not merely to the fact that females receive lower wages (ultimately a historical factor explaining nothing in itself) but to the relative passivity and lack of organisation of female workers, and the deliberate employment of females in such industries for these reasons.

The same may also be said of the plant size variable which is positively associated with earnings. It is possible that the plant size/earnings phenomenon has a simple if indirect explanation in a correlation between plant size and the extent of shift work. It is also plausible that employment concentration in large plants enhances the capacity of the workforce for collective action, and that this factor has resulted in historically higher earnings in larger plants. Migrants and females are thus disproportionately employed to dilute this potential for the industry workforce as a whole.

Even if the plant size/shift work connection exists, the employment of disadvantaged groups for shift work is still used for the same purpose - to break the nexus between a militant workforce and an industrial structure which is ripe for the achievement of higher earnings.

We are of the opinion that the surplus of a particular industry is not made of parts separately attributable to separate factors of production and therefore divisible. The surplus is a collective product which is 'up for grabs' by the participants in the process, the contributors of capital and the various segments of the labour force. The varied significance of the

productivity variable during the period under examination indicates that some industries part with a good deal of their surplus to certain members of their workforce for reasons other than the personal qualities embodied in the latter. Firms do not act thus out of generosity. We suggest that the elusive factor of collective worker militancy is the ultimate reason for this monetary advantage.

#### 6. Dynamics of the Period

In aggregate terms, the period was relatively stable for manufacturing industry. Internally, substantial structural changes belied the calm impression given by the aggregate figures. Appendix C attests to the significant changes in production employment across industries, indicating significantly different rates of growth and/or job structural change.

Results from Sub-Section III 'earnings change' equations were both good and bad. They failed to provide information on the reasons for changes in industry earnings relativities. In particular, industry productivity changes exerted no independent influence on these changed relativities.<sup>33</sup> While differential productivity exerted an influence on differentials for historical reasons, there was no continuation of the independent influence once personal characteristics variables were added to the equation.

It may be true that the substantial earnings increases achieved during this period were linked to conditions generally favourable to wage bargaining, perhaps key productivity linked wage decisions which then flowed on to other awards. Such rises would not be measured, therefore, in industry-specific equations.<sup>34</sup> These across the board increases would then be hidden in the constant terms of our equations. The other important issue is the failure to explain substantial percentage differences in industry earnings changes, ranging from 50% to 120%.

The equations are unusually successful, however, in pointing to factors implying structural adjustment, factors which point mostly to attempts to contain earnings increases. These are of two kinds. Firstly, there was an inverse relation between employment change and earnings changes. These changes were contained in the labour intensive and/or small turnover industry groups. Structural job changes in these areas then meant lower earnings increases on the average. Insofar as this was a period for relative wage gains for some females - and labour intensive industries are intensive users of female employment - one might surmise that industries were

substituting males for females. In some industries this was the case (some textile industries for example). Employment went down absolutely, female employment went down relatively, and earnings rose faster than on the average. These cases were exceptions, however. More typically, male employment went down relatively, total employment went up rapidly, and earnings increases were fairly mild. In these cases, female employment was enhanced significantly, while industries benefitted in the form of lower average earnings. Females were still relatively attractive propositions for employers during this period. This situation was quite widespread in our 'labour intensive' group - food, textiles, paper, wood, appliances, and miscellaneous manufacturing.

Secondly, in the capital intensive group, high male employment (1968) and a high qualifications ratio were detrimental to earnings increases. This inverse connection with qualificative may mean either a reduction in the premium for skill (assuming the 1971 Census ratio has stayed stable) or that the capital intensive group has substituted less qualified for qualified workers. We have no means of resolving this issue without more detailed industry studies (lacking any rapid publication of 1976 Census results), but the possibility of worker substitution cannot be ruled out, especially given the observed change in the sex ratio in some industries. The inverse connection with male employment does not necessarily mean that male relativities were reduced during the period. It could also mean that those industries with the highest percentage male employment had partly substituted female for male employment. Comparison of the changes in the sex ratio with the percentage changes in earnings (in the capital intensive group) indicate that the negative relationship between high male employment (1968-69) and earnings increases was probably due partly to the substitution of females for males. This was especially so in metal fabrication, vehicles and industrial equipment. Employment in these industries expanded strongly, so that the sex substitution was a relative one, with employment of both sexes increasing absolutely.

By 1973-74, then, it appeared that females were still considered attractive propositions for employment, because there was relative substitution of female for male employment in both labour intensive and capital intensive industries.

The above explanation of the link between high initial male employment and low earnings increases in the C group also gains some support from the correlations of the 'male ratio change' variable with other relevant variables.<sup>35</sup> Generally, the direction of male employment (relatively) is into

productive industries - out of high wage industries, out of high qualification industries, out of high male employment industries, and into industries with high earnings increases. Thus the interpretation of the negative coefficient of the male ratio is similar to the interpretation of the negative coefficient of the qualifications variable - that the ratio has changed during the period.

In general, the equations for earnings changes did not provide a predominant explanation of the origins of earnings differentials, in the sense that factors making up workforce strategy to enhance earnings, such as skill acquisition and collective action, were enumerated. The 'Other' migrant group was the only workforce group whose employment was positively associated with percentage earnings increases. Rather, the equations were more informative (indirectly) about countervailing employer strategy which sought to keep the rise in average production earnings to a minimum. It is this disclosure which offers the ultimate defence of the examination of earnings from an industrial rather than an (in other ways more desirable) individual base.

This same issue also highlights a limitation of the conceptual framework of studies such as this. In order to understand the dynamics of earnings differentials, it appears that one must accept that these differentials are the result of the interplay of forces which make for higher earnings and forces which make for the containment or reduction of earnings. In principle, one needs a dynamic simultaneous equation model which is highly disaggregated. A tall order indeed! In practice, simple equations of the type used here would have been much more suggestive if annual data had existed on personal characteristics of the workforce such as qualifications and migrant group employment. In the circumstances, we believe we have done reasonably well with inferences from available data.

#### 7. Wage Spillover and Comparative Wage Justice

There is no doubt that there exist sufficient market imperfections to prevent labour mobility from equalising payment for equal work. Yet the concept of comparative wage justice and its manifestation in award flow-ons is an alternative means of achieving the same result. How well did this second mechanism work?

It appeared that the industry specific relationship between labour productivity and average earnings testified to the imperfect operation of this second mechanism as well, otherwise such links would not be found. In our study, the relationship was even stronger at the 3-digit level than at the 4-digit level. We infer from this that there was some inter-industry redistribution of specific productivity within three-digit groups, but that

the redistribution went little further. There is a plausible explanation for this phenomenon. Trade unions are likely to spread across industries within particular industry groups, and hence would be responsible for spreading the gains extracted from improved industry productivity within industry groups and no further. This is only a conjecture which needs supportive evidence.

As explained above, the period was one in which specific industry productivity ceased to exert any further influence on earnings differentials. This may indicate that wage flow-on was much more successful than pre-1968. Casual evidence for the boom years of 1972-74 supported this possibility. However, the percentage increase of average earnings across industries varied enormously during the period. Either particular workforces were still gaining from industry-specific factors (which would demand explanation), or the workforce hierarchy (according to earnings) had changed fairly substantially in structure. The previous section attested to changes of this nature, but the present study is not sufficiently equipped to deal with the problem adequately.

There are, however, two general points that can be made on this issue. The first is the implication for incomes policies of industry-specific earnings linked to differential productivity (which includes both productivity in the normal sense and profitability). Who decides the percentage of a nation's workers that should benefit from industry-specific productivity?<sup>36</sup> The combined operation of industry-specific bargaining and comparative wage justice in boom periods leads to wage gains for many workers which are only compatible with selective employment in highly productive industries. One is left either with the Scylla of inflation or the Charybdis of the elimination of the rights to industry-specific bargaining, the latter being anti-liberal and unconstitutional in most western 'liberal democracies'. In the contemporary Australian scene, the latter alternative has been effected by the joint means of large scale unemployment and the centralised wage fixing machinery of the Arbitration Commission.

The second point is the implication for the study of inflation. Many economists have been interested in the study of wage determination because of its effects on the level of inflation. If inflation is one's preoccupation, then the study of inflation cannot profitably be further pursued at an aggregate level of analysis. Rather, the examination of earnings determination on a microeconomic level and its structural impact is an essential ingredient for an understanding of the contemporary process of inflation.

### 8. Further Work

This study examined earnings differentials from an industrial base because the data were available. It was hoped that inferences could be made about the determinants of earnings differentials of particular sub-groups within the production workforce. The assumption was made that the representation of these sub-groups in each industry's workforce remained fairly stable during the period. The results imply that this assumption may have been incorrect. Nevertheless, we believe that our findings have not been invalidated by such structural changes. Indeed, such structural changes are an integral part of the study of earnings differentials, especially from the viewpoint of employers' strategy and the examination of such changes is performed most suitably at an industry level.

However, in the process of drawing conclusions about the earnings and employment of segments of the labour market, numerous conjectures and inferences were made on grounds which were less than satisfactory. In particular, the position of various migrant groups remained unclear because the divisions of the migrant workforce - male/female and Southern European/Other - were not sub-divided so that the sexes from each area could be examined independently. More refined data have become available recently and it now appears possible to make such divisions. Future research could clarify the distinct role of the various migrant sub-groups.

More generally, this study needs to be supplemented by more information about the changes in firm structure, the nature and changes in production techniques and job structure, the industrial coverage of specific unions and the nature and coverage of award decisions. The study of the pattern of production techniques is a vital part of the subject and, although it is now a more popular area for research in individual industries, an integration of such material is essential for a proper perspective on the relationship between earnings differentials and industrial structure.

## APPENDIX A

Data Collection and Suitability

This appendix is devoted to a discussion of the advantages and limitations of the data and the derivation of certain 'troublesome' variables.

In general, the introduction of the Australian Standard Industrial Classification code (ASIC) in 1968 provided hope for industry data on a consistent basis and of a broad nature. The Australian Bureau of Statistics (ABS), Manufacturing Establishments, Details of Operations by Industry Class, Australia (ref. 12.29), now the key document for data on manufacturing industry, is not comprehensive. For example, information for the year 1970-71 has not been collected. Nevertheless, this gap did not prove too much of a handicap in gauging the trends of the period. More generally, certain problems in the form of the continuing absence of certain data and the slow adaptation of other data to the ASIC basis remain for a detailed study of manufacturing industry.

Earnings

The data for industry earnings vary for a number of reasons which, in principle, we would like to control. The two most significant factors are the sex composition of earnings and the differential hours worked.

The ABS, Manufacturing Establishments (ref. 12.29), replaced the publication Manufacturing Industry, 1963-64 to 1967-68, which in its turn had replaced Secondary Industries. In these previous publications, the earnings of the sexes were separated. This practice ceased for ABS publication ref. 12.29 because, according to a spokesman for the ABS, industry found the compilation onerous and a survey at that time of users of the Bureau's data indicated no express interest in the separation. It is both ironic and unfortunate that this separation of earnings is no longer available when interest in women's economic role has burgeoned. Failing the availability of sex-differentiated earnings data, we had little choice but to attempt to account for differential earnings by including the sex ratio of manual employment as an independent variable.

The other problem with earnings data is the variation across industries of hours worked. The only figures which presently exist for hours worked across industry are in ABS, Earnings and Hours of Employees, Distribution and Composition (ref. 6.52). Manufacturing industry is broken down into 8 groups, which are mostly 2-digit ASIC except for the combination

of some 2-digit sub-divisions into one residual group. Surveys on this basis have only existed since May 1974. Previously, similar surveys showed hours worked at a similar level of disaggregation, although on the pre-ASIC industrial classification (see ABS, Earnings and Hours of Employees, October Surveys (ref. 6.40) and Labour Reports (ref. 6.7). The October 1972 survey (Labour Report, 1972, p.113), for example, showed variation in hours worked between 44.0 for metal extraction to 42.2 for ships for adult males. Although differences of this magnitude would influence earnings differentials, they are not sufficiently marked to warrant a detailed adjustment of the data. The lack of further disaggregation, the different industrial classification for the period, and the different figures for males and females make adjustment for hours worked a nearly impossible task. This lack of adjustment must be taken into account when interpreting the coefficients of the independent variables.

A problem more important than cross-industry differences appears to be sex differences in hours worked. In 1972, for example, adult males worked on average 10% longer hours than adult females. This would bias the coefficient of the male ratio variable upwards, a fact which has been previously noted in the text.

#### Enterprise Size

Footnote 6 mentions one problem in the use of enterprise data in this study. Although the enterprise data in ABS, Integrated Economic Censuses: Enterprise Statistics (ref. 17.15) are classified by ASIC, allocations to that classification are made on an ownership basis - activities classified according to the dominant activity of the enterprise. Other data for this study are allocated by the key activity of particular establishments. Casual comparison of turnover figures indicates that differences are not marked, but we have no way of gauging the extent of any bias introduced.

There is a more serious difficulty to surmount. From Table 6 of this ABS publication one can, in principle, derive the proportion of enterprises or establishments employing 100/500 or more persons. In fact, the figures are aggregated to hide the 500 figure for a majority of 5-digit industries. For 99 of the 172 4-digit industry class, this figure is not publically available. King and Langley use the 100+ figure which suffers

less from hidden figures, but there is still a significant number of omissions. One can see the potential absurdity involved in the traditional official attitude towards confidentiality as industry becomes more concentrated. Figures become unpublishable at the same time as they increase in importance from the point of view of market dominance.

There were large gaps in the 1968-69 bulletin, and succeeding issues would give successively less information.

As it is not possible to extract such information from ABS, some effort has been made to estimate the missing data by using corporate directories to establish the top firms in each industry with missing data and to estimate their employment in that industry.

#### Labour Costs compared to Total Costs

In principle, one needs to compare labour costs with total costs which include the nebulous factor of capital costs.

Hancock [1976] used the value of assets included in the ABS publications Secondary Industries (to 1962-63) and Manufacturing Industries (from 1963-64 to 1967-68). He then estimated alternative figures for the cost of capital by assuming that capital inputs were equal to a variety of arbitrary percentages of the reported values of the capital stock. The percentages of 15% and 25% were preferred by him. Hancock claimed that, although this was a crude procedure, it was still superior to ignoring capital costs altogether.

Kmenta provides an example of the latter practice. Kmenta's variable is a measure of wage costs as a percentage of total direct costs, which include the wage bill, materials, maintenance and fuel. A practice similar to Kmenta's is all that appears possible if current data are to be obtained on a continuing basis. ABS, Integrated Economic Censuses: Enterprise Statistics (ref. 17.15) includes figures for depreciation and net interest paid, but only for the year 1968-69. The same caveat, mentioned above regarding the slightly different classification used in this publication and in ABS, Manufacturing Establishments, Details of Operations by Industry class (ref. 12.29), also applies to the use of these additional items of expense. Moreover, these figures are available at the 4-digit level but they are published only at the 3-digit level, which indicates the low status which the former figures hold in the view of ABS.

The same Census also produced 1968-69 figures for 'Value of Fixed Tangible Assets', again at the 4-digit level with the same caveats attached to their use. Given the problems associated with asset valuation, it would seem preferable to use the 4-digit depreciation figures as an estimate of capital costs than to resort to the method adopted by Hancock. However, since the representation of capital costs by depreciation figures is itself not without peril, it still seems desirable to examine the influence of the ratio of manual labour costs to total direct costs, the variable used by Kmenta and found to be significant for his large industry group. In the ABS publication ref. 12.29 for 1968-69, for example, this ratio exhibits great variation.

#### Union Power

Regarding the percentage of workers unionised, information related to the classification of trade union membership by industry groups was collected for a brief period from 1969 to 1971 (ABS ref. 6.24). Unfortunately, these statistics were not classified on the ASIC code, and the industry groupings were much too broad to be of any use in the present kind of study.

Industrial dispute statistics are now collected (ABS, Industrial Disputes (ref. 6.6).) with some disaggregation on an annual basis, but this amounted to a meagre six sub-groups until 1973. Since 1973, all 2-digit industry sub-divisions are represented. There are now twelve separate statistics for manufacturing industry, which is an improvement, but still a problem for the ideal disaggregation for such a study.

ABS claims that the 2-digit level of disaggregation is the most sensible, given the method of collection, the need for confidentiality and the difficulty of locating the incidence of strikes in specific industries. Confidentiality hardly seems the appropriate concern for such statistics, but the latter difficulty is understandable.

Under the circumstances, the 2-digit data are used to represent militancy in each of the 3-digit industry groups within a 2-digit sub-division. Since data for all 2-digit categories only exist since the calendar year 1973, some adjustment is necessary. Militancy figures for 1973-74 are derived using a simple average of the data for 1973 and 1974. Figures for 1972-73 use a simple average of the two years, with additional interpolation necessary for the greater aggregation of the figures in 1972.

Vacancies

The Commonwealth Employment Service (CES) collects vacancy statistics on an industry basis, but the classification is from a Commonwealth Bureau of Census and Statistics (CBCS) classification of the late 1940's. The classification shows major differences in emphasis, and anomalies have developed with the passage of time. A study of CES statistics by Hancock, Isaac and Ironmonger<sup>37</sup> recommended, among other things, that vacancy statistics be placed on the ASIC code, but nothing as yet has come of the recommendation. In the meantime, CES has attempted a rough reconciliation of the CES industry classification with the ASIC code. There are 28 relevant manufacturing industry groupings within the CES classification, and five of these correspond to particular 4-digit ASIC industries, so the classification is neither broad nor balanced.

Hancock carried out some work with similar intent, using post-war data until 1967-68. He claims to have achieved a successful reconciliation of the CES groupings with the CBCS classification used before ASIC was introduced (personal correspondence). Hancock also claims that his study showed no explanatory power with respect to movements in earnings, and he concluded that the failure lay in the vacancy figures as a measure of demand pressure at the industry level. It seemed likely, he said, that there were systematic differences between the propensities to register vacancies of employers in different industries.

We used the CES reconciliation code to convert the raw vacancy statistics for use in our ASIC classification.

## APPENDIX B

Australian Standard Industrial ClassificationDivision C : Manufacturing

Sub-division	Group	Class	Title
21-22			FOOD, BEVERAGES AND TOBACCO
	211		Meat Products
		2111	Fresh, preserved and canned meat (including tallow, meals and fertilisers of animal origin)
		2112	Fresh and frozen poultry
		2113	Bacon, ham and smallgoods
		2114	Casings of animal origin
	212		Milk Products
		2121	Liquid milk and cream
		2122	Butter
		2123	Cheese
		2124	Ice cream and other frozen confections
		2125	Milk products n.e.c.
	213		Canned and Preserved Fruit and Vegetable Products
		2131	Canned and preserved fruit products
		2132	Canned and preserved vegetable products
	214		Margarine and Oils and Fats n.e.c.
		2140	Margarine and oils and fats n.e.c.
	215		Flour Mill and Cereal Food Products
		2151	Flour mill products
		2152	Starch, gluten and starch sugars
		2153	Cereal foods, prepared flour and baking mixes
	216		Bread, Cakes and Biscuits
		2161	Bread
		2162	Cakes and pastries
		2163	Biscuits
	217		Sugar
		2171	Raw sugar
		2172	Refined sugar
	218		Other Food Products
		2181	Confectionery, chocolate and cocoa products
		2182	Preserved and canned fish and other seafoods
		2183	Prepared animal and bird foods
		2184	Food products n.e.c.

Australian Standard Industrial ClassificationDivision C: Manufacturing - contd

Sub-division	Group	Class	Title
			FOOD, BEVERAGES AND TOBACCO - contd
	219		Beverages and Malt
		2191	Soft drinks, cordials and syrups
		2192	Beer
		2193	Malt
		2194	Wine and brandy
		2195	Alcoholic beverages n.e.c.
	221		Tobacco Products
		2210	Tobacco products
23			TEXTILES
	231-232		Textile Fibres, Yarns and Woven Fabrics and Household Textiles
		2311	Cotton ginning
		2312	Scoured and carbonised wool
		2313	Wool and man-made fibre tops
		2314	Man-made fibres and yarns
		2315	Man-made fibre broadwoven fabrics
		2316	Cotton, silk and flax yarns and broadwoven fabrics
		2317	Worsted yarns and broadwoven fabrics
		2318	Woollen yarns and broadwoven fabrics
		2319	Narrow woven fabrics (including broadwoven elastic or elastomeric fabrics)
		2321	Textile finishing
		2322	Household textiles (except floor coverings)
	233		Other Textile Products (except Knitted Goods and Clothing)
		2331	Textile floor coverings
		2332	Felt and felt products
		2333	Canvas products and associated textile products n.e.c.
		2334	Rope, cordage and twine
		2335	Textile products n.e.c.
24			CLOTHING AND FOOTWEAR (INCLUDING KNITTING MILLS)
	241		Knitting Mills
		2411	Hosiery
		2412	Cardigans and pullovers
		2413	Knitted goods n.e.c.

Australian Standard Industrial ClassificationDivision C : Manufacturing - contd

Sub-division	Group	Class	Title
24			CLOTHING AND FOOTWEAT (INCLUDING KNITTING MILLS) - contd
	242		Clothing
		2421	Womens and girls blouses and frocks
		2422	Womens and girls outerwear n.e.c.
		2423	Mens and boys trousers and shorts; work clothing
		2424	Mens and boys suits and coats; water- proof clothing
		2425	Underwear, nightwear, mens and boys shirts and infants and babies clothing n.e.c.
		2426	Foundation garments
		2427	Headwear
		2428	Clothing n.e.c. and clothing trade services
	243		Footwear
		2431	Rubber footwear
		2432	Footwear n.e.c.
25			WOOD, WOOD PRODUCTS AND FURNITURE (EXCEPT SHEET METAL)
	251		Wood and Wood Products (except Furniture)
		2511	Log sawmilling
		2512	Resawn and dressed timber
		2513	Plywood, veneers and manufactured boards of wood
		2514	Joinery and wooden structural fittings
		2515	Wooden containers
		2516	Wood, cork, bamboo and cane products n.e.c.
	252		Furniture (except Sheet Metal) and Mattresses
		2521	Furniture (except sheet metal)
		2522	Mattresses (except rubber or wire)
26			PAPER AND PAPER PRODUCTS, PRINTING AND PUBLISHING
	261		Paper and Paper Products
		2611	Pulp, paper and paperboard
		2612	Paper bags (including textile bags)
		2613	Solid fibreboard containers
		2614	Corrugated fibreboard containers
		2615	Paper products n.e.c.

Australian Standard Industrial ClassificationDivision C : Manufacturing - contd

Sub-division	Group	Class	Title
26			PAPER AND PAPER PRODUCTS, PRINTING AND PUBLISHING - contd
	262		Printing and Publishing
		2621	Publishing (including printing and publishing)
		2622	Commercial and job printing (including stationery and bookbinding)
		2623	Printing trade services n.e.c.
27			CHEMICAL, PETROLEUM AND COAL PRODUCTS
	271		Basic chemicals
		2711	Chemical fertilisers
		2712	Industrial gases
		2713	Plastics materials, synthetic resins and synthetic rubber
		2714	Organic industrial chemicals n.e.c.
		2715	Inorganic industrial chemicals n.e.c.
	272		Other Chemical and Related Products
		2721	Ammunition, explosives and fireworks
		2722	Paints, varnishes and lacquers
		2723	Pharmaceutical and veterinary products
		2724	Pest control and agricultural chemical products n.e.c.
		2725	Soap and other detergents
		2726	Cosmetics and toilet preparations
		2727	Inks
		2728	Chemical products n.e.c.
	273		Petroleum Refining
		2730	Petroleum refining
	274		Petroleum and Coal Products n.e.c.
		2740	Petroleum and coal products n.e.c.
28			GLASS, CLAY AND OTHER NON-METALLIC MINERAL PRODUCTS
	281		Glass and Glass Products
		2811	Plate and sheet glass
		2812	Glass bottles and jars
		2813	Glass products n.e.c.

Australian Standard Industrial ClassificationDivision C : Manufacturing - contd

Sub-division	Group	Class	Title
28			GLASS, CLAY AND OTHER NON-METALLIC MINERAL PRODUCTS - contd
			Clay Products and Refractories
		2821	Clay bricks and clay refractories
		2822	Ceramic construction goods (except vitreous china or porcelain)
		2823	China and other ceramic goods n.e.c.
	283		Cement and Concrete Products
		2831	Cement
		2832	Ready mixed concrete
		2833	Concrete pipes
		2834	Concrete products (except pipes)
		2835	Asbestos cement products
	284		Other Non-Metallic Mineral Products
		2841	Plaster products
		2842	Stone products
		2843	Non-metallic mineral products n.e.c.
29			BASIC METAL PRODUCTS
	291		Basic Iron and Steel
		2911	Iron ore pelletising and metallising
		2912	Iron and steel basic products
		2913	Iron and steel castings and forgings
		2914	Steel pipes and tubes
	292-293		Non-Ferrous Metal Basic Products
		2921	Smelting and refining of copper
		2922	Smelting and refining of silver, lead and zinc
		2923	Alumina
		2924	Smelting of aluminium
		2925	Smelting and refining of nickel
		2926	Smelting and refining of non-ferrous metals n.e.c.
		2927	Rolling, drawing and extruding of aluminium
		2928	Rolling, drawing and extruding of non-ferrous metals n.e.c.
		2929	Non-ferrous metal castings
		2931	Secondary recovery and alloying of non-ferrous metals n.e.c.

Australian Standard Industrial ClassificationDivision C : Manufacturing - contd

Sub-division	Group	Class	Title
31			FABRICATED METAL PRODUCTS
	311		Fabricated Structural Metal Products
		3111	Fabricated structural steel
		3112	Architectural aluminium products
		3113	Architectural metal products n.e.c.
		3114	Boiler and plate work
	312		Sheet Metal Products (including Metal Cans)
		3121	Metal cans, canisters and containers
		3122	Sheet metal furniture and storage equipment
		3123	Sheet metal products n.e.c.
	313		Other Fabricated Metal Products (except Machinery and Equipment)
		3131	Cutlery, industrial knives and hand tools (except power operated)
		3132	Springs and wire products
		3133	Nuts, bolts, screws and rivets
		3134	Metal coating and finishing
		3135	Steam, gas and water fittings (non-ferrous metal)
		3136	Blinds and awnings (except textile, bamboo or cane)
		3137	Fabricated metal products n.e.c.
32			TRANSPORT EQUIPMENT
	321		Motor Vehicles and Parts
		3211	Motor vehicles
		3212	Truck and bus bodies, trailers and caravans
		3213	Motor vehicle instruments, heaters and electrical equipment (except batteries)
		3214	Motor vehicle parts and accessories n.e.c.
	322		Other Transport Equipment
		3221	Ship building and repair
		3222	Boat building and repair
		3223	Railway locomotives and rolling stock manufacture and repair
		3224	Aircraft building and repair
		3225	Transport equipment n.e.c.

Australian Standard Industrial ClassificationDivision C : Manufacturing - contd

<b>Sub-division</b>	<b>Group</b>	<b>Class</b>	<b>Title</b>
<b>33</b>			<b>OTHER INDUSTRIAL MACHINERY AND EQUIPMENT AND HOUSEHOLD APPLIANCES</b>
	<b>331</b>		<b>Photographic, Professional and Scientific Equipment</b>
		<b>3311</b>	<b>Photographic equipment and supplies, optical instruments and film processing</b>
		<b>3312</b>	<b>Measuring apparatus and professional and scientific equipment and supplies n.e.c.</b>
	<b>332</b>		<b>Household Appliances and Electrical Equipment</b>
		<b>3321</b>	<b>Television sets, radios, communication and other electronic equipment</b>
		<b>3322</b>	<b>Refrigerators and household appliances</b>
		<b>3323</b>	<b>Water heating systems</b>
		<b>3324</b>	<b>Electric and telephone cable, wire and strip</b>
		<b>3325</b>	<b>Batteries</b>
		<b>3326</b>	<b>Electrical machinery, equipment and supplies n.e.c.</b>
	<b>333</b>		<b>Other Machinery and Equipment</b>
		<b>3331</b>	<b>Agricultural machinery and equipment</b>
		<b>3332</b>	<b>Construction and earthmoving machinery and equipment</b>
		<b>3333</b>	<b>Materials handling equipment</b>
		<b>3334</b>	<b>Woodworking and metal-working machinery and equipment</b>
		<b>3335</b>	<b>Pumps, pumping equipment and air and gas compressors</b>
		<b>3336</b>	<b>Commercial and industrial space heating and air conditioning equipment</b>
		<b>3337</b>	<b>Dies, saw blades and machine tool accessories</b>
		<b>3338</b>	<b>Food processing machinery</b>
		<b>3339</b>	<b>Industrial machinery and equipment n.e.c.</b>

Australian Standard Industrial ClassificationDivision C : Manufacturing - contd

Sub-division	Group	Class	Title
34			LEATHER, RUBBER AND PLASTIC PRODUCTS AND MANUFACTURING N.E.C.
	341		Leather and Leather Products
		3411	Leather tanning and finishing, fur dressing and dyeing
		3412	Leather and leather substitute products n.e.c.
	342		Rubber Products
		3421	Rubber tyres, tubes, belting, hose and sheeting
		3422	Rubber products n.e.c.
	343		Plastic and Related Products
		3431	Flexible packaging and packaging materials (except paper), adhesive tapes and abrasive coated papers
		3432	Rigid plastic sheeting
		3433	Hard surface floor coverings n.e.c.
		3434	Plastic products n.e.c.
	344		Other Manufacturing Industries
		3441	Ophthalmic articles
		3442	Jewellery and silverware
		3443	Brooms and brushes
		3444	Signs and advertising displays
		3445	Sporting equipment
		3446	Writing and marking equipment
		3447	Manufacturing n.e.c.

APPENDIX C

Data for Earnings, Productivity and Employment

TABLE CI

## Data for Key Variables

1968-69 and 1968-69 to 1973-74

	1968 - 69				1968 - 69 to 1973 - 74					
	AE	LP	L	DE	DIP	DRIP	DL			
	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000	%		
2111	2.72	4.75	31.91	2.89	106	3.46	73	5	1.22	4
2112	2.12	6.00	3.19	1.58	75	4.28	71	18	2.11	66
2113	2.65	6.32	5.94	2.28	86	2.55	40	3	.64	11
2114	2.49	4.75	.94	2.56	103	2.59	55	45	- .31	-33
211 Meat	2.66	5.11	41.98	2.62	98	3.25	63	5	3.66	9
212 Milk	3.04	6.94	15.09	2.52	83	3.46	50	16	-1.74	-12
2131	3.26	5.76	4.71	2.05	63	5.13	89	41	-.18	-4
2132	2.80	7.11	5.51	1.77	63	4.93	69	6	.95	17
213 Canned f & v	3.01	6.43	10.22	1.86	62	5.10	79	21	1.36	7
214 Margarine	3.16	9.32	1.88	3.11	98	6.77	73	38	.01	-
2151	2.30	7.72	2.72	2.06	69	6.12	79	18	-.51	-19
2152	3.59	6.87	.70	3.58	100	3.73	54	56	-.06	-8
2153	2.42	8.70	2.99	1.85	76	3.16	36	16	.36	12
215 Flour/cereals	2.79	8.11	6.40	2.06	74	4.33	53	19	-.21	-3
2161	2.67	4.65	10.49	1.86	70	2.12	46	-	.38	4
2162	2.26	4.23	5.24	1.40	62	2.23	53	-11	1.02	19
2163	2.27	4.88	5.95	1.60	70	3.29	67	20	.13	2
216 Bread/cakes	2.46	4.62	21.67	1.66	67	2.38	52	2	1.52	7
2181	2.38	4.70	6.89	1.67	70	4.22	90	17	.60	9
2182	2.21	4.09	.48	.97	44	3.58	88	-	.22	46

1968 - 69

1968 - 69 to 1973 - 74

A.S.I.C. <sup>a</sup>

	AE		L		DE		DLP		DRLP		DL	
	\$'000	\$'000	\$'000	%	\$'000	%	\$'000	%	\$'000	%	\$'000	%
2183	3.00	8.58	2.40	2.14	70	7.63	89	2.44	28	.43	18	
2184	3.26	7.46	10.92	1.96	60	5.56	75	.67	9	1.33	12	
217/8 Sugar/Other	2.92	6.71	20.68	1.86	64	5.40	81	.91	14	2.59	13	
2191	2.71	6.36	4.19	2.08	77	4.40	69	2.95	46	1.16	28	
2192	3.59	9.79	4.57	3.12	87	6.50	66	2.91	30	.87	19	
2193	3.81	15.97	.43	2.53	66	9.42	59	n.a.	-	.03	8	
2194	2.39	8.67	2.22	1.78	74	4.23	49	.83	10	1.14	52	
2195	2.73	10.30	.20	3.41	125	5.54	54	n.a.	-	.03	15	
219 Beverages	3.04	8.32	11.60	2.39	79	5.19	62	2.52	30	3.24	28	
221 Tobacco	2.67	13.64	3.73	2.38	89	7.23	53	.40	3	.83	22	
21 - 22 Food, etc	2.79	6.41	133.25	2.22	80	4.00	62	.84	13	10.67	8	
2311	1.60	31.58	.23	1.63	102	.77	2	5.41	17	-.09	-39	
2312	3.13	5.59	1.71	2.06	66	2.32	41	1.12	20	-.71	-42	
2313	2.87	5.19	1.41	3.12	109	1.34	26	.41	8	-.70	-49	
2314	2.97	8.12	5.18	2.71	91	2.42	30	n.a.	-	.42	8	
2315	2.62	4.73	3.35	2.00	76	3.65	77	1.41	30	.40	12	
2316	2.70	5.05	8.40	1.79	66	2.84	56	1.30	26	-1.00	-12	
2317	2.16	3.56	6.97	1.73	80	2.64	74	.79	22	-2.86	-41	
2318	2.19	3.09	6.00	2.35	108	3.22	104	1.33	43	-1.76	-29	
2319	2.33	4.71	1.67	2.01	90	2.86	61	1.80	38	-.13	-8	
2321	2.72	5.49	3.12	2.58	95	4.37	80	n.a.	-	-.41	-13	
2322	1.91	3.78	1.33	1.83	96	2.82	75	.44	12	.59	43	
231/2 Textiles	2.51	4.99	39.37	2.19	87	3.11	62	1.71	34	-6.24	-16	



1968 - 69

1968 - 69 to 1973 - 74

A.S.I.C. a

	AE		L		DE		DLP		DRIP		DL	
	\$'000	\$'000	\$'000	%	\$'000	%	\$'000	%	\$'000	%	\$'000	%
2432	2.18	3.33	17.12	95	2.06	94	3.11	21	.70	21	-5.93	-35
243	2.17	3.53	20.12	93	2.02	86	3.04	27	.94	27	-5.75	-29
24	2.01	3.35	107.55	83	1.67	84	2.80	27	.91	27	-13.62	-13
2511	2.60	4.52	14.63	61	1.59	23	5.55	31	1.40	31	-1.15	8
2512	2.71	5.40	6.84	67	1.80	95	5.14	11	.58	11	.17	3
2513	2.79	5.29	6.29	77	2.13	91	4.81	35	1.83	35	.33	5
2514	2.88	4.98	13.49	63	1.82	58	2.87	6	.31	6	.14	1
2515	2.51	3.98	2.08	59	1.49	75	2.96	-	n.a.	-	-.22	-10
2516	2.52	4.79	3.31	71	1.79	102	4.89	50	2.37	50	.48	14
251	2.71	4.87	46.64	66	1.78	91	4.44	21	1.04	21	-.25	-1
2521	2.79	4.46	16.91	64	1.79	71	3.16	8	.34	8	3.96	23
2522	2.17	4.65	1.89	87	1.89	103	4.79	47	2.19	47	-1.14	-8
252	2.72	4.48	18.80	67	1.82	73	3.26	10	.47	10	3.81	20
25	2.71	4.76	65.44	66	1.80	85	4.03	17	.83	17	3.56	5
2611	3.74	7.67	8.28	80	2.97	78	5.98	37	2.81	37	.44	5
2612	2.36	5.50	2.12	88	2.08	85	4.70	14	.79	14	.11	5
2613	2.67	4.79	4.51	90	2.39	86	4.12	53	2.55	53	-.70	-15
2614	2.88	7.09	4.02	84	2.40	55	3.91	11	.77	11	1.08	27
2615	2.81	8.78	3.47	77	2.17	42	3.69	18	1.58	18	.69	20
261	3.10	6.92	22.40	82	2.54	71	4.89	30	2.05	30	1.63	7
2621	3.49	6.82	17.77	67	2.35	68	4.62	16	1.07	16	-.12	-1
2622	2.87	4.93	27.94	66	1.88	66	3.27	32	1.57	32	2.12	8

1968 - 69

1968 - 69 to 1973 - 74

A.S.I.C. a

	AE	LP	L	DE	DLP	DRLP	DL
	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000
2623	3.59	5.67	3.46	2.09	3.75	n.a.	.12
262	3.14	5.78	49.17	2.04	3.87	2.01	2.12
26	3.13	6.11	71.57	2.19	4.17	1.55	3.74
2711	3.71	10.19	3.80	3.30	9.35	6.80	-.50
2713	3.95	9.47	2.16	3.36	15.57	11.28	.39
2714	3.78	13.25	2.02	2.85	11.59	n.a.	.11
271	3.76	10.27	12.26	3.16	8.07	5.24	-.14
2722	3.02	7.70	3.38	2.23	4.29	2.17	.39
2723	2.63	10.11	4.80	1.78	4.37	4.01	1.18
2724	3.03	11.31	.67	2.13	8.77	6.99	.05
2725	2.92	9.93	3.03	2.28	5.52	2.62	.12
2726	1.92	8.75	3.08	1.98	5.80	2.99	-.11
2727	2.84	6.69	.59	2.45	5.02	3.44	.03
272	2.73	8.47	22.15	2.04	4.90	2.96	.97
273	4.90	20.44	2.83	2.51	11.29	8.16	.15
274	3.57	8.78	.77	2.58	4.23	n.a.	-.04
27	3.24	9.93	38.00	2.42	6.10	3.81	-.95
281	3.34	6.55	8.12	3.27	5.79	3.24	-1.18
2821	3.35	6.76	8.21	2.26	4.54	1.97	.37
2822	3.15	6.11	3.79	2.24	4.30	1.69	-.12
2823	2.51	4.48	2.36	2.05	3.56	n.a.	.07

114

1968 - 69

1968 - 69 to 1973 - 74

A.S.I.C. a

	AE	LP		L	DE		DLP		DRIP		DL
		\$'000	%		\$'000	%	\$'000	%	\$'000	%	
282 Clay	3.16	6.21	14.36	2.22	70	4.30	69	1.68	27	.33	2
2831	3.80	12.59	2.64	2.57	67	5.27	42	2.51	20	.38	14
2832	3.68	11.62	1.31	2.54	69	3.79	33	.01	nll	.52	40
2833	3.60	6.29	1.90	2.58	72	4.67	74	.62	10	.38	20
2834	3.14	6.76	4.97	2.50	80	4.52	67	1.14	17	1.15	23
2835	3.51	7.22	2.70	2.41	67	3.84	53	1.02	14	.32	12
283 Cement	3.46	8.42	13.51	2.51	72	4.54	54	1.20	14	2.75	20
2841	3.31	7.28	1.78	2.26	68	6.04	83	4.05	56	-.42	-24
2842	3.13	4.95	.77	2.16	69	2.78	56	-.97	-20	-.11	-14
2843	3.42	7.45	2.11	2.40	70	4.46	60	n.a.	-	.26	12
284 Plaster, etc	3.33	7.00	4.65	2.24	67	4.77	68	1.91	27	-.27	-6
28	3.31	7.18	40.62	2.53	76	4.79	67	1.85	26	1.63	4
2911	4.46	17.60	.65	3.06	69	-8.17	-46	1.00	6	.13	21
2912	3.60	7.52	37.62	2.66	74	5.04	67	.65	9	.87	2
2913	3.31	5.53	9.68	2.13	64	3.15	57	n.a.	-	1.07	11
2914	3.87	6.85	6.80	2.11	54	3.84	56	.94	14	.25	4
291 Iron/Steel	3.59	7.22	54.74	2.48	69	4.39	61	.69	9	2.32	4
2921	4.26	14.06	.81	2.90	68	17.73	126	n.a.	-	-.02	-3
2922	3.60	10.06	4.10	2.55	71	12.68	126	n.a.	-	-.58	-14
2923/4	4.32	24.61	2.09	3.45	80	1.77	7	4.29	17	2.16	103
2925/6	3.52	6.35	.38	2.54	72	5.88	92	4.26	67	.32	84
2927	4.38	8.57	2.83	2.33	53	6.80	79	3.92	46	.15	5
2928	3.74	9.31	3.27	2.58	69	3.99	43	1.90	20	.17	5

115

1968 - 69

1968 - 69 to 1973 - 74

A.S.I.C. a

	1968 - 69		1968 - 69 to 1973 - 74		DE	DIP		DRLP		DL	
	AE	LP	L			\$'000	%	\$'000	%		\$'000
2929	3.22	5.29	1.39	49	1.57	60	3.19	n.a.	-	.45	32
2931	3.37	11.18	1.07	68	2.30	43	4.80	n.a.	-	.22	21
292/3 Non-ferrous	3.84	11.41	15.95	69	2.66	68	7.75	5.38	47	2.86	18
29 Basic Metals	3.65	8.24	70.69	70	2.54	65	5.32	1.90	23	5.18	7
3111	3.27	5.34	16.33	61	2.00	71	3.78	.84	16	-2.71	-17
3112	2.91	5.10	4.33	55	1.59	58	2.94	1.05	21	1.43	33
3113	2.80	4.95	1.90	69	1.93	62	3.09	.48	10	.27	14
3114	3.63	7.00	3.78	54	1.96	53	3.69	.78	11	1.49	40
311 Struc. Metal	3.22	5.50	26.34	59	1.90	65	3.58	.89	16	.48	2
3121	2.82	6.70	6.67	94	2.64	72	4.80	1.33	20	-.24	-4
3122	2.78	5.12	2.24	70	1.94	67	3.40	.79	15	.09	4
3123	2.80	5.30	1.63	68	1.92	66	3.49	.86	16	.78	5
312	2.81	5.63	25.22	75	2.10	67	3.80	.95	17	.65	3
3131	2.98	5.48	1.83	55	1.65	58	3.18	.96	17	.43	24
3132	2.75	5.82	7.67	66	1.82	67	3.89	.72	12	-.33	-4
3133	3.15	6.09	3.32	65	2.06	65	3.96	1.84	30	.52	16
3134	3.08	5.52	5.15	62	1.90	61	3.36	n.a.	-	-.19	-4
3135	3.01	5.66	4.12	61	1.83	56	3.17	.13	2	.16	4
3136	2.49	5.30	1.04	73	1.82	80	4.23	-.05	-1	.38	37
3137	2.86	4.94	14.27	70	1.94	72	3.54	.52	10	1.81	13
313 Other Fab.	2.87	5.42	37.42	66	1.89	66	3.57	.57	11	2.78	7
31 Fabric. Metal	2.96	5.50	88.97	66	1.94	66	3.64	.77	14	3.89	4

	1968 - 69		1968 - 69 to 1973 - 74		DL						
	AE	IP	L	DE		DIP	DRLP	DL			
	\$'000	\$'000	\$'000	\$'000		%	\$'000	%	\$'000	%	
3211	3.02	8.29	38.68	2.70	89	.70	8	-.60	-7	7.47	19
3212	2.96	4.94	5.87	2.06	69	3.81	77	1.63	33	1.73	29
3213	2.49	4.35	3.80	1.88	76	3.01	69	1.16	27	1.49	39
3214	2.77	5.30	17.61	2.15	77	3.82	72	1.12	21	4.54	26
321	2.92	6.95	65.95	2.43	83	1.95	28	.13	2	15.22	23
3221	3.47	4.95	13.92	2.28	66	2.82	57	.19	4	-1.17	-8
3222	3.06	4.80	3.20	1.54	50	3.17	66	n.a.	-	-.31	-10
3223	2.81	3.37	25.60	2.31	82	3.11	92	.34	10	-2.48	-10
3224	3.84	5.47	8.96	2.79	73	4.13	75	n.a.	-	-.58	-6
3225	2.51	3.67	1.09	1.68	67	4.53	124	1.37	37	.32	29
322	3.17	4.30	52.76	2.32	73	3.31	77	.24	5	-4.21	-8
32	3.03	5.78	118.72	2.37	78	2.64	46	.36	6	11.00	9
3311	2.35	5.17	3.71	2.73	116	4.31	83	4.56	88	.44	12
3312	3.05	4.58	1.97	1.76	58	4.31	94	n.a.	-	.71	36
331	2.59	4.96	5.68	2.38	92	4.29	86	3.77	76	1.15	20
3321	2.60	4.82	23.80	1.99	76	3.23	67	1.34	28	.93	4
3322	2.84	5.18	21.23	1.61	56	3.60	70	1.13	22	3.97	19
3323	2.75	6.49	1.05	1.99	72	2.08	30	.40	6	.45	43
3324	2.98	6.58	4.81	2.35	79	4.17	63	.67	10	-.21	-4
3325	3.23	5.91	2.15	2.06	64	6.39	108	1.12	19	-.04	-2
3326	2.60	4.84	26.62	1.78	69	3.04	63	.01	nil	1.19	4
332	2.71	5.09	79.74	1.84	68	3.38	66	.78	15	6.28	8
3331	3.06	5.27	9.83	2.00	65	3.24	61	.48	9	.07	1
3332	3.51	6.51	3.43	2.02	57	3.38	52	.57	8	-.62	-18

	AE	LP	L	DE	DLP	DRLP	DL
	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000
				%	%	%	%
3333	3.63	6.81	4.89	1.95	3.22	.67	.49
3334	3.38	5.85	3.34	1.82	4.90	1.40	-.35
3335	3.24	5.54	3.88	2.18	4.70	.39	.10
3336	3.51	6.89	2.09	1.60	3.79	2.08	.72
3337	3.55	5.92	4.86	2.19	3.60	.91	.25
3338	3.37	5.52	2.97	1.86	3.50	n.a.	.20
3339	3.32	5.90	22.77	2.01	3.43	.27	2.69
333	3.34	5.90	58.04	1.99	3.60	.62	3.54
33	2.96	5.42	143.46	1.92	3.50	.84	10.98
3411	2.88	4.35	3.35	2.21	3.90	.64	-.19
3412	1.97	3.81	4.22	1.95	3.00	n.a.	-.90
341	2.37	4.04	7.56	2.03	3.33	.79	-1.87
3421	3.54	7.27	7.35	2.85	3.89	.96	.26
3422	.86	5.05	5.17	2.00	3.37	1.27	.60
342	3.26	6.40	12.52	2.47	3.61	1.03	.86
3431	3.03	7.71	3.69	2.22	4.52	2.27	1.01
3432	3.48	8.62	.64	2.06	3.55	2.51	-.25
3433	3.41	7.29	.68	2.80	12.97	n.a.	-.25
3434	2.57	5.37	14.08	2.06	4.42	2.36	7.28
343	2.72	6.09	19.09	2.05	4.48	2.19	7.79
3441	2.09	4.35	.93	1.92	4.61	n.a.	.57
3442	2.39	4.67	1.81	1.81	2.74	n.a.	.41
3443	1.96	4.23	1.84	1.69	3.42	.81	.00
3444	2.66	4.32	2.69	1.65	2.39	1.33	.79

118

1968 - 69 to 1973 - 74

1968 - 69

A.S.I.C. a

	1968 - 69		1968 - 69 to 1973 - 74		DLP		DRLP		DL		
	AE \$'000	LP \$'000	L \$'000	DE \$'000	%	\$'000	%	\$'000	%	\$'000	%
3445	2.57	4.95	1.98	1.92	75	3.28	66	.16	3	.41	21
3446	2.37	5.76	1.07	1.39	58	3.64	63	2.21	38	.14	13
3447	2.34	5.08	1.99	.38	16	.91	18	n.a.	-	.64	32
344 Other	2.38	4.71	12.30	1.51	64	2.75	58	.57	12	2.94	24
34 Misc.	2.72	5.56	51.46	2.01	74	3.74	67	1.39	25	9.72	19
All Manufacturing	2.88	5.91	979.08	2.13	74	3.91	66	1.24	21	41.36	4

Note: a For industry names see ASIC listing in Appendix B.



## APPENDIX D

Composition of Industry Division4-Digit Data Coverage

Data on a number of 4-digit industries are not available, principally because of the dominance of one or a handful of firms in the operations of the industry. These industries are: 2121, 2122, 2123, 2124, 2125 (aggregated into 212 Milk Products); 2171, 2172 (Sugar, aggregated into 2184 Food Products nec.); 2712, 2715, 2721, 2728 (aggregated into 271 and 272, Basic and Other Chemicals); 2811, 2812, 2813 (aggregated into 281 Glass Products); 2923, 2924, 2925, 2926 (aggregated into 2923/2924, 2925/2926 Smelting and Refining of Non-Ferrous Metals). With the elimination of these industries, 157 industries form the data base at the 4-digit level.

TABLE D1

Labour Intensive/Capital Intensive Division

<u>Labour Intensive</u>		<u>Capital Intensive</u>	
<u>ASIC Code</u>	<u>4-digit industries (No.)</u>	<u>ASIC Code</u>	<u>4-digit industries (No.)</u>
21/22	23	26	8
23	16	27	11
24	13	28	11
25	8	29	12
331, 332	8	31	14
34	15	32	9
		333	9
	83		74

Note: This industry division was created for a number of reasons and the titles may be slightly misleading. Initial regressions of 4-digit data exposed a marked bunching of residuals which produced low values of the Durbin Watson statistic in the ranges indicating .....

either auto-correlation or uncertainty. In general, negative residuals were associated with industries typically thought of as labour intensive and positive residuals with industries typically thought of as capital intensive. No variable representing capital intensity was included in the equations partly because we possessed little faith in the reliability of available figures on asset values. Since there was strong reason to believe that the degree of capital intensity was an important missing variable, the 4-digit data were divided into groups roughly corresponding to low and high degrees of capital intensity. However, the bunching of residuals was also patterned fairly closely after 2-digit industry sub-divisions, so the ultimate division was decided with this in mind, in order to retain the coherence of industries within 2-digit sub-divisions. The correspondence with capital intensity is, therefore, rough. The outcome of this data division on residuals was a slight improvement of the D.W. statistic in the 'labour intensive' group and the elimination of autocorrelation in the 'capital intensive' group.

TABLE D2

Small Turnover/Large Turnover Division<sup>a</sup>

ASIC Sub-Division	Small Turnover ASIC Class <sup>b</sup>	Large Turnover ASIC Class <sup>b</sup>
21/22	2114	2111
	2152	2112
	2162	2113
	2182	2131
	2193	2132
		2140
		2151
		2153
		2161
		2163
		2181
		2183
		2184
		2191
		2192
		2194
	2210	
23	2311	2314
	2312	2316
	2313	2331
	2315	
	2317	
	2318	
	2319	
	2321	
	2322	
	2332	
	2333	
24	2411	2413
	2412	2421
	2422	2423
	2424	2425
	2426	2432
	2427	
	2428	
	2431	

ASIC Sub-Division	Small Turnover ASIC Class <sup>b</sup>	Large Turnover ASIC Class <sup>b</sup>
25	2515	2511
	2516	2512
	2522	2513
		2514
		2521
26	2612	2611
	2613	2614
	2623	2615
		2621
		2622
27	2712	2711
	2715	2713
	2724	2714
	2727	2722
	2728	2723
	2740	2725
		2726
	2730	
28	2822	2821
	2823	2831
	2833	2832
	2835	2834
	2841	
	2842	
	2843	
29	2911	2912
	2925/6	2913
	2929	2914
	2931	2921
		2922
		2923/4
		2927
	2928	
31	3113	3111
	3114	3112
	3122	3121
	3131	3123
	3133	3132
	3134	3137
	3135	
	3136	

ASIC Sub-Division	Small Turnover <sup>b</sup> ASIC Class	Large Turnover <sup>b</sup> ASIC Class
32	3213	3211
	3222	3212
	3225	3214
		3221
		3223
		3224
33	3311	3321
	3312	3322
	3323	3324
	3325	3326
	3332	3331
	3334	3333
	3336	3335
	3337	3339
	3338	
34	3411	3421
	3412	3431
	3422	3434
	3432	
	3433	
	3441	
	3442	
	3443	
	3444	
	3445	
	3446	
3447		

Notes: a The division of 4-digit industries by size of turnover was established following the example of Kmenta [1963] where quite different results appeared from such a data division. The split has been effected in terms of 1971 figures. The boundary established was at \$85 million without acknowledgement of 2-digit boundaries (as in the previous division). The boundary is ultimately an arbitrary one, but the arbitrariness only extends to a range around that boundary. There is no question that the division separates industries which are fundamentally different in productive techniques employed.

b Only 4-digit ASIC codes are listed here; for industry names, see ASIC listing in Appendix B.

TABLE D3

Average Employment Levels of Sub-Groups of the WorkforceAll Industry and Industry Divisions

Average Employment Levels					
Variables	Small turnover	Large turnover	Labour intensive	Capital intensive	All industry 1971
% of Production Workforce					
M <sup>a</sup>	68.8	77.0	60.6	86.7	74.0
QAM <sup>a,b</sup>	13.7	15.8	8.4	20.9	16.5
UAM <sup>a,b</sup>	28.5	32.3	28.4	32.3	28.9
QMM <sup>a,b</sup>	5.0	10.3	6.7	11.9	9.6
UMM <sup>a,b</sup>	21.6	18.6	16.1	21.6	18.3
Australian Females <sup>a,b</sup>	18.9	21.3	33.1	8.9	15.1
Migrant Females <sup>a,b</sup>	12.3	11.7	16.3	4.4	10.9
% of Male Workforce					
OSM <sup>b</sup>	38.7	37.6	37.6	38.6	38.0
% of Female Workforce					
OSF <sup>b</sup>	39.4	35.6	41.3	32.8	42.0
% of Total Workforce					
SEM <sup>c</sup>	14.9	12.5	15.9	12.5	13.0
OTH <sup>c</sup>	23.9	22.9	23.3	26.6	26.0
\$ 000					
ALP <sup>a</sup>	7.5	9.3	7.5	9.4	8.4

Sources: (a) Australian Bureau of Statistics, Manufacturing Establishments,

.... /

Details of Operations by Industry Class, Canberra (ref. 12.29).

- (b) Industries Assistance Commission, Annual Report, 1974-75, Canberra, 1975.
- (c) Australian Bureau of Statistics, Census of Population and Housing, 1971, unpublished data.

## FOOTNOTES

- 1 An alternative proposal tried by Kmenta, based on work by L. Johansen, attempts to explain the dispersion itself. However, its conceptual justification is impoverished, and its relative explanatory power is significantly less than the Dunlop based study.
- 2 Brown uses Pearson product-moment estimation. Average annual earnings are regressed against a single variable, with all other explanatory variables held at their mean level.
- 3 It is true that some manual tasks require physical strength that is beyond the capacity of most women. Nevertheless, my estimation is that the proportion of these tasks is much less than is commonly imagined, and they constitute only a small proportion of those jobs normally considered to be the preserve of the male sex.
- 4 The inadequacy of the 3-digit 4-firm ratio for its allotted task offers no explanation for the particularly poor performance of the concentration measure for both 3-digit and 4-digit equations.
- 5 A cursory examination of industry differences in various profit measures indicates that higher profit margins are typically restricted to consumer goods industries (drugs, tobacco, beer, cosmetics, soap, and detergents). Intermediate goods industries do not fare as well in terms of profit margins. It is possible that the latter face more powerful and rational 'consumers' in the sense that substitutability on technical grounds is more rigorous than substitutability on psychological grounds. A fortiori, intermediate goods industries, in general, would have less market power. On the other hand, it is possible that the goals of these industries are more growth oriented, and the lower profit margins reflect these priorities.
- 6 The classification for enterprise size is different to that used in the manufacturing census (see Appendix A), but a comparison of turnover figures for 4-digit industries, for example, indicates that it would not be stretching credibility too far to use enterprise data for a measure of industry-specific enterprise size, in conjunction with other data from the manufacturing census.
- 7 Robertson [1963, p. 192ff.]
- 8 Sheridan [1974] used the concept 'growth rate of net assets' in her examination of the relative expansion rates of Australian firms. However, her subject was individual companies, not industries, and she attempted to

- make the use of this concept a defensible one by separating companies into groups determined by the date of their incorporation.
- 9 ABS, Census of Population and Housing, Birthplace, 1971, Table 6 (ref 2.86.9) gives a cross tabulation of occupation (major groups) by birthplace of major nationalities. Although the table refers to total employment, the marked differences in occupational groupings according to birthplace must carry over somewhat to the manufacturing sector. The ratio of white collar employment (professional, administrative, clerical) to blue collar workers (tradesmen, process workers, labourers) was for Australians 1.26, for British plus Germans, .89, and for Italians plus Greeks plus Yugoslavs, .16.
  - 10 Reserve Bank, Annual Report, 1968-69.
  - 11 Percentages are from ABS, Labour Report (ref 6.7). The figures for manufacturing employment in this publication differ slightly from those in ABS, Manufacturing Establishments, Details of Operations by Industry Class (ref 12.29), but the difference does not affect the total workforce percentages significantly.
  - 12 Examination of labour force participation rates indicates that there may have been some substitution within the ranks of female employment. From 1969 to 1974, the participation rate for all females rose from 37.1% to 41.4%. However, the rate for married females rose substantially from 31.4% to 39.4% while the rate for other females dropped from 48.1% to 45.3%. See ABS, Labour Report, 1973 (ref 6.7). No doubt: the greater employment of migrant females was a factor in the rise in the married females rate.
  - 13 These and later figures on general migration patterns come from Price [1975].
  - 14 Following the indifferent performance of the tariff rate variable and its questionable theoretical role, the variable is dropped from further consideration.
  - 15 The values of KLR (1968) vary from less than .1 for clothing, footwear, etc., to 4.0 for petroleum refining, with the typical value being less than 1.0.
  - 16 The work of Sheridan [1974, ch. 3] shows that profit rates of individual firms are not monotonically related to size, but 'bend back' after a certain moderate size. These firm data seem to be consistent with the industry data. We suspect that this finding does not

- necessarily imply an increasing inefficiency with size, but a greater preoccupation with profit levels, and the resulting capacity for more rapid growth.
- 17 We refuse to believe that foreign investment is as inept at profit making as this low correlation implies. Two interpretations are possible. Foreign dominated firms may be more adept at hiding the true extent of their surplus. The second possibility, which does not exclude the first, is that the correlation supports our claim that it is not profit rates but profit mass which is the goal of the large modern corporation.
  - 18 All regressions in Sub-Section II are run with a value productivity variable which is an average for the three yearly figures between 1968-69 and 1971-72.
  - 19 Regressions for 1972 and 1973 generally support these results. These regressions are not shown because of the lower confidence in the accuracy of the dependent variable.
  20. The correlation between Q and OTH for the L group (1971) is .24, and for the C group, .14. The male component of OTH, if taken by itself, would have a significantly higher correlation.
  - 21 The correlation between Q and DL is .12, so that those industries with a higher skill factor have also been, on average, expanding their manual employment. Of course, only a detailed examination of structural change or a prolonged wait for 1976 Census data would disclose the skill proportion of these employment changes.
  - 22 Regressions similar to lp.g. and lp.y. were also run with output change substituting for productivity change. Results were similar with the output change coefficients being slightly higher at .17 and .14, and  $R^2$  being increased to .20 and .37.
  - 23 It may be that the negative wage ratio influence is partly accounted for by the negative qualifications influence in the IPC equation - the correlation between (1968) ICRD and Q is .35.
  - 24 The groups' boundaries were defined partly to retain coherence at the 2-digit level. Consequently, not every industry in the L group is labour intensive (e.g. beer) and not every industry in the C group is capital intensive (e.g. motor vehicle instruments). See Appendix D, Table D1.
  - 25 V. Fuchs [1968], The Service Economy, quoted in Gordon [1972, p. 34].

- 26 There is, of course, the problem of collinearity with other variables, especially (in this context) with qualifications. The Q/M correlation is typically around .55. There is the possibility of running the substitute variable, unqualified males, in Sub-Section I regressions. However, as 'qualifications' is only available for 1971, this adjustment would involve potential errors in yet another variable for years other than 1971. Moreover, the male variable would not be consistent with the migrant variables, the SEM/OTH distinction not being adjustable for qualifications.
- 27 In doing so, we omit any considerations of the prior processes of segmentation by which a disproportionate percentage of males receive skills training vis-a-vis females.
- 28 See footnote 20.
- 29 The caveat to this claim is the insignificance of the OTH variable at the 3-digit level, whereas migrant males are shown to be still advantaged at this level. We have no explanation for this phenomenon.
- 30 See, for example, Bosanquet & Doeringer [1975] where, however, the original dual labour market distinction is interpreted fairly flexibly.
- 31 Of the three years examined for this split - 1968, 1971 and 1973 - productivity exerted a positive influence on earnings in the small turnover industry group only in 1971.
- 32 It would be hasty to conclude that the relationships of the capital intensive group dominate those of the large turnover group. This may be the case, but the present evidence suggests that the two dimensional division is a useful one.
- 33 Real productivity change is significant in explaining earnings changes in equations representing 127 industries. This arbitrary industry selection was forced on the regressions because of the lack of data on 'real' output for n.e.c. industries involving miscellaneous products.
- 34 This is the form of argument used by Eckstein and Wilson [1962] in explaining earnings increases in the key group of industries in the U.S. They use cross-industry averages as explanatory variables.
- 35 The correlations referred to are for the full 4-digit data.
- 36 Jones [1973] gives a good account of this dilemma.
- 37 Advisory Committee on Commonwealth Employment Service Statistics, Report, Melbourne, 1973.

## REFERENCES

A. Official Publications

Australian Bureau of Statistics,

Census of Population and Housing, Birthplace, 1971.  
Bulletin No.4, Pt.9. Canberra, 1973 (ref 2.86.9).

Census of Population and Housing, Labour Force, 1971.  
Bulletin No.5, Pt.9. Canberra, 1974 (ref 2.87.9).

Census of Population and Housing, 1971, unpublished  
data on cross-tabulation of birthplace and industry.

Earnings and Hours of Employees, Distribution and  
Composition, May 1974. Canberra, 1974 (ref 6.52).

Indexes of Manufacturing Production, 1973-74.  
Canberra, 1974 (ref 12.36).

Industrial Disputes, March 1972-Dec 1974. Canberra,  
1972-75 (ref 6.6).

Integrated Economic Censuses: Enterprise Statistics,  
Details by Industry Class, Australia, 1968-69.  
Canberra, 1969 (ref 17.15).

Integrated Economic Censuses: Industry Concentration  
Statistics, Details by Industry Class, Australia, 1968-69,  
1972-73. Canberra, 1969-73 (ref 17.14).

Labour Report, 1968-69, 1973. Canberra, 1969-74 (ref 6.7).

Manufacturing Establishments, Details of Operations by  
Industry Class, 1968-69 to 1973-74. Canberra, 1969-74 (ref 12.29).

Manufacturing Establishments, Selected Items of Data Classified  
by Industry and Employment Size, 1968-69, 1972-73.  
Canberra, 1969-73 (ref 12.28).

Committee to Advise on Policies for Manufacturing Industry,  
Policies for Development of Manufacturing Industry, Vol.II,  
Statistics. A Green Paper. Canberra, 1976.

Department of Labour and Immigration, Monthly Report of Employment  
Office Transactions: Dissection by Industries of Unfilled  
Vacancies, Sep 1969-June 1974. Canberra, 1969-74.

Industries Assistance Commission, Annual Report, 1973-74, 1974-75.  
Canberra, 1974-75.

Reserve Bank of Australia, Annual Report, 1967-68 to 1973-74.  
Sydney, 1968-74.

## B. Books and Articles

- Becker, G., [1957], The Economics of Discrimination. Chicago University Press.
- Blandy, R., (ed.) [1977], "Migrant Workers in Australia: Industrial Cannon-Fodder?", Australian Bulletin of Labour, 3, 2 April, pp.20-31.
- Bosanquet, N., & P.B. Doeringer, [1973], "Is There a Dual Labour Market in Great Britain?", Economic Journal, 330, 83, June, pp.421-435.
- Brown, D.G., [1962], "Expected Ability to Pay and Inter-Industry Wage Structure in Manufacturing", Industrial and Labour Relations Review, 16, October, pp.45-62.
- Collins, J., [1975], "The Political Economy of Post-War Immigration", in Wheelwright, E.L., & K. Buckley (eds.), Political Economy of Australian Capitalism I. Sydney, ANZ, pp.105-129.
- Collins, J., [1977], "A Divided Working Class", Intervention, 8, March, pp.64-78.
- Doeringer, P.B., & M. Piore [1972], Internal Labour Markets and Manpower Analysis. Lexington, Mass., Heath.
- Dunlop, J., [1948], "Productivity and Wage Structure", in L.A. Metzler et.al. (eds.), Income, Employment and Public Policy: Essays in Honor of Alvin H. Hansen. N.Y., Norton.
- Eckstein, O., & T.A. Wilson, [1962], "The Determination of Money Wages in American Industry", Quarterly Journal of Economics, 76, August, pp.379-414.
- Edwards, R.C., et.al. (eds.) [1975], Labour Market Segmentation. Lexington, Mass., Heath.
- Galbraith, J.K., [1973], Economics and the Public Purpose. Boston, Houghton Mifflin.
- Gordon, D.M., [1972], Theories of Poverty and UnderEmployment. Lexington, Mass., Heath.
- Hancock Keith [1976], "The Relation between Changes in Costs and Changes in Product Prices in Australian Manufacturing Industries, 1949-50 to 1967-68", Economic Record, 52, 137, March, pp.53-68.
- Hood, W., and R.D. Rees [1974], "Inter-Industry Wage Levels in United Kingdom Manufacturing", Manchester School, pp.171-185.
- Howarth, C.T., & D.W. Rasmussen [1971], "Human Capital and Inter-Industry Wages in Manufacturing", Review of Economic Statistics, 53, November, pp.376-80.
- Jones, A. [1973], The New Inflation. Harmondsworth, Penguin.
- King, J.E., & P.C. Langley [1976], "Earnings in Australian Industry: Low Pay and its Determinants", Working Paper, Latrobe University, April 1976.
- Kmenta, J. [1963], "Inter-Industry Wage Differentials in Australia, 1947-1954", Australian Economic Papers, 2,1, June, pp.85-106.
- Levinson, C. [1971], Capital, Inflation and the Multinationals. London, Allen & Unwin.

- Lydall, Harold [1976], "The Economics of Inequality", Australian Bulletin of Labour, 2,3, May, pp.29-52.
- Masters, S.H. [1969], "An Inter-Industry Analysis of Wages and Plant Size", Review of Economics and Statistics, 51, August, pp.341-5.
- Piore, M.J. [1975], "Notes for a Theory of Labor Market Stratification", in Edwards, R.C. et.al. (eds.), Labor Market Segmentation. Lexington, Mass., Heath. pp.125-150.
- Power, M. [1975], "Women's Work is Never Done by Men...", Journal of Industrial Relations, 17,3, September, pp.225-239.
- Price, C.A. [1975], Australian Immigration. National Population Inquiry, Canberra, A.G.P.S.
- Reich, M., et.al. [1973], "A Theory of Labour Market Segmentation", American Economic Review, Papers & Proceedings, 63,2, May, pp.359-365.
- Robertson, D.H. [1963], Lectures on Economic Principles. London, Fontana.
- Ryan, E., & A. Conlon [1975], Gentle Invaders: Australian Women at Work. Melbourne, Nelson, Ch.6.
- Sawyer, M.C. [1973], "The Earnings of Manual Workers: A Cross-Section Analysis", Scottish Journal of Political Economy, 20,2, June pp.141-58.
- Sheridan, K. [1974], The Firm in Australia. Melbourne, Nelson.
- Thurow, L. [1969], Poverty and Discrimination. Washington D.C., Brookings.
- Weiss, L. [1966], "Concentration and Labour Earnings", American Economic Review, 56, March, pp.96-117.

**WORKING PAPERS IN ECONOMICS**

- \*1 I.G. Sharpe A Framework for Analysis of the Money Supply Process in Australia.
- \*2 I.G. Sharpe & R.G. Walker Asset Revaluation and Stock Market Prices.
- \*3 N.V. Lam Incidence and Stabilization Impact of Tin Export Taxation in West Malaysia.
- \*4 V.B. Hall & M.L. King Inflationary Expectations in New Zealand: A Preliminary Study.
- \*5 A.J. Phipps Strike Activity and Inflation in Australia.
- 6 N.V. Lam Incidence of the Rice Export Premium in Thailand.
- \*7 I.G. Sharpe Secondary Reserve Requirements, the Monetary Base and the Money Supply in Australia.
- 8 P. Saunders Labour Demand Functions and the Quasi-Fixity Hypothesis: Some Empirical Results for U.K. Manufacturing Industries, 1963-1974.
- 9 W.P. Hogan Economic Strategies for Recovery.
- 10 T.P. Truong Asset Revaluation and Share Prices: A Study using the M.S.A.E. Regression Technique.
- 11 S. Kim Instability of Primary Exports, Income Stabilization Policies and Welfare.
- \*12 I.G. Sharpe & P.A. Volker Institutional Change, Specification Error, Inflation and the Stability of the Demand for Money Function in the United States, 1901-1974.
- 13 I.G. Sharpe & P.A. Volker The Impact of Institutional Changes on the Australian Short-Run Money Demand Function.
- \*14 W.P. Hogan The Connections between Foreign Trade and Economic Development: An Empirical Study.
- \*15 F. Gill The Case of the Black Exodus from the Southern U.S., 1910 - 1970: Some Lessons for Theory and Applied Theory.

