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# Trinidad and Tobago: Inter-industry wage differentials

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Conventional labour economics argues that the typical firm is a wage taker and that wages are determined by the interaction of labour supply and the aggregate demand for labour. Under these conditions, markets clear, and non-frictional unemployment cannot feature in the long run. The persistently high levels of unemployment in the Caribbean present a significant challenge to this critical prediction of neoclassical economics. Efficiency wage theories argue that wages are endogenously determined by firms, which pick wage levels that minimize the average per unit cost of "efficiency labour". Among the important conclusions of these theories is the possibility of persistent non-frictional unemployment. This paper presents evidence suggesting the existence of long-term inter-industry wage differentials in Trinidad and Tobago. This is a possible indication of the applicability of efficiency wage theories in explaining labour market phenomena in the twin-island Republic.

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# I
# Introduction

Standard economic theory assumes that the typical firm is a wage taker, i.e., it takes the market-determined wage rate as given and proceeds to employ labour units until the marginal revenue product of labour (MRPL) equals the wage rate. This can, of course, be adjusted to accommodate the reality of heterogeneous labour, so that equation (1) represents the profit-maximizing behaviour of firm *j* as far as the employment of labour is concerned.

$$MRPl_{ij} = W_i \; \forall j = 1, 2, 3 \ldots n \qquad (1)$$

where *i* denotes the category of worker skill/class/occupation.

Equation (1) implies that each firm will pay the same wage rate for the same category of labour. Therefore, according to textbook labour economics, any observed differences in wage rates for the same category of labour between firms or between industries must be transitory in nature and will be eroded in the long run by competitive market forces.

## 1. Inter-industry wage differentials

Economists have noted stable inter-industry wage differentials since at least as far back as the early 1950s. Slichter (1950, as cited in Krueger and Summers, 1987) illustrates the time-invariant nature of inter-industry wage differentials. Slichter found an intertemporal rank correlation coefficient of 0.73 in industry wages using hourly wage data for unskilled male workers from the National Industrial Conference Board establishment surveys of 20 manufacturing industries in the United States from 1923 to 1946.

Many studies have since reconfirmed the presence of stable inter-industry wage differentials in the United States. Among them, Krueger and Summers (1987), using correlations of log annual earnings for full-time equivalent employees in nine major industries for selected years between 1900 and 1984, found stability in the United States inter-industry wage structure throughout the period from 1915 to 1984. Correlations with the wage structure of 1984 range from 0.76 to 0.98.

Inter-industry wage differences are not unique to the United States. In a study of 14 Organisation for Economic Co-operation and Development (OECD) countries for the period from 1970 to 1985, Gittleman and Wolff (1993) found that the rank order of industrial wages had been stable over the period for all countries studied and that industrial wage differentials were positively related to an industry's productivity growth, output growth, capital intensity and export orientation. Arbache (2001) used microdata for Brazil to explain industrial wage differentials for the period from 1984 to 1998 and found that efficiency wage and unmeasured ability models were significant in explaining the wage structure.

## 2. Caribbean literature

The subject of labour market segmentation along industrial lines has received relatively little attention in the Caribbean literature. One notable exception is Scott (2005), who used a segmented (along industrial lines) labour market approach to estimate the distributional effects of trade in Jamaica. Anderson (1987) proposed that the Jamaican labour market should be analysed using six conceptually distinct categories (primary formal, central government, secondary formal, large-scale agriculture, small-scale agriculture and informal sectors). She further demonstrated that these sectors differed by average education level, average worker age, sex and average income.

This paper extends the literature on labour market segmentation in the Caribbean by demonstrating that a temporally stable inter-industry wage distribution exists in Trinidad and Tobago after fully accounting for occupational differences. Furthermore, accounting for compositional differences in labour quality does not significantly affect the industry distribution.

The remainder of the paper is divided into three sections. In section II, evidence is presented to support the hypothesis of a temporally stable wage hierarchy among industries. Theoretical explanations for inter-industry wage differentials are presented in section III, and section IV contains conclusions and recommendations.

# II

# Inter-industry wage differentials in Trinidad and Tobago

## 1. Data and methodology

The data for this paper come from the Continuous Sample Survey of the Population (CSSP), which is carried out quarterly by the Central Statistics Office of Trinidad and Tobago. Weekly earnings of respondents engaged in paid employment, as well as hours worked, occupation and industry worked in, were extracted from the CSSP. The third quarters of 1993, 1994, 2001 and 2002 and the second and third quarters of 1997 and 2007 were utilized. In addition, data were obtained on the age, sex and education of respondents for the surveys from the third quarters of 1993, 1994, 2001 and 2002.

Data for the six years were collapsed into the following four samples:

— Sample 1: 1993 Q3 and 1994 Q3;
— Sample 2: 1997 Q2 and Q3;
— Sample 3: 2001 Q3 and 2002 Q3; and
— Sample 4: 2007 Q2 and Q3.

The sample sizes ranged from 3,918 respondents in sample 1 to 6,859 in sample 4.

Each sample was sorted by a four-digit occupation code (OC). The average weekly and hourly earnings were then calculated for each four-digit OC.[1] The earnings of each respondent relative to his or her occupation average () were calculated using the formula in equation (2) below.

$$Dinc_{ij} = Inc_{ij} / \overline{Inc_j} \qquad (2)$$

where $Inc_{ij}$ is the weekly/hourly income of individual $i$ in occupation $j$ and $\overline{Inc_j}$ is the average weekly/hourly income for individuals in occupation $j$.

Each sample was then sorted by the Trinidad and Tobago Standard Industrial Classification (TTSIC).[2] The average relative earnings for each major industry group were calculated as shown in equation (3) below.

$$Dinc_k = \frac{\sum_{i=1}^{N}\sum_{j=1}^{M} Dinc_{ijk}}{N} \qquad (3)$$

where $k$ refers to the major industry group, $ijk$ refers to individual $i$ working in occupation $j$ in industry group $k$, $N$ is the number of respondents (individuals) in industry group $k$ and $M$ is the number of occupations in industry group $k$, with $N \geq M$ for all $k$ (industry groups).

It can be easily demonstrated that the weighted average of $Dinc_k$ ($\overline{Dinc}$) is equal to 1. Therefore, $Dinc_k$ -1 can be interpreted as the percentage difference in average wages between industry group $k$ and the average wage for all industries after accounting for occupational differences across groups. Thus, $Dinc_k$ a of 0.9 means that, on average, industry group $k$ pays 10% less than the average for all industries after accounting for occupational differences. $Dinc_k$ is also referred to as the relative occupationally adjusted wage (ROAW) in the text of this paper.

Subsection 2 of this section employs various simple statistical techniques to answer the following questions:

(i) Would the average employee, with knowledge only of the wages of his occupational cohort, perceive that there is an industrial wage hierarchy?
(ii) Is that industrial wage structure temporally stable?

Subsection 3 examines what happens to the industrial wage hierarchy when adjustment is made for compositional differences in experience, education and sex between industries.

[1] Reported weekly earnings are used in the paper as a proxy for the weekly wage, which is not captured by the surveys. Reported weekly earnings divided by reported hours worked are used to proxy hourly wage rates. Since most employment contracts in Trinidad and Tobago are written for a fixed monthly or fortnightly wage with the standard eight-hour work day, the authors thought it best to present the analysis in terms of both weekly wages and hourly wage rates.

[2] The TTSIC can be disaggregated to the four-digit level or industry level; this paper, however, uses a three-digit level of disaggregation (major subsectors).

## 2. Inter-industry wage differentials when only differences in occupation are accounted for

Table 1 presents the ROAW for 41 industry groups and the standard deviation in ROAW for individual workers in each group.[3] In table 1 and the subsequent tables and figures, Dinch refers to the ROAW based on hourly earnings and Dinc to the ROAW based on weekly earnings.[4]

Figure 1 presents the box plots for the ROAW for 1993/1994, 1997, 2001/2002 and 2007.

For the most part, the ROAW distributions are skewed to the right. This can also be inferred from figure 1, as the ROAWs for each year are clustered more tightly in the lower half of the inter-quartile range (as can be seen from the fact that the median line is positioned closer to the bottom of each box) than in the upper half.[5]

The positively skewed distributions seem to suggest that industries that pay a below-average ROAW tend not to stray too far to the left, and industries that pay above one (the average ROAW) tend to have widely varying relative wages. This assessment is further corroborated by the fact that most outliers are beyond the upper inner fence in the box plot (figure 1).[6]

Table 2 shows the ranking of industry groups by their ROAW over the four sample periods. Although there is some movement in rank, generally groups tend to be ranked in the same neighbourhood from sample to sample. Table 3 shows the number of groups specifying place changes in rank (0, 1-3, greater than 3, etc.) between the sample periods.

Where weekly wages (*Dinc*) are concerned, a comparison of the 1993/1994 sample with the 1997 sample (see table 3) reveals that five of the 41 industry groups maintained their rank and 28, or 68.3%, of the 1997 sample ranked within three places of their 1993/1994 ranking. In the eight-year period between

[3] Industry groups were selected if they contained more than 20 respondents in each sample; otherwise the group was deemed not fit for analysis because of the small size of the subsample. As can be seen from table 1, between 82% and 86% of each original sample is contained in these 41 industry groups.

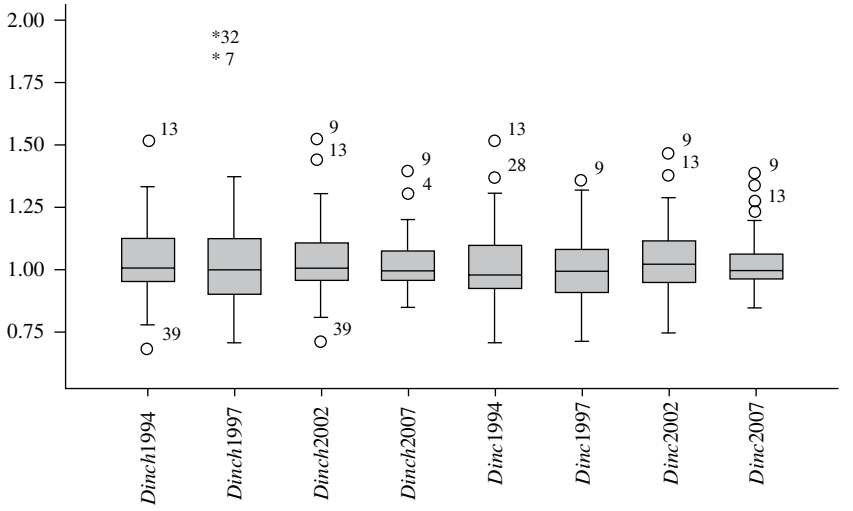
[4] Appendix 1 matches the industry groups to the industry codes used in table 1 and subsequent tables.

[5] The exceptions are the *Dinch94* and *Dinc97* distributions, as tests for skewness reveal that they are more or less symmetrical. Kurtosis tests show that all distributions were mesokurtic except *Dinch97* and *Dinc94* (in these two cases, the distributions were leptokurtic).

[6] The identifiers (IDs) of the outliers are presented in the box plot (cross-reference with appendix 1 for industry group name).

FIGURE 1

**Box plot of the ROAW for different samples**




*Source:* Central Statistics Office of Trinidad and Tobago and authors' calculations.

ROAW: Relative occupationally adjusted wage.
*Dinch*: ROAW based on hourly earnings.
*Dinc*: ROAW based on weekly earnings.
*Values that are very far outside the range of the graph.

TABLE 1.a

**Relative occupationally adjusted weekly wage (*Dinc*) across industry groups, four samples**

| ID | Sample 1: 1993/1994 | | | Sample 2: 1997 | | | Sample 3: 2001/2002 | | | Sample 4: 2007 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *N* | *Dinc* | *S* | *N* | *Dinc* | *S* | *N* | *Dinc* | *S* | *N* | *Dinc* | *S* |
| Ind. 1 | 144 | 0.97 | 0.37 | 132 | 1.00 | 0.41 | 115 | 0.98 | 0.39 | 27 | 0.89 | 0.23 |
| Ind. 2 | 30 | 0.94 | 0.52 | 32 | 0.89 | 0.51 | 26 | 0.92 | 0.53 | 123 | 0.97 | 0.44 |
| Ind. 3 | 39 | 1.15 | 0.37 | 45 | 1.00 | 0.28 | 35 | 1.06 | 0.33 | 35 | 1.01 | 0.28 |
| Ind. 4 | 64 | 1.27 | 0.64 | 60 | 1.29 | 0.48 | 66 | 1.30 | 0.50 | 87 | 1.32 | 0.57 |
| Ind. 5 | 32 | 1.01 | 0.90 | 41 | 0.98 | 0.46 | 47 | 1.06 | 0.53 | 50 | 0.95 | 0.35 |
| Ind. 6 | 23 | 0.97 | 0.48 | 29 | 0.88 | 0.33 | 32 | 1.04 | 0.46 | 29 | 0.91 | 0.32 |
| Ind. 7 | 38 | 0.90 | 0.42 | 59 | 0.99 | 0.47 | 43 | 0.96 | 0.66 | 34 | 1.01 | 0.47 |
| Ind. 8 | 23 | 1.13 | 0.50 | 35 | 1.23 | 0.62 | 35 | 1.24 | 0.55 | 44 | 1.20 | 0.62 |
| Ind. 9 | 66 | 1.31 | 0.54 | 46 | 1.35 | 0.45 | 47 | 1.46 | 0.53 | 70 | 1.35 | 0.53 |
| Ind. 10 | 31 | 0.97 | 0.38 | 23 | 1.09 | 0.28 | 33 | 1.09 | 0.50 | 47 | 1.13 | 0.43 |
| Ind. 11 | 22 | 1.11 | 0.58 | 25 | 1.10 | 0.35 | 23 | 1.28 | 0.50 | 27 | 1.05 | 0.35 |
| Ind. 12 | 29 | 0.88 | 0.41 | 24 | 0.88 | 0.37 | 21 | 0.91 | 0.35 | 69 | 0.85 | 0.31 |
| Ind. 13 | 40 | 1.52 | 0.71 | 48 | 1.33 | 0.52 | 40 | 1.38 | 0.70 | 40 | 1.25 | 0.39 |
| Ind. 14 | 39 | 1.12 | 0.31 | 44 | 1.20 | 0.39 | 42 | 1.14 | 0.31 | 47 | 1.23 | 0.47 |
| Ind. 15 | 132 | 0.95 | 0.39 | 281 | 0.96 | 0.37 | 369 | 0.96 | 0.35 | 654 | 0.99 | 0.48 |
| Ind. 16 | 231 | 1.01 | 0.36 | 234 | 1.01 | 0.34 | 253 | 1.00 | 0.38 | 282 | 0.99 | 0.45 |
| Ind. 17 | 28 | 0.95 | 0.35 | 38 | 0.91 | 0.37 | 77 | 1.07 | 0.40 | 89 | 1.04 | 0.42 |
| Ind. 18 | 44 | 1.02 | 0.44 | 39 | 1.00 | 0.58 | 62 | 1.04 | 0.69 | 77 | 1.05 | 0.51 |
| Ind. 19 | 93 | 0.91 | 0.62 | 89 | 0.89 | 0.43 | 105 | 0.87 | 0.46 | 155 | 0.92 | 0.48 |
| Ind. 20 | 25 | 0.86 | 0.33 | 33 | 1.06 | 0.33 | 24 | 1.12 | 0.49 | 20 | 1.06 | 0.32 |
| Ind. 21 | 72 | 0.80 | 0.29 | 73 | 0.77 | 0.25 | 77 | 0.82 | 0.39 | 105 | 0.95 | 0.60 |
| Ind. 22 | 63 | 1.10 | 0.62 | 84 | 1.03 | 0.60 | 75 | 1.08 | 1.17 | 130 | 1.19 | 0.75 |
| Ind. 23 | 21 | 0.80 | 0.43 | 27 | 0.89 | 0.32 | 42 | 0.98 | 0.41 | 22 | 1.02 | 0.32 |
| Ind. 24 | 104 | 0.95 | 0.41 | 142 | 0.98 | 0.50 | 136 | 0.89 | 0.51 | 246 | 0.99 | 0.56 |
| Ind. 25 | 100 | 0.79 | 0.41 | 164 | 0.84 | 0.29 | 176 | 0.90 | 0.42 | 360 | 0.85 | 0.51 |
| Ind. 26 | 49 | 0.98 | 0.44 | 55 | 0.98 | 0.50 | 63 | 1.12 | 0.53 | 58 | 1.17 | 0.58 |
| Ind. 27 | 78 | 0.90 | 0.48 | 84 | 0.91 | 0.38 | 86 | 0.92 | 0.35 | 317 | 0.97 | 0.41 |
| Ind. 28 | 35 | 1.38 | 0.69 | 42 | 1.08 | 0.39 | 44 | 1.12 | 0.51 | 49 | 1.20 | 0.54 |
| Ind. 29 | 42 | 1.25 | 0.45 | 56 | 1.23 | 0.47 | 38 | 1.12 | 0.31 | 27 | 0.99 | 0.41 |
| Ind. 30 | 61 | 1.14 | 0.51 | 63 | 1.24 | 0.44 | 85 | 1.20 | 0.53 | 63 | 1.20 | 0.63 |
| Ind. 31 | 101 | 1.10 | 0.39 | 167 | 1.04 | 0.36 | 145 | 1.09 | 0.43 | 111 | 1.02 | 0.35 |
| Ind. 32 | 81 | 1.03 | 0.43 | 83 | 1.02 | 0.55 | 76 | 1.03 | 0.53 | 70 | 1.00 | 0.56 |
| Ind. 33 | 129 | 0.88 | 0.37 | 225 | 0.89 | 0.35 | 195 | 0.89 | 0.38 | 327 | 0.96 | 0.39 |
| Ind. 34 | 392 | 1.06 | 0.41 | 431 | 1.09 | 0.37 | 562 | 1.02 | 0.33 | 612 | 1.05 | 0.37 |
| Ind. 35 | 76 | 1.01 | 0.38 | 149 | 1.03 | 0.48 | 117 | 0.97 | 0.35 | 220 | 0.98 | 0.45 |
| Ind. 36 | 312 | 0.98 | 0.42 | 352 | 1.01 | 0.41 | 368 | 1.00 | 0.35 | 336 | 1.00 | 0.36 |
| Ind. 37 | 175 | 1.05 | 0.40 | 180 | 1.15 | 0.39 | 192 | 1.02 | 0.40 | 185 | 1.06 | 0.41 |
| Ind. 38 | 29 | 0.95 | 0.42 | 37 | 0.98 | 0.49 | 31 | 0.97 | 0.36 | 28 | 0.97 | 0.53 |
| Ind. 39 | 87 | 0.70 | 0.35 | 89 | 0.71 | 0.35 | 86 | 0.75 | 0.33 | 198 | 0.87 | 0.41 |
| Ind. 40 | 151 | 0.92 | 0.40 | 216 | 0.93 | 0.42 | 178 | 0.93 | 0.79 | 213 | 0.89 | 0.45 |
| Ind. 41 | 37 | 0.97 | 0.39 | 29 | 0.81 | 0.66 | 41 | 0.95 | 0.45 | 164 | 0.97 | 0.58 |
| *Total table (N>20)*[a] | *3 368* | *1.00* | *0.43* | *4 105* | *1.01* | *0.40* | *4 308* | *1.00* | *0.44* | *5 847* | *1.00* | *0.45* |
| *Total sample* | *3 918* | *1.00* | *0.48* | *4 937* | *1.00* | *0.43* | *5 250* | *1.00* | *0.46* | *6 860* | *1.00* | *0.47* |

*Source:* Central Statistics Office of Trinidad and Tobago and authors' calculations.

[a] The weighted standard deviation is presented in this row.
Ind.: Industry.
ROAW: Relative occupationally adjusted wage.
Dinc: ROAW based on weekly earnings.

TABLE 1.b

**Relative occupationally adjusted hourly wage (*Dinch*) across industry groups, four samples**

| ID | Sample 1: 1993/1994 | | | Sample 2: 1997 | | | Sample 3: 2001/2002 | | | Sample 4: 2007 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *N* | *Dinch* | *S* | *N* | *Dinch* | *S* | *N* | *Dinch* | *S* | *N* | *Dinch* | *S* |
| Ind. 1 | 139 | 0.94 | 0.37 | 129 | 0.99 | 0.43 | 114 | 0.97 | 0.36 | 27 | 0.92 | 0.23 |
| Ind. 2 | 29 | 1.26 | 1.35 | 32 | 0.93 | 0.40 | 25 | 0.96 | 0.62 | 121 | 1.00 | 0.55 |
| Ind. 3 | 38 | 1.13 | 0.36 | 45 | 1.05 | 0.38 | 34 | 1.07 | 0.35 | 35 | 1.00 | 0.30 |
| Ind. 4 | 63 | 1.31 | 0.72 | 60 | 1.35 | 0.53 | 66 | 1.31 | 0.52 | 87 | 1.30 | 0.59 |
| Ind. 5 | 31 | 0.95 | 0.82 | 41 | 0.93 | 0.40 | 47 | 1.07 | 0.57 | 49 | 0.95 | 0.37 |
| Ind. 6 | 22 | 0.97 | 0.52 | 29 | 0.90 | 0.33 | 32 | 1.05 | 0.54 | 29 | 0.88 | 0.29 |
| Ind. 7 | 37 | 0.87 | 0.41 | 58 | 1.88 | 6.48 | 40 | 0.98 | 0.58 | 34 | 0.96 | 0.43 |
| Ind. 8 | 23 | 1.09 | 0.49 | 35 | 1.19 | 0.58 | 35 | 1.24 | 0.50 | 43 | 1.19 | 0.65 |
| Ind. 9 | 60 | 1.34 | 0.54 | 46 | 1.38 | 0.48 | 45 | 1.51 | 0.61 | 70 | 1.38 | 0.53 |
| Ind. 10 | 29 | 0.97 | 0.39 | 23 | 1.07 | 0.37 | 33 | 1.11 | 0.52 | 45 | 1.12 | 0.47 |
| Ind. 11 | 18 | 1.20 | 0.57 | 25 | 1.11 | 0.41 | 23 | 1.28 | 0.52 | 27 | 1.08 | 0.38 |
| Ind. 12 | 29 | 1.25 | 0.89 | 24 | 0.82 | 0.37 | 20 | 0.89 | 0.39 | 69 | 0.85 | 0.27 |
| Ind. 13 | 39 | 1.52 | 0.80 | 46 | 1.35 | 0.57 | 37 | 1.40 | 0.74 | 39 | 1.30 | 0.47 |
| Ind. 14 | 38 | 1.03 | 0.34 | 41 | 1.19 | 0.43 | 41 | 1.12 | 0.28 | 44 | 1.20 | 0.44 |
| Ind. 15 | 130 | 1.04 | 0.66 | 279 | 0.99 | 0.42 | 364 | 0.97 | 0.44 | 641 | 0.99 | 0.50 |
| Ind. 16 | 226 | 1.01 | 0.38 | 231 | 0.99 | 0.33 | 250 | 1.00 | 0.42 | 276 | 1.03 | 0.75 |
| Ind. 17 | 26 | 1.07 | 0.62 | 38 | 0.94 | 0.36 | 76 | 1.07 | 0.39 | 89 | 1.02 | 0.40 |
| Ind. 18 | 43 | 0.95 | 0.43 | 39 | 1.02 | 0.65 | 57 | 1.08 | 0.70 | 77 | 1.05 | 0.52 |
| Ind. 19 | 93 | 0.98 | 0.71 | 89 | 0.89 | 0.47 | 104 | 0.87 | 0.48 | 154 | 0.90 | 0.46 |
| Ind. 20 | 24 | 0.88 | 0.38 | 32 | 1.04 | 0.30 | 22 | 1.11 | 0.37 | 20 | 1.05 | 0.30 |
| Ind. 21 | 71 | 0.80 | 0.34 | 73 | 0.76 | 0.24 | 77 | 0.84 | 0.43 | 105 | 0.97 | 0.70 |
| Ind. 22 | 63 | 1.07 | 0.62 | 84 | 1.00 | 0.58 | 75 | 1.12 | 1.23 | 129 | 1.20 | 0.75 |
| Ind. 23 | 21 | 0.80 | 0.45 | 27 | 0.88 | 0.35 | 42 | 0.97 | 0.43 | 21 | 0.99 | 0.33 |
| Ind. 24 | 102 | 0.95 | 0.43 | 141 | 0.95 | 0.51 | 135 | 0.88 | 0.49 | 245 | 0.98 | 0.53 |
| Ind. 25 | 99 | 0.78 | 0.38 | 159 | 0.81 | 0.30 | 171 | 0.89 | 0.42 | 355 | 0.85 | 0.48 |
| Ind. 26 | 48 | 0.96 | 0.54 | 54 | 0.92 | 0.48 | 62 | 1.05 | 0.47 | 57 | 1.09 | 0.51 |
| Ind. 27 | 77 | 0.91 | 0.49 | 83 | 0.90 | 0.43 | 85 | 0.91 | 0.41 | 310 | 0.96 | 0.39 |
| Ind. 28 | 35 | 1.25 | 0.58 | 41 | 1.11 | 0.49 | 41 | 1.17 | 0.63 | 48 | 1.20 | 0.53 |
| Ind. 29 | 41 | 1.19 | 0.43 | 56 | 1.24 | 0.48 | 38 | 1.15 | 0.37 | 26 | 0.97 | 0.46 |
| Ind. 30 | 60 | 1.12 | 0.49 | 62 | 1.24 | 0.44 | 83 | 1.22 | 0.55 | 61 | 1.19 | 0.65 |
| Ind. 31 | 95 | 1.08 | 0.41 | 163 | 1.04 | 0.39 | 141 | 1.10 | 0.45 | 109 | 1.03 | 0.35 |
| Ind. 32 | 77 | 0.99 | 0.42 | 82 | 1.95 | 8.43 | 75 | 1.00 | 0.52 | 70 | 1.00 | 0.53 |
| Ind. 33 | 126 | 0.86 | 0.40 | 224 | 0.88 | 0.38 | 184 | 0.86 | 0.37 | 322 | 0.96 | 0.41 |
| Ind. 34 | 376 | 1.04 | 0.41 | 414 | 1.23 | 3.28 | 545 | 1.01 | 0.32 | 603 | 1.06 | 0.39 |
| Ind. 35 | 72 | 1.00 | 0.35 | 141 | 1.02 | 0.47 | 115 | 0.99 | 0.33 | 213 | 0.97 | 0.43 |
| Ind. 36 | 205 | 1.17 | 5.22 | 287 | 0.87 | 0.46 | 269 | 0.81 | 0.37 | 274 | 0.85 | 0.46 |
| Ind. 37 | 171 | 1.30 | 3.75 | 177 | 1.13 | 0.39 | 188 | 1.01 | 0.38 | 182 | 1.04 | 0.39 |
| Ind. 38 | 29 | 0.95 | 0.47 | 37 | 1.01 | 0.49 | 30 | 0.97 | 0.53 | 27 | 0.99 | 0.55 |
| Ind. 39 | 86 | 0.68 | 0.31 | 89 | 0.70 | 0.35 | 85 | 0.71 | 0.34 | 196 | 0.86 | 0.42 |
| Ind. 40 | 149 | 1.01 | 0.48 | 214 | 0.99 | 0.49 | 175 | 0.97 | 0.76 | 210 | 0.92 | 0.40 |
| Ind. 41 | 37 | 1.01 | 0.49 | 27 | 0.81 | 0.60 | 40 | 0.91 | 0.39 | 160 | 1.01 | 0.59 |
| *Total table (N>20)*[a] | *3 177* | *1.03* | *0.96* | *3 977* | *1.04* | *0.98* | *4 121* | *0.99* | *0.45* | *5 699* | *1.00* | *0.48* |
| *Total sample* | *3 716* | *1.00* | *1.55* | *4 796* | *1.00* | *1.71* | *5 055* | *1.00* | *0.49* | *6 707* | *1.00* | *0.49* |

*Source:* Central Statistics Office of Trinidad and Tobago and authors' calculations.

[a] The weighted standard deviation is presented in this row.
Ind.: Industry.
ROAW: Relative occupationally adjusted wage.
Dinch: ROAW based on hourly earnings.

TABLE 2

**ROAW ranking, by period**

| ID | Weekly wages | | | | Hourly wages | | | |
|---|---|---|---|---|---|---|---|---|
| | 1993/1994 | 1997 | 2001/2002 | 2007 | 1993/1994 | 1997 | 2001/2002 | 2007 |
| | *Dinc* | *Dinc* | *Dinc* | *Dinc* | *Dinch* | *Dinch* | *Dinch* | *Dinch* |
| Ind. 1 | 22 | 22 | 25 | 38 | 33 | 24 | 26 | 34 |
| Ind. 2 | 30 | 33 | 34 | 28 | 5 | 29 | 31 | 21 |
| Ind. 3 | 6 | 20 | 16 | 20 | 11 | 15 | 15 | 20 |
| Ind. 4 | 4 | 3 | 3 | 2 | 3 | 4 | 3 | 2 |
| Ind. 5 | 19 | 26 | 17 | 34 | 32 | 28 | 17 | 33 |
| Ind. 6 | 25 | 36 | 18 | 36 | 26 | 32 | 18 | 37 |
| Ind. 7 | 34 | 23 | 30 | 19 | 36 | 2 | 25 | 32 |
| Ind. 8 | 8 | 6 | 5 | 6 | 13 | 10 | 5 | 7 |
| Ind. 9 | 3 | 1 | 1 | 1 | 2 | 3 | 1 | 1 |
| Ind. 10 | 24 | 11 | 12 | 10 | 27 | 14 | 11 | 9 |
| Ind. 11 | 10 | 9 | 4 | 13 | 8 | 12 | 4 | 11 |
| Ind. 12 | 35 | 37 | 35 | 41 | 7 | 37 | 34 | 41 |
| Ind. 13 | 1 | 2 | 2 | 3 | 1 | 5 | 2 | 3 |
| Ind. 14 | 9 | 7 | 7 | 4 | 19 | 9 | 10 | 4 |
| Ind. 15 | 29 | 28 | 29 | 25 | 18 | 25 | 28 | 23 |
| Ind. 16 | 18 | 18 | 24 | 24 | 22 | 22 | 23 | 17 |
| Ind. 17 | 28 | 31 | 15 | 16 | 15 | 27 | 16 | 18 |
| Ind. 18 | 16 | 21 | 19 | 15 | 30 | 19 | 14 | 13 |
| Ind. 19 | 32 | 35 | 39 | 35 | 25 | 33 | 37 | 36 |
| Ind. 20 | 37 | 13 | 9 | 11 | 35 | 16 | 12 | 14 |
| Ind. 21 | 39 | 40 | 40 | 33 | 39 | 40 | 39 | 27 |
| Ind. 22 | 11 | 16 | 14 | 8 | 16 | 21 | 9 | 5 |
| Ind. 23 | 38 | 34 | 26 | 18 | 38 | 35 | 27 | 24 |
| Ind. 24 | 27 | 27 | 38 | 26 | 31 | 26 | 36 | 26 |
| Ind. 25 | 40 | 38 | 36 | 40 | 40 | 39 | 35 | 39 |
| Ind. 26 | 21 | 24 | 11 | 9 | 28 | 30 | 19 | 10 |
| Ind. 27 | 33 | 30 | 33 | 30 | 34 | 31 | 32 | 30 |
| Ind. 28 | 2 | 12 | 8 | 7 | 6 | 13 | 7 | 6 |
| Ind. 29 | 5 | 5 | 10 | 23 | 9 | 6 | 8 | 29 |
| Ind. 30 | 7 | 4 | 6 | 5 | 12 | 7 | 6 | 8 |
| Ind. 31 | 12 | 14 | 13 | 17 | 14 | 17 | 13 | 16 |
| Ind. 32 | 15 | 17 | 20 | 22 | 24 | 1 | 22 | 22 |
| Ind. 33 | 36 | 32 | 37 | 32 | 37 | 34 | 38 | 31 |
| Ind. 34 | 13 | 10 | 21 | 14 | 17 | 8 | 20 | 12 |
| Ind. 35 | 17 | 15 | 27 | 27 | 23 | 18 | 24 | 28 |
| Ind. 36 | 20 | 19 | 23 | 21 | 10 | 36 | 40 | 40 |
| Ind. 37 | 14 | 8 | 22 | 12 | 4 | 11 | 21 | 15 |
| Ind. 38 | 26 | 25 | 28 | 31 | 29 | 20 | 29 | 25 |
| Ind. 39 | 41 | 41 | 41 | 39 | 41 | 41 | 41 | 38 |
| Ind. 40 | 31 | 29 | 32 | 37 | 21 | 23 | 30 | 35 |
| Ind. 41 | 23 | 39 | 31 | 29 | 20 | 38 | 33 | 19 |

*Source:* Central Statistics Office of Trinidad and Tobago and authors' calculations.

ROAW: Relative occupationally adjusted wage.
*Dinch*: ROAW based on hourly earnings.
*Dinc*: ROAW based on weekly earnings.
Ind.: Industry.

1993/1994 and 2001/2002, roughly 50% of industries had a rank difference of three or less. The average rank difference from 1993/1994 increased from 4.3 in 1997 to 6.8 in 2007.

With respect to hourly wages (*Dinch*), in the 2007 sample 32% of the industries were ranked within and up to three places from their 1993/1994 rank. In the eight-year period between 1993/1994 and 2001/2002, 39% of industries maintained their relative position within and up to three places. The average rank change ranged from 5.6 (2001/2002 compared with 2007) to 8.7 (1993/1994 compared with 2007).

The information in table 3 suggests a significant degree of stability over time in the ranking of industry groups. This finding is further supported by the information presented in table 4.

TABLE 3

**Movements in ROAW ranking, 1997-2007**

| | | | 1997 | | 2001/2002 | | 2007 | |
|---|---|---|---|---|---|---|---|---|
| | | | *Dinc* | *Dinch* | *Dinc* | *Dinch* | *Dinc* | *Dinch* |
| 1993/1994 | Change in rank | | | | | | | |
| | | 0 | 5.00 | 2.00 | 4.00 | 4.00 | 1.00 | 1.00 |
| | | 1 to 3 | 23.00 | 12.00 | 16.00 | 12.00 | 16.00 | 12.00 |
| | | Greater than 3 | 13.00 | 27.00 | 21.00 | 25.00 | 24.00 | 28.00 |
| | Average rank change | | 4.29 | 8.39 | 5.22 | 7.90 | 6.83 | 8.68 |
| 1997 | | 0 | | | 6.00 | 2.00 | 7.00 | 2.00 |
| | | 1 to 3 | | | 15.00 | 14.00 | 12.00 | 13.00 |
| | | Greater than 3 | | | 20.00 | 25.00 | 22.00 | 26.00 |
| | Average rank change | | | | 4.83 | 5.95 | 5.07 | 7.12 |
| 2001/2002 | | 0 | | | | | 3.00 | 3.00 |
| | | 1 to 3 | | | | | 16.00 | 14.00 |
| | | Greater than 3 | | | | | 22.00 | 24.00 |
| | Average rank change | | | | | | 5.02 | 5.61 |

*Source:* Central Statistics Office of Trinidad and Tobago and authors' calculations.

ROAW: Relative occupationally adjusted wage.
*Dinch*: ROAW based on hourly earnings.
*Dinc*: ROAW based on weekly earnings.

TABLE 4

**Selected statistics, 1997-2007**

| | | 1997 | | 2001/2002 | | 2007 | |
|---|---|---|---|---|---|---|---|
| | | *Dinc* | *Dinch* | *Dinc* | *Dinch* | *Dinc* | *Dinch* |
| 1993/1994 | Correlation coefficient | 0.839* | 0.318** | 0.825* | 0.660* | 0.735* | 0.572* |
| | P-value (equality of variance) | 0.514 | 0.0142 | 0.478 | 0.661 | 0.091 | 0.066 |
| | Spearman rank correlation | 0.842* | 0.499* | 0.806* | 0.555* | 0.700* | 0.508* |
| 1997 | Correlation coefficient | | | 0.880* | 0.496* | 0.813* | 0.441* |
| | P-value (equality of variance) | | | 0.955 | 0.004 | 0.324 | 0.000 |
| | Spearman rank correlation | | | 0.839* | 0.777* | 0.819* | 0.663* |
| 2001/2002 | Correlation coefficient | | | | | 0.839* | 0.862* |
| | P-value (equality of variance) | | | | | 0.297 | 0.159 |
| | Spearman rank correlation | | | | | 0.837* | 0.807* |

*Source:* Central Statistics Office of Trinidad and Tobago and authors' calculations.

** Significant at 5%.
* Significant at 1%.
ROAW: Relative occupationally adjusted wage.
Dinch: ROAW based on hourly earnings.
Dinc: ROAW based on weekly earnings.

Table 4 shows that there is a strong positive correlation between the ROAW in each of the six possible pairs of samples.

With regard to weekly wages, the correlation coefficient ranges from 0.88 (1997-2001/2002) to 0.74 (1993/1994-2007). The Spearman rank correlation coefficient ranges from 0.84 (1993/1994-1997) to 0.70 (1993/1994-2007), suggesting that a group's ranking in one sample is a fairly good indication of what its ranking would be in other samples.

With respect to hourly wages, the Pearson correlation coefficient ranges from 0.86 (2001/2002-2007) to 0.32 (1993/1994-1997). The Spearman rank correlation coefficient ranges from 0.81 (2001/2002-2007) to 0.5 (1993/1994-1997).

Table 4 also presents the p-values for the F-test of variances. For the most part, the null hypothesis of equality of variances cannot be rejected for *Dinc* (weekly wages) at conventional levels of significance, as the probability of type 1 error ranges from 0.30 (2001/2002 and 2007) to 0.51 (1993/1994 and 1997).[7] This suggests that by and large, the ROAWs in the various samples have the same distributional spread.

The hypothesis of equality of variances between the various *Dinch* (hourly wages) is rejected for all sample pairs except the 1993/1994-2001/2002 and the 2001/2002-2007 pairs. The volatility in variances from sample to sample stems from temporal instability in the relative hours worked.

Table 5 presents the ROAW for industry groups in each sample sorted into three tiers. The first tier consists of those industry groups whose ROAW is greater than one and which have p-values (two-tailed) of less than 0.30 or, equivalently, 0.15 (one-tailed). The second tier consists of those groups whose ROAW was found not to be significantly different from one in the two-tailed test (p-value > 0.30). The last tier comprises groups whose ROAW is significantly less than one. Table 6a summarizes the findings of table 5 with respect to the first tier, while table 6b summarizes the last tier.

Analysis of the ROAW based on weekly wages is presented in tables 5a, 6a and 6b. The size of tier 1 ranges from 12 groups (2007) to 14 groups (1997 and 2001/2002). Eight industry groups are found in each of the four tier 1 groupings, and 12 are common to at least three samples (see table 6a).

An analysis of the third tier reveals that the number of groups in this tier ranges from 10 (2001/2002 and 2007) to 14 (1997). A total of seven industry groups were common to all four samples, and a further two groups were found in three of the sample periods (see table 6b).

With respect to the ROAW based on *Dinch* (hourly wages) (see tables 5b, 6a and 6b), the size of tier 1 ranges from 12 (samples 1, 2 and 4) to 15 (sample 3). A total of seven industry groups were in tier 1 in each of the four samples, with a further five industry groups found in three of the four tier 1 groupings (see table 6a).

The size of tier 3 ranges from 10 industry groups (sample 1 and sample 4) to 15 (sample 2). A total of nine industry groups were found in this tier at least three times over the four samples, with four of them being common to all samples.

Tables 5 and 6 suggest that the average employee, with knowledge only of the weekly wages of his occupational cohort, will probably perceive that there are about eight to 12 industry groups that pay an above-average wage for a given occupation type. He will also perceive that there are seven to nine industry groups that pay less than the average wage for a given occupation. The remaining industry groups seemingly tend to pay wages that are about average.

If this employee also has knowledge of the hours worked by his occupational cohorts, he or she will probably conclude that of the 41 industry groups under consideration, seven to 12 of them pay above average for a given occupation type. He or she may also perceive that between four and nine industry groups consistently pay below average for a given occupation.

## 3. Adjusting for labour quality

Having established that there is a stable inter-industry wage distribution, it is important to determine whether these wage differentials disappear when other factors that influence wages are considered. Experience is one such factor, as are education and, as numerous studies show, gender.

Age is used as a proxy for experience, two dummy variables for secondary and tertiary education are used to capture the education effect, and a dummy variable "male" is used to capture the gender effect.

The following equation was estimated for the first and third samples:

$$Dinc_{ij} = \alpha + \beta_1 Age + \beta_2 Tert + \beta_3 Sec + \beta_4 Male \quad (4)$$

[7] The sample pair 1993/1994 and 2007 is an exception, as the null hypothesis was rejected at the 10% level of significance; this result is consistent with the visual representation in figure 1.

TABLE 5.a

**ROAW (weekly wage) ranking of industry groups by their significance from 1, four samples**

| | Sample 1: 1993/1994 | | | Sample 2: 1997 | | | Sample 3: 2001/2002 | | | Sample 4: 2007 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Code | *Dinc* | P-value | Code | *Dinc* | P-value | Code | *Dinc* | P-value | Code | *Dinc* | P-value |
| Tier 1 | Ind. 9 | 1.31 | 0.00 | Ind. 34 | 1.09 | 0.00 | Ind. 9 | 1.46 | 0.00 | Ind. 9 | 1.35 | 0.00 |
| | Ind. 13 | 1.52 | 0.00 | Ind. 9 | 1.35 | 0.00 | Ind. 4 | 1.30 | 0.00 | Ind. 4 | 1.32 | 0.00 |
| | Ind. 29 | 1.25 | 0.00 | Ind. 37 | 1.15 | 0.00 | Ind. 13 | 1.38 | 0.00 | Ind. 13 | 1.25 | 0.00 |
| | Ind. 4 | 1.27 | 0.00 | Ind. 4 | 1.29 | 0.00 | Ind. 30 | 1.20 | 0.00 | Ind. 14 | 1.23 | 0.00 |
| | Ind. 28 | 1.38 | 0.00 | Ind. 30 | 1.24 | 0.00 | Ind. 14 | 1.14 | 0.00 | Ind. 34 | 1.05 | 0.00 |
| | Ind. 34 | 1.06 | 0.00 | Ind. 13 | 1.33 | 0.00 | Ind. 11 | 1.28 | 0.01 | Ind. 22 | 1.19 | 0.00 |
| | Ind. 3 | 1.15 | 0.01 | Ind. 29 | 1.23 | 0.00 | Ind. 8 | 1.24 | 0.01 | Ind. 28 | 1.20 | 0.01 |
| | Ind. 31 | 1.10 | 0.01 | Ind. 14 | 1.20 | 0.00 | Ind. 31 | 1.09 | 0.01 | Ind. 30 | 1.20 | 0.01 |
| | Ind. 14 | 1.12 | 0.02 | Ind. 8 | 1.23 | 0.03 | Ind. 29 | 1.12 | 0.02 | Ind. 26 | 1.17 | 0.03 |
| | Ind. 30 | 1.14 | 0.03 | Ind. 10 | 1.09 | 0.15 | Ind. 26 | 1.12 | 0.08 | Ind. 8 | 1.20 | 0.03 |
| | Ind. 37 | 1.05 | 0.10 | Ind. 11 | 1.10 | 0.16 | Ind. 34 | 1.02 | 0.09 | Ind. 37 | 1.06 | 0.04 |
| | Ind. 22 | 1.10 | 0.19 | Ind. 31 | 1.04 | 0.17 | Ind. 28 | 1.12 | 0.11 | Ind. 10 | 1.13 | 0.04 |
| | Ind. 8 | 1.13 | 0.22 | Ind. 28 | 1.08 | 0.21 | Ind. 17 | 1.07 | 0.14 | | | |
| | | | | Ind. 20 | 1.06 | 0.28 | Ind. 20 | 1.12 | 0.22 | | | |
| | | | | | | | Ind. 3 | 1.06 | 0.30 | | | |
| | | | | | | | Ind. 10 | 1.09 | 0.30 | | | |
| Tier 2 | Ind. 1 | 0.97 | 0.35 | Ind. 35 | 1.03 | 0.43 | Ind. 35 | 0.97 | 0.33 | Ind. 21 | 0.95 | 0.36 |
| | Ind. 11 | 1.11 | 0.35 | Ind. 24 | 0.98 | 0.68 | Ind. 2 | 0.92 | 0.42 | Ind. 20 | 1.06 | 0.37 |
| | Ind. 36 | 0.98 | 0.41 | Ind. 22 | 1.03 | 0.69 | Ind. 37 | 1.02 | 0.42 | Ind. 17 | 1.04 | 0.40 |
| | Ind. 17 | 0.95 | 0.44 | Ind. 16 | 1.01 | 0.69 | Ind. 5 | 1.06 | 0.45 | Ind. 18 | 1.05 | 0.41 |
| | Ind. 2 | 0.94 | 0.50 | Ind. 36 | 1.01 | 0.72 | Ind. 41 | 0.95 | 0.51 | Ind. 35 | 0.98 | 0.42 |
| | Ind. 32 | 1.03 | 0.51 | Ind. 32 | 1.02 | 0.73 | Ind. 22 | 1.08 | 0.55 | Ind. 11 | 1.05 | 0.44 |
| | Ind. 38 | 0.95 | 0.56 | Ind. 26 | 0.98 | 0.82 | Ind. 38 | 0.97 | 0.60 | Ind. 2 | 0.97 | 0.47 |
| | Ind. 16 | 1.01 | 0.61 | Ind. 5 | 0.98 | 0.82 | Ind. 1 | 0.98 | 0.63 | Ind. 41 | 0.97 | 0.51 |
| | Ind. 41 | 0.97 | 0.62 | Ind. 38 | 0.98 | 0.84 | Ind. 6 | 1.04 | 0.64 | Ind. 31 | 1.02 | 0.51 |
| | Ind. 10 | 0.97 | 0.62 | Ind. 1 | 1.00 | 0.92 | Ind. 32 | 1.03 | 0.66 | Ind. 15 | 0.99 | 0.60 |
| | Ind. 26 | 0.98 | 0.71 | Ind. 7 | 0.99 | 0.93 | Ind. 18 | 1.04 | 0.67 | Ind. 38 | 0.97 | 0.74 |
| | Ind. 6 | 0.97 | 0.73 | Ind. 3 | 1.00 | 0.96 | Ind. 7 | 0.96 | 0.70 | Ind. 16 | 0.99 | 0.75 |
| | Ind. 18 | 1.02 | 0.73 | Ind. 18 | 1.00 | 0.97 | Ind. 23 | 0.98 | 0.72 | Ind. 23 | 1.02 | 0.78 |
| | Ind. 35 | 1.01 | 0.73 | | | | Ind. 36 | 1.00 | 0.85 | Ind. 24 | 0.99 | 0.78 |
| | Ind. 5 | 1.01 | 0.96 | | | | Ind. 16 | 1.00 | 0.99 | Ind. 7 | 1.01 | 0.88 |
| | | | | | | | | | | Ind. 3 | 1.01 | 0.90 |
| | | | | | | | | | | Ind. 29 | 0.99 | 0.92 |
| | | | | | | | | | | Ind. 32 | 1.00 | 0.94 |
| | | | | | | | | | | Ind. 36 | 1.00 | 0.97 |
| Tier 3 | Ind. 39 | 0.70 | 0.00 | Ind. 21 | 0.77 | 0.00 | Ind. 39 | 0.75 | 0.00 | Ind. 25 | 0.85 | 0.00 |
| | Ind. 21 | 0.80 | 0.00 | Ind. 39 | 0.71 | 0.00 | Ind. 33 | 0.89 | 0.00 | Ind. 39 | 0.87 | 0.00 |
| | Ind. 25 | 0.79 | 0.00 | Ind. 25 | 0.84 | 0.00 | Ind. 21 | 0.82 | 0.00 | Ind. 12 | 0.85 | 0.00 |
| | Ind. 33 | 0.88 | 0.00 | Ind. 33 | 0.89 | 0.00 | Ind. 25 | 0.90 | 0.00 | Ind. 40 | 0.89 | 0.00 |
| | Ind. 40 | 0.92 | 0.02 | Ind. 40 | 0.93 | 0.01 | Ind. 19 | 0.87 | 0.00 | Ind. 1 | 0.89 | 0.01 |
| | Ind. 20 | 0.86 | 0.03 | Ind. 19 | 0.89 | 0.01 | Ind. 24 | 0.89 | 0.01 | Ind. 19 | 0.92 | 0.03 |
| | Ind. 23 | 0.80 | 0.04 | Ind. 27 | 0.91 | 0.04 | Ind. 27 | 0.92 | 0.03 | Ind. 33 | 0.96 | 0.08 |
| | Ind. 27 | 0.90 | 0.08 | Ind. 6 | 0.88 | 0.05 | Ind. 15 | 0.96 | 0.04 | Ind. 6 | 0.91 | 0.12 |
| | Ind. 15 | 0.95 | 0.11 | Ind. 23 | 0.89 | 0.07 | Ind. 12 | 0.91 | 0.25 | Ind. 27 | 0.97 | 0.15 |
| | Ind. 12 | 0.88 | 0.11 | Ind. 15 | 0.96 | 0.10 | Ind. 40 | 0.93 | 0.26 | Ind. 5 | 0.95 | 0.27 |
| | Ind. 7 | 0.90 | 0.13 | Ind. 12 | 0.88 | 0.10 | | | | | | |
| | Ind. 19 | 0.91 | 0.17 | Ind. 41 | 0.81 | 0.12 | | | | | | |
| | Ind. 24 | 0.95 | 0.24 | Ind. 17 | 0.91 | 0.14 | | | | | | |
| | | | | Ind. 2 | 0.89 | 0.23 | | | | | | |

*Source:* Central Statistics Office of Trinidad and Tobago and authors' calculations.

ROAW: Relative occupationally adjusted wage.
Dinc: ROAW based on weekly earnings.
Ind.: Industry.

TABLE 5.b

**ROAW (hourly wage) ranking of industry groups by their significance from 1, four samples**

| | Sample 1: 1993/1994 | | | Sample 2: 1997 | | | Sample 3: 2001/2002 | | | Sample 4: 2007 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Code | *Dinch* | P-value | Code | *Dinch* | P-value | Code | *Dinch* | P-value | Code | *Dinch* | P-value |
| Tier 1 | Ind. 9 | 1.34 | 0.00 | Ind. 9 | 1.38 | 0.00 | Ind. 9 | 1.51 | 0.00 | Ind. 9 | 1.38 | 0.00 |
| | Ind. 13 | 1.52 | 0.00 | Ind. 4 | 1.35 | 0.00 | Ind. 4 | 1.31 | 0.00 | Ind. 4 | 1.30 | 0.00 |
| | Ind. 4 | 1.31 | 0.00 | Ind. 37 | 1.13 | 0.00 | Ind. 30 | 1.22 | 0.00 | Ind. 34 | 1.06 | 0.00 |
| | Ind. 29 | 1.19 | 0.00 | Ind. 30 | 1.24 | 0.00 | Ind. 13 | 1.40 | 0.00 | Ind. 13 | 1.30 | 0.00 |
| | Ind. 28 | 1.25 | 0.01 | Ind. 13 | 1.35 | 0.00 | Ind. 8 | 1.24 | 0.00 | Ind. 14 | 1.20 | 0.00 |
| | Ind. 3 | 1.13 | 0.03 | Ind. 29 | 1.24 | 0.00 | Ind. 14 | 1.12 | 0.01 | Ind. 22 | 1.20 | 0.00 |
| | Ind. 34 | 1.04 | 0.05 | Ind. 14 | 1.19 | 0.00 | Ind. 11 | 1.28 | 0.01 | Ind. 28 | 1.20 | 0.01 |
| | Ind. 30 | 1.12 | 0.06 | Ind. 8 | 1.19 | 0.05 | Ind. 31 | 1.10 | 0.01 | Ind. 30 | 1.19 | 0.03 |
| | Ind. 31 | 1.08 | 0.07 | Ind. 28 | 1.11 | 0.14 | Ind. 29 | 1.15 | 0.02 | Ind. 8 | 1.19 | 0.05 |
| | Ind. 12 | 1.25 | 0.13 | Ind. 34 | 1.23 | 0.15 | Ind. 28 | 1.17 | 0.08 | Ind. 10 | 1.12 | 0.09 |
| | Ind. 11 | 1.20 | 0.14 | Ind. 11 | 1.11 | 0.17 | Ind. 17 | 1.07 | 0.11 | Ind. 37 | 1.04 | 0.18 |
| | Ind. 37 | 1.30 | 0.30 | Ind. 31 | 1.04 | 0.17 | Ind. 20 | 1.11 | 0.19 | Ind. 26 | 1.09 | 0.19 |
| | | | | | | | Ind. 10 | 1.11 | 0.22 | Ind. 11 | 1.08 | 0.29 |
| | | | | | | | Ind. 3 | 1.07 | 0.23 | | | |
| | | | | | | | Ind. 34 | 1.01 | 0.29 | | | |
| Tier 2 | Ind. 2 | 1.26 | 0.31 | Ind. 7 | 1.88 | 0.30 | Ind. 18 | 1.08 | 0.37 | Ind. 31 | 1.03 | 0.33 |
| | Ind. 22 | 1.07 | 0.39 | Ind. 32 | 1.95 | 0.31 | Ind. 22 | 1.12 | 0.38 | Ind. 35 | 0.97 | 0.33 |
| | Ind. 8 | 1.09 | 0.39 | Ind. 2 | 0.93 | 0.33 | Ind. 5 | 1.07 | 0.40 | Ind. 5 | 0.95 | 0.39 |
| | Ind. 18 | 0.95 | 0.46 | Ind. 3 | 1.05 | 0.33 | Ind. 1 | 0.97 | 0.44 | Ind. 18 | 1.05 | 0.41 |
| | Ind. 15 | 1.04 | 0.54 | Ind. 10 | 1.07 | 0.39 | Ind. 26 | 1.05 | 0.45 | Ind. 16 | 1.03 | 0.48 |
| | Ind. 17 | 1.07 | 0.55 | Ind. 20 | 1.04 | 0.40 | Ind. 40 | 0.97 | 0.55 | Ind. 20 | 1.05 | 0.50 |
| | Ind. 38 | 0.95 | 0.59 | Ind. 15 | 0.99 | 0.61 | Ind. 6 | 1.05 | 0.61 | Ind. 24 | 0.98 | 0.54 |
| | Ind. 14 | 1.03 | 0.63 | Ind. 35 | 1.02 | 0.66 | Ind. 23 | 0.97 | 0.67 | Ind. 7 | 0.96 | 0.56 |
| | Ind. 26 | 0.96 | 0.64 | Ind. 40 | 0.99 | 0.74 | Ind. 38 | 0.97 | 0.73 | Ind. 17 | 1.02 | 0.63 |
| | Ind. 36 | 1.17 | 0.64 | Ind. 1 | 0.99 | 0.76 | Ind. 2 | 0.96 | 0.74 | Ind. 21 | 0.97 | 0.71 |
| | Ind. 10 | 0.97 | 0.70 | Ind. 16 | 0.99 | 0.80 | Ind. 37 | 1.01 | 0.75 | Ind. 29 | 0.97 | 0.71 |
| | Ind. 5 | 0.95 | 0.71 | Ind. 18 | 1.02 | 0.88 | Ind. 35 | 0.99 | 0.78 | Ind. 15 | 0.99 | 0.80 |
| | Ind. 6 | 0.97 | 0.80 | Ind. 38 | 1.01 | 0.94 | Ind. 7 | 0.98 | 0.86 | Ind. 38 | 0.99 | 0.91 |
| | Ind. 32 | 0.99 | 0.81 | Ind. 22 | 1.00 | 0.98 | Ind. 16 | 1.00 | 0.97 | Ind. 41 | 1.01 | 0.91 |
| | Ind. 19 | 0.98 | 0.81 | | | | Ind. 32 | 1.00 | 0.98 | Ind. 2 | 1.00 | 0.93 |
| | Ind. 16 | 1.01 | 0.82 | | | | | | | Ind. 32 | 1.00 | 0.94 |
| | Ind. 40 | 1.01 | 0.85 | | | | | | | Ind. 23 | 0.99 | 0.94 |
| | Ind. 41 | 1.01 | 0.87 | | | | | | | Ind. 3 | 1.00 | 0.95 |
| | Ind. 35 | 1.00 | 0.94 | | | | | | | | | |
| Tier 3 | Ind. 39 | 0.68 | 0.00 | Ind. 21 | 0.76 | 0.00 | Ind. 36 | 0.81 | 0.00 | Ind. 25 | 0.85 | 0.00 |
| | Ind. 25 | 0.78 | 0.00 | Ind. 25 | 0.81 | 0.00 | Ind. 39 | 0.71 | 0.00 | Ind. 36 | 0.85 | 0.00 |
| | Ind. 21 | 0.80 | 0.00 | Ind. 39 | 0.70 | 0.00 | Ind. 33 | 0.86 | 0.00 | Ind. 12 | 0.85 | 0.00 |
| | Ind. 33 | 0.86 | 0.00 | Ind. 36 | 0.87 | 0.00 | Ind. 25 | 0.89 | 0.00 | Ind. 39 | 0.86 | 0.00 |
| | Ind. 23 | 0.80 | 0.04 | Ind. 33 | 0.88 | 0.00 | Ind. 21 | 0.84 | 0.00 | Ind. 40 | 0.92 | 0.00 |
| | Ind. 1 | 0.94 | 0.04 | Ind. 12 | 0.82 | 0.02 | Ind. 24 | 0.88 | 0.00 | Ind. 19 | 0.90 | 0.01 |
| | Ind. 7 | 0.87 | 0.05 | Ind. 19 | 0.89 | 0.03 | Ind. 19 | 0.87 | 0.00 | Ind. 6 | 0.88 | 0.03 |
| | Ind. 27 | 0.91 | 0.09 | Ind. 27 | 0.90 | 0.04 | Ind. 27 | 0.91 | 0.05 | Ind. 33 | 0.96 | 0.07 |
| | Ind. 20 | 0.88 | 0.12 | Ind. 23 | 0.88 | 0.08 | Ind. 41 | 0.91 | 0.15 | Ind. 27 | 0.96 | 0.07 |
| | Ind. 24 | 0.95 | 0.25 | Ind. 6 | 0.90 | 0.09 | Ind. 12 | 0.89 | 0.22 | Ind. 1 | 0.92 | 0.09 |
| | | | | Ind. 41 | 0.81 | 0.10 | Ind. 15 | 0.97 | 0.22 | | | |
| | | | | Ind. 26 | 0.92 | 0.20 | | | | | | |
| | | | | Ind. 24 | 0.95 | 0.28 | | | | | | |
| | | | | Ind. 17 | 0.94 | 0.28 | | | | | | |
| | | | | Ind. 5 | 0.93 | 0.29 | | | | | | |

*Source:* Central Statistics Office of Trinidad and Tobago and authors' calculations.

ROAW: Relative occupationally adjusted wage.
Dinch: ROAW based on hourly earnings.
Ind.: Industry.

TABLE 6.a

**Summary of tier 1**

| 4 occurrences | | 3 occurrences | | 2 occurrences | | 1 occurrence | |
|---|---|---|---|---|---|---|---|
| *Dinc* | *Dinch* | *Dinc* | *Dinch* | *Dinc* | *Dinch* | *Dinc* | *Dinch* |
| Ind. 4 | Ind. 4 | Ind. 10 | Ind. 8 | Ind. 3 | Ind. 3 | Ind. 17 | Ind. 12 |
| Ind. 8 | Ind. 9 | Ind. 29 | Ind. 14 | Ind. 11 | Ind. 10 | | Ind. 17 |
| Ind. 9 | Ind. 11 | Ind. 31 | Ind. 29 | Ind. 20 | | | Ind. 20 |
| Ind. 13 | Ind. 13 | Ind. 37 | Ind. 31 | Ind. 22 | | | Ind. 22 |
| Ind. 14 | Ind. 28 | | Ind. 37 | Ind. 26 | | | Ind. 26 |
| Ind. 28 | Ind. 30 | | | | | | |
| Ind. 30 | Ind. 34 | | | | | | |
| Ind. 34 | | | | | | | |

*Source:* Central Statistics Office of Trinidad and Tobago and authors' calculations.

ROAW: Relative occupationally adjusted wage.
*Dinch:* ROAW based on hourly earnings.
*Dinc:* ROAW based on weekly earnings.

TABLE 6.b

**Summary of tier 3**

| 4 occurrences | | 3 occurrences | | 2 occurrences | | 1 occurrence | |
|---|---|---|---|---|---|---|---|
| *Dinc* | *Dinch* | *Dinc* | *Dinch* | *Dinc* | *Dinch* | *Dinc* | *Dinch* |
| Ind. 12 | Ind. 25 | Ind. 15 | Ind. 12 | Ind. 6 | Ind. 1 | Ind. 1 | Ind. 5 |
| Ind. 19 | Ind. 27 | Ind. 21 | Ind. 19 | Ind. 23 | Ind. 6 | Ind. 2 | Ind. 7 |
| Ind. 25 | Ind. 33 | | Ind. 21 | Ind. 24 | Ind. 23 | Ind. 5 | Ind. 15 |
| Ind. 27 | Ind. 39 | | Ind. 24 | | Ind. 41 | Ind. 7 | Ind. 17 |
| Ind. 33 | | | Ind. 36 | | | Ind. 17 | Ind. 20 |
| Ind. 39 | | | | | | Ind. 20 | Ind. 26 |
| Ind. 40 | | | | | | Ind. 41 | Ind. 40 |

*Source:* Central Statistics Office of Trinidad and Tobago and authors' calculations.

ROAW: Relative occupationally adjusted wage.
*Dinch:* ROAW based on hourly earnings.
*Dinc:* ROAW based on weekly earnings.
Ind.: Industry.

TABLE 7

**Regression coefficients, two samples**

| | Weekly wage | | | | | Hourly wage | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Sample 1: 1993/1994 | $R^2$ = 0.107 Adjusted $R^2$ = 0.106 F-statistic = 117.4 | | | | | $R^2$ = 0.008 Adjusted $R^2$ = 0.007 F-statistic =7.65 | | | | |
| Sample 2: 2001/2002 | $R^2$ = 0.07 Adjusted $R^2$ =0.069 F-statistic = 98.8 | | | | | $R^2$ = 0.057 Adjusted $R^2$ = 0.056 F-statistic = 76.6 | | | | |
| | $\alpha$ | $\beta_1$ | $\beta_2$ | $\beta_3$ | $\beta_4$ | $\alpha$ | $\beta_1$ | $\beta_2$ | $\beta_3$ | $\beta_4$ |
| Sample 1: 1993/1994 | 0.368*** | 0.014*** | 0.136*** | 0.109*** | 0.099*** | 0.453*** | 0.013*** | 0.017 | 0.106* | 0.119** |
| Sample 2: 2001/2002 | 0.497*** | 0.010*** | 0.172*** | 0.109*** | 0.109*** | 0.515*** | 0.1*** | 0.08*** | 0.94*** | 0.111*** |

*Source:* Central Statistics Office of Trinidad and Tobago and authors' calculations.

* Significant at 10%; ** Significant at 5%; *** Significant at 1%.

Equation (4) is estimated separately for sample 1 (1993/1994) and sample 3 (2001/2002).[8] The regression coefficients are presented in table 7.

For the most part, the coefficients were significant at conventional levels of significance. The explanatory power of the model is limited, however, as the fitted model with the highest $R^2$ only explained 10.7% of the variance in in that sample (1993/1994).[9]

Table 8 presents the adjusted/unexplained ROAW —the difference between the actual $Dinc_k$ and the $Dinc_k$ calculated using the estimated regression coefficients. The table follows the format of table 5 above, where tier 1 consists of those industry groups whose unexplained $Dinc_k$ is greater than 0 and the p-value (two-tailed) is less than 30%. Tier 2 comprises those whose p-value is greater than 30%. Tier 3 contains groups whose unexplained $Dinc_k$ is less than 0 and whose p-value is less than 0.3. The unadjusted *Dinc* and *Dinch* found in table 5 for the relevant samples are also reproduced in table 8 for comparison purposes.

A comparison of adjusted and unadjusted *Dinc* and *Dinch* is summarized in table 9.

With respect to the ROAW based on weekly wages:

- In the 1993/1994 sample, 12 of the 13 groups in the adjusted tier 1 were also in the unadjusted tier 1.
- In the 2001/2002 sample, 11 of the 14 groups in tier 1 adjusted were also in tier 1 unadjusted.
- In the 1993/1994 sample, 11 of the 15 categories in the adjusted tier 2 were also in the unadjusted tier 2.
- In the 2001/2002 sample, 12 of the 17 groups in the adjusted tier 2 were common to the unadjusted tier 2.
- In the 1993/1994 sample, eight of the 11 groups in the adjusted tier 3 were common to the unadjusted tier 3.
- In the 2001/2002 sample, there were seven groups common to the adjusted and unadjusted tier 3.

With respect to the ROAW based on hourly wages, 62.5% to 78% of the groups in each adjusted tier are common to the respective unadjusted tier.

The above analysis suggests that inter-industry wage differentials persist even after compensating for inter-industry differences in experience, education and sex. Further, the industry wage hierarchy that would be perceived by individuals with knowledge only of the wages of their occupational cohort seems to be roughly consistent with the hierarchy that takes into account differences in labour quality across industries.

[8] The data needed for the above regression were made available for these samples only.

[9] We experimented with other model specifications, but there was no significant difference in the explanatory power of the model.

TABLE 8.a

**Unexplained ROAW (weekly) after accounting for industry differences in labour quality, two samples**

| | Sample 1: 1993/1994 | | | | | | Sample 3: 2001/2002 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Industry code | Unexplained *Dinc* | P-value | Industry code | *Dinc* | P-value | Industry code | Unexplained *Dinc* | P-value | Industry code | *Dinc* | P-value |
| Tier 1 | Ind. 13 | 0.47 | 0.00 | Ind. 9 | 1.31 | 0.00 | Ind. 9 | 0.37 | 0.00 | Ind. 9 | 1.46 | 0.00 |
| | Ind. 29 | 0.24 | 0.00 | Ind. 13 | 1.52 | 0.00 | Ind. 4 | 0.23 | 0.00 | Ind. 4 | 1.30 | 0.00 |
| | Ind. 9 | 0.22 | 0.00 | Ind. 29 | 1.25 | 0.00 | Ind. 30 | 0.19 | 0.00 | Ind. 13 | 1.38 | 0.00 |
| | Ind. 31 | 0.11 | 0.00 | Ind. 4 | 1.27 | 0.00 | Ind. 13 | 0.32 | 0.00 | Ind. 30 | 1.20 | 0.00 |
| | Ind. 4 | 0.22 | 0.00 | Ind. 28 | 1.38 | 0.00 | Ind. 31 | 0.10 | 0.00 | Ind. 14 | 1.14 | 0.00 |
| | Ind. 28 | 0.28 | 0.01 | Ind. 34 | 1.06 | 0.00 | Ind. 26 | 0.18 | 0.01 | Ind. 11 | 1.28 | 0.01 |
| | Ind. 14 | 0.09 | 0.07 | Ind. 3 | 1.15 | 0.01 | Ind. 11 | 0.26 | 0.01 | Ind. 8 | 1.24 | 0.01 |
| | Ind. 37 | 0.05 | 0.12 | Ind. 31 | 1.10 | 0.01 | Ind. 29 | 0.12 | 0.01 | Ind. 31 | 1.09 | 0.01 |
| | Ind. 22 | 0.12 | 0.13 | Ind. 14 | 1.12 | 0.02 | Ind. 8 | 0.21 | 0.02 | Ind. 29 | 1.12 | 0.02 |
| | Ind. 41 | 0.08 | 0.17 | Ind. 30 | 1.14 | 0.03 | Ind. 20 | 0.16 | 0.11 | Ind. 26 | 1.12 | 0.08 |
| | Ind. 30 | 0.09 | 0.22 | Ind. 37 | 1.05 | 0.10 | Ind. 10 | 0.11 | 0.17 | Ind. 34 | 1.02 | 0.09 |
| | Ind. 3 | 0.07 | 0.23 | Ind. 22 | 1.10 | 0.19 | Ind. 14 | 0.06 | 0.20 | Ind. 28 | 1.12 | 0.11 |
| | Ind. 34 | 0.02 | 0.24 | Ind. 8 | 1.13 | 0.22 | Ind. 17 | 0.05 | 0.23 | Ind. 17 | 1.07 | 0.14 |
| | | | | | | | Ind. 5 | 0.08 | 0.30 | Ind. 20 | 1.12 | 0.22 |
| | | | | | | | | | | Ind. 3 | 1.06 | 0.30 |
| | | | | | | | | | | Ind. 10 | 1.09 | 0.30 |
| Tier 2 | Ind. 10 | -0.07 | 0.30 | Ind. 1 | 0.97 | 0.35 | Ind. 16 | -0.02 | 0.32 | Ind. 35 | 0.97 | 0.33 |
| | Ind. 8 | 0.10 | 0.31 | Ind. 11 | 1.11 | 0.35 | Ind. 28 | 0.07 | 0.37 | Ind. 2 | 0.92 | 0.42 |
| | Ind. 24 | 0.03 | 0.39 | Ind. 36 | 0.98 | 0.41 | Ind. 35 | -0.03 | 0.38 | Ind. 37 | 1.02 | 0.42 |
| | Ind. 6 | -0.07 | 0.40 | Ind. 17 | 0.95 | 0.44 | Ind. 19 | -0.04 | 0.40 | Ind. 5 | 1.06 | 0.45 |
| | Ind. 12 | -0.06 | 0.44 | Ind. 2 | 0.94 | 0.50 | Ind. 22 | 0.11 | 0.42 | Ind. 41 | 0.95 | 0.51 |
| | Ind. 35 | -0.03 | 0.49 | Ind. 32 | 1.03 | 0.51 | Ind. 37 | 0.02 | 0.42 | Ind. 22 | 1.08 | 0.55 |
| | Ind. 11 | 0.07 | 0.52 | Ind. 38 | 0.95 | 0.56 | Ind. 6 | 0.05 | 0.47 | Ind. 38 | 0.97 | 0.60 |
| | Ind. 32 | 0.03 | 0.55 | Ind. 16 | 1.01 | 0.61 | Ind. 18 | 0.05 | 0.52 | Ind. 1 | 0.98 | 0.63 |
| | Ind. 40 | -0.02 | 0.57 | Ind. 41 | 0.97 | 0.62 | Ind. 41 | 0.04 | 0.61 | Ind. 6 | 1.04 | 0.64 |
| | Ind. 7 | -0.03 | 0.59 | Ind. 10 | 0.97 | 0.62 | Ind. 3 | 0.02 | 0.68 | Ind. 32 | 1.03 | 0.66 |
| | Ind. 38 | 0.02 | 0.76 | Ind. 26 | 0.98 | 0.71 | Ind. 25 | -0.01 | 0.73 | Ind. 18 | 1.04 | 0.67 |
| | Ind. 5 | 0.04 | 0.77 | Ind. 6 | 0.97 | 0.73 | Ind. 7 | -0.03 | 0.74 | Ind. 7 | 0.96 | 0.70 |
| | Ind. 17 | -0.02 | 0.79 | Ind. 18 | 1.02 | 0.73 | Ind. 40 | -0.02 | 0.74 | Ind. 23 | 0.98 | 0.72 |
| | Ind. 19 | 0.02 | 0.80 | Ind. 35 | 1.01 | 0.73 | Ind. 2 | -0.03 | 0.77 | Ind. 36 | 1.00 | 0.85 |
| | Ind. 18 | -0.01 | 0.88 | Ind. 5 | 1.01 | 0.96 | Ind. 23 | 0.02 | 0.77 | Ind. 16 | 1.00 | 0.99 |
| | Ind. 2 | 0.01 | 0.89 | | | | Ind. 38 | 0.01 | 0.94 | | | |
| | Ind. 26 | 0.00 | 0.94 | | | | Ind. 32 | 0.00 | 0.95 | | | |
| Tier 3 | Ind. 39 | -0.19 | 0.00 | Ind. 39 | 0.70 | 0.00 | Ind. 39 | -0.20 | 0.00 | Ind. 39 | 0.75 | 0.00 |
| | Ind. 1 | -0.10 | 0.00 | Ind. 21 | 0.80 | 0.00 | Ind. 33 | -0.11 | 0.00 | Ind. 33 | 0.89 | 0.00 |
| | Ind. 33 | -0.10 | 0.00 | Ind. 25 | 0.79 | 0.00 | Ind. 36 | -0.05 | 0.00 | Ind. 21 | 0.82 | 0.00 |
| | Ind. 36 | -0.07 | 0.00 | Ind. 33 | 0.88 | 0.00 | Ind. 27 | -0.09 | 0.01 | Ind. 25 | 0.90 | 0.00 |
| | Ind. 21 | -0.09 | 0.01 | Ind. 40 | 0.92 | 0.02 | Ind. 1 | -0.07 | 0.07 | Ind. 19 | 0.87 | 0.00 |
| | Ind. 25 | -0.10 | 0.01 | Ind. 20 | 0.86 | 0.03 | Ind. 34 | -0.02 | 0.08 | Ind. 24 | 0.89 | 0.01 |
| | Ind. 16 | -0.04 | 0.04 | Ind. 23 | 0.80 | 0.04 | Ind. 15 | -0.03 | 0.09 | Ind. 27 | 0.92 | 0.03 |
| | Ind. 27 | -0.09 | 0.07 | Ind. 27 | 0.90 | 0.08 | Ind. 21 | -0.06 | 0.15 | Ind. 15 | 0.96 | 0.04 |
| | Ind. 20 | -0.11 | 0.07 | Ind. 15 | 0.95 | 0.11 | Ind. 24 | -0.06 | 0.18 | Ind. 12 | 0.91 | 0.25 |
| | Ind. 15 | -0.06 | 0.07 | Ind. 12 | 0.88 | 0.11 | Ind. 12 | -0.08 | 0.25 | Ind. 40 | 0.93 | 0.26 |
| | Ind. 23 | -0.13 | 0.16 | Ind. 7 | 0.90 | 0.13 | | | | | | |
| | | | | Ind. 19 | 0.91 | 0.17 | | | | | | |
| | | | | Ind. 24 | 0.95 | 0.24 | | | | | | |

*Source:* Central Statistics Office of Trinidad and Tobago and authors' calculations.

ROAW: Relative occupationally adjusted wage.
*Dinc:* ROAW based on weekly earnings.
Ind: Industry.

TABLE 8.b

**Unexplained ROAW (hourly) after accounting for industry differences in labour quality, two samples**

| | Sample 1: 1993/1994 | | | | | | Sample 3: 2001/2002 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Industry code | Unexplained *Dinch* | P-value | Industry code | *Dinch* | P-value | Industry code | Unexplained *Dinch* | P-value | Industry code | *Dinch* | P-value |
| Tier 1 | Ind. 9 | 0.22 | 0.00 | Ind. 9 | 1.34 | 0.00 | Ind. 9 | 0.42 | 0.00 | Ind. 9 | 1.51 | 0.00 |
| | Ind. 13 | 0.43 | 0.00 | Ind. 13 | 1.52 | 0.00 | Ind. 30 | 0.23 | 0.00 | Ind. 4 | 1.31 | 0.00 |
| | Ind. 4 | 0.23 | 0.01 | Ind. 4 | 1.31 | 0.00 | Ind. 4 | 0.25 | 0.00 | Ind. 30 | 1.22 | 0.00 |
| | Ind. 29 | 0.14 | 0.03 | Ind. 29 | 1.19 | 0.00 | Ind. 31 | 0.12 | 0.00 | Ind. 13 | 1.40 | 0.00 |
| | Ind. 31 | 0.07 | 0.09 | Ind. 28 | 1.25 | 0.01 | Ind. 13 | 0.34 | 0.00 | Ind. 8 | 1.24 | 0.00 |
| | Ind. 12 | 0.26 | 0.11 | Ind. 3 | 1.13 | 0.03 | Ind. 8 | 0.22 | 0.01 | Ind. 14 | 1.12 | 0.01 |
| | Ind. 28 | 0.12 | 0.19 | Ind. 34 | 1.04 | 0.05 | Ind. 29 | 0.16 | 0.01 | Ind. 11 | 1.28 | 0.01 |
| | Ind. 41 | 0.09 | 0.27 | Ind. 30 | 1.12 | 0.06 | Ind. 11 | 0.26 | 0.01 | Ind. 31 | 1.10 | 0.01 |
| | Ind. 2 | 0.27 | 0.28 | Ind. 31 | 1.08 | 0.07 | Ind. 26 | 0.10 | 0.06 | Ind. 29 | 1.15 | 0.02 |
| | | | | Ind. 12 | 1.25 | 0.13 | Ind. 20 | 0.14 | 0.08 | Ind. 28 | 1.17 | 0.08 |
| | | | | Ind. 11 | 1.20 | 0.14 | Ind. 10 | 0.13 | 0.13 | Ind. 17 | 1.07 | 0.11 |
| | | | | Ind. 37 | 1.30 | 0.30 | Ind. 17 | 0.06 | 0.17 | Ind. 20 | 1.11 | 0.19 |
| | | | | | | | Ind. 28 | 0.12 | 0.20 | Ind. 10 | 1.11 | 0.22 |
| | | | | | | | Ind. 14 | 0.05 | 0.23 | Ind. 3 | 1.07 | 0.23 |
| | | | | | | | Ind. 5 | 0.09 | 0.24 | Ind. 34 | 1.01 | 0.29 |
| | | | | | | | Ind. 18 | 0.09 | 0.25 | | | |
| | | | | | | | Ind. 22 | 0.16 | 0.25 | | | |
| Tier 2 | Ind. 11 | 0.10 | 0.32 | Ind. 2 | 1.26 | 0.31 | Ind. 16 | -0.03 | 0.31 | Ind. 18 | 1.08 | 0.37 |
| | Ind. 6 | -0.09 | 0.32 | Ind. 22 | 1.07 | 0.39 | Ind. 15 | -0.02 | 0.31 | Ind. 22 | 1.12 | 0.38 |
| | Ind. 37 | 0.27 | 0.33 | Ind. 8 | 1.09 | 0.39 | Ind. 21 | -0.04 | 0.36 | Ind. 5 | 1.07 | 0.40 |
| | Ind. 40 | 0.04 | 0.36 | Ind. 18 | 0.95 | 0.46 | Ind. 19 | -0.04 | 0.37 | Ind. 1 | 0.97 | 0.44 |
| | Ind. 14 | -0.05 | 0.38 | Ind. 15 | 1.04 | 0.54 | Ind. 6 | 0.07 | 0.46 | Ind. 26 | 1.05 | 0.45 |
| | Ind. 32 | -0.03 | 0.41 | Ind. 17 | 1.07 | 0.55 | Ind. 37 | 0.02 | 0.50 | Ind. 40 | 0.97 | 0.55 |
| | Ind. 30 | 0.05 | 0.49 | Ind. 38 | 0.95 | 0.59 | Ind. 3 | 0.03 | 0.54 | Ind. 6 | 1.05 | 0.61 |
| | Ind. 26 | -0.05 | 0.50 | Ind. 14 | 1.03 | 0.63 | Ind. 25 | -0.02 | 0.54 | Ind. 23 | 0.97 | 0.67 |
| | Ind. 22 | 0.05 | 0.50 | Ind. 26 | 0.96 | 0.64 | Ind. 23 | 0.02 | 0.74 | Ind. 38 | 0.97 | 0.73 |
| | Ind. 19 | 0.04 | 0.61 | Ind. 36 | 1.17 | 0.64 | Ind. 35 | -0.01 | 0.81 | Ind. 2 | 0.96 | 0.74 |
| | Ind. 5 | -0.06 | 0.64 | Ind. 10 | 0.97 | 0.70 | Ind. 32 | -0.01 | 0.83 | Ind. 37 | 1.01 | 0.75 |
| | Ind. 17 | 0.05 | 0.65 | Ind. 5 | 0.95 | 0.71 | Ind. 38 | 0.02 | 0.83 | Ind. 35 | 0.99 | 0.78 |
| | Ind. 36 | 0.10 | 0.68 | Ind. 6 | 0.97 | 0.80 | Ind. 41 | -0.01 | 0.84 | Ind. 7 | 0.98 | 0.86 |
| | Ind. 24 | -0.01 | 0.79 | Ind. 32 | 0.99 | 0.81 | Ind. 40 | 0.01 | 0.86 | Ind. 16 | 1.00 | 0.97 |
| | Ind. 3 | 0.01 | 0.80 | Ind. 19 | 0.98 | 0.81 | Ind. 2 | 0.01 | 0.94 | Ind. 32 | 1.00 | 0.98 |
| | Ind. 38 | -0.02 | 0.85 | Ind. 16 | 1.01 | 0.82 | Ind. 7 | 0.00 | 0.96 | | | |
| | Ind. 15 | -0.01 | 0.88 | Ind. 40 | 1.01 | 0.85 | | | | | | |
| | Ind. 8 | 0.01 | 0.89 | Ind. 41 | 1.01 | 0.87 | | | | | | |
| | | | | Ind. 35 | 1.00 | 0.94 | | | | | | |
| Tier 3 | Ind. 39 | -0.27 | 0.00 | Ind. 39 | 0.68 | 0.00 | Ind. 36 | -0.13 | 0.00 | Ind. 36 | 0.81 | 0.00 |
| | Ind. 1 | -0.16 | 0.00 | Ind. 25 | 0.78 | 0.00 | Ind. 39 | -0.24 | 0.00 | Ind. 39 | 0.71 | 0.00 |
| | Ind. 33 | -0.14 | 0.00 | Ind. 21 | 0.80 | 0.00 | Ind. 33 | -0.12 | 0.00 | Ind. 33 | 0.86 | 0.00 |
| | Ind. 25 | -0.15 | 0.00 | Ind. 33 | 0.86 | 0.00 | Ind. 1 | -0.08 | 0.02 | Ind. 25 | 0.89 | 0.00 |
| | Ind. 16 | -0.08 | 0.00 | Ind. 23 | 0.80 | 0.04 | Ind. 27 | -0.10 | 0.02 | Ind. 21 | 0.84 | 0.00 |
| | Ind. 21 | -0.12 | 0.00 | Ind. 1 | 0.94 | 0.04 | Ind. 24 | -0.07 | 0.10 | Ind. 24 | 0.88 | 0.00 |
| | Ind. 27 | -0.14 | 0.01 | Ind. 7 | 0.87 | 0.05 | Ind. 34 | -0.02 | 0.12 | Ind. 19 | 0.87 | 0.00 |
| | Ind. 18 | -0.12 | 0.06 | Ind. 27 | 0.91 | 0.09 | Ind. 12 | -0.09 | 0.25 | Ind. 27 | 0.91 | 0.05 |
| | Ind. 35 | -0.07 | 0.08 | Ind. 20 | 0.88 | 0.12 | | | | Ind. 41 | 0.91 | 0.15 |
| | Ind. 20 | -0.12 | 0.08 | Ind. 24 | 0.95 | 0.25 | | | | Ind. 12 | 0.89 | 0.22 |
| | Ind. 23 | -0.17 | 0.08 | | | | | | | Ind. 15 | 0.97 | 0.22 |
| | Ind. 7 | -0.10 | 0.10 | | | | | | | | | |
| | Ind. 10 | -0.10 | 0.12 | | | | | | | | | |
| | Ind. 34 | -0.02 | 0.30 | | | | | | | | | |

*Source:* Central Statistics Office of Trinidad and Tobago and authors' calculations.

ROAW: Relative occupationally adjusted wage.
*Dinch:* ROAW based on hourly earnings.
*Dinc:* ROAW based on weekly earnings.
Ind.: Industry.

TABLE 9

**Comparison of inter-industry wage distribution with and without adjustment for differences in labour quality**

| Sample | Weekly ROAW | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Tier 1 | | | Tier 2 | | | Tier 3 | | |
| | Common | Total unadjusted | Total adjusted | Common | Total unadjusted | Total adjusted | Common | Total unadjusted | Total adjusted |
| 1993/1994 | 12 | 13 | 13 | 11 | 15 | 17 | 8 | 13 | 11 |
| 2001/2002 | 13 | 16 | 14 | 12 | 15 | 17 | 7 | 10 | 10 |
| | Hourly ROAW | | | | | | | | |
| Sample | Tier 1 | | | Tier 2 | | | Tier 3 | | |
| | Common | Total unadjusted | Total adjusted | Common | Total unadjusted | Total adjusted | Common | Total unadjusted | Total adjusted |
| 1993/1994 | 7 | 12 | 9 | 13 | 19 | 18 | 9 | 10 | 14 |
| 2001/2002 | 13 | 15 | 17 | 10 | 15 | 16 | 6 | 11 | 8 |

*Source:* Central Statistics Office of Trinidad and Tobago and authors' calculations.

ROAW: Relative occupationally adjusted wage.

# III

# Theoretical explanations for inter-industry wage differentials

This section presents theoretical explanations for wage differentials. By so doing, it points to testable hypotheses that can be investigated for Trinidad and Tobago.

## 1. Competitive explanations

The neoclassical explanation for wage differentials is a combination of one or more of the following:

(i) Differentials are the result of shifts in labour demand stemming from changes in demand for specific products. Industries facing growing product demand may increase wages to attract more factor inputs. The presence of information asymmetries or high adjustment costs, or both, will allow for transitory wage differentials.

(ii) Wage differentials may reflect differences in unmeasured labour quality, with industries having differing preferences for worker ability.

(iii) Inter-industry wage differentials compensate workers for asymmetries in working conditions (for example, safety, undesirable working conditions, etc.).

## 2. Efficiency wage theories

Riveros and Bouton (1994, p. 698) define efficiency wage models as "a family of conceptually distinct theories that, for the most part, seek to offer an [endogenously determined] explanation of persistent real wage rigidities in the presence of involuntary unemployment. The central assumption of these theories is that higher real wages can, through various mechanisms, result in higher labour productivity."

There are three main efficiency wage models, namely: (a) the shirking model, (b) the labour turnover model and (c) the sociological model. The following paragraphs present a basic summary of these models, and appendix 2 outlines profit-maximizing behaviour under the efficiency wage hypothesis.

(a) *The shirking model*

Shapiro and Stiglitz (1984) formulated the basic framework for this model. Using the basic neoclassical

competitive paradigm as their starting point, they showed that the typical employee, under conditions of imperfect monitoring, will have an inbuilt incentive to shirk. They argued that since labour markets clear, i.e., there is no involuntary unemployment, there is no cost associated with shirking since if a worker is caught shirking and is fired he will be immediately rehired at the going wage rate. Thus, at the market clearing rate, all workers will shirk.

To elicit greater effort from employees, the firm pays more than the market clearing wage, thereby instituting a penalty for an employee who is caught shirking and is fired.[10] Assuming firms are identical, it would therefore be profitable for all firms to increase wages. What results is an equilibrium where the market wage is not market clearing. This market-produced unemployment is a worker discipline device of sorts, as it ensures that the worker who is fired for shirking will not immediately obtain another job.

Bulow and Summers (1986) extended the basic Shapiro-Stiglitz framework to show how equally productive workers can in equilibrium be arbitrarily allocated between a high-wage and a low-wage sector.[11] They thereby provided a theoretical basis for explaining market equilibrium with both inter-industry wage differentials and involuntary unemployment.

(b) *The labour turnover model*

This model postulates that when workers quit, firms incur sunk costs associated with hiring replacements, training new workers and losing productivity as new workers move along the learning curve. Firms try to minimize these turnover costs by paying a wage premium (Salop, 1979). For any given occupation, turnover costs may vary from industry to industry, thereby creating different wage premiums. The model produces equilibria with involuntary unemployment and a distribution of wages for a given occupation.

(c) *The sociological model*

Akerloff (1982 and 1984) argues that social conventions in the workplace, which he refers to as norms, have a strong effect on workers' attitudes. Workers are motivated to work hard because they acquire sentiment for each other and for the firm. In return for their commitment, workers expect to be reciprocated with "fair" wages. This fair wage depends on the wages of workers in the workers' reference group and past wages, among other things. According to the basic sociological model, "the loyalty of workers is exchanged for high wages, and this loyalty can be translated via effective management into high productivity" (Akerloff, 1984, p. 80). Inter-firm (inter-industry) wage differentials can be explained by the differing ability of firms (industries) to translate employee loyalty into higher productivity.

[10] The extent of the wage premium is obviously dependent on the cost of shirking to the firm.
[11] The high-wage sector pays a high-wage premium because shirking is more costly in that sector than in other sectors.

# IV
## Conclusion

Trinidad and Tobago seems to have a relatively temporally stable inter-industry wage distribution. Some industries at times pay as much as 52% more than average for a given occupation, while others sometimes pay as little as 25% below average. Even after accounting for measured differences in labour quality, disparities in industry wages still persist.

While the paper does not necessarily provide an explanation for these differentials, it has provided a snapshot of current explanations for this phenomenon in the literature. Further work is needed to test the hypotheses put forward by these explanations. The importance of this work should not be underestimated. Knowledge of and explanations for these differentials should be important to researchers and policymakers, as the existence of wage differentials has distributional implications and may also point to a need to radically rethink our understanding of how labour markets function in the Caribbean.

**APPENDIX 1**

Industry code and industry group

| Industry code | Industry group | Sector |
|---|---|---|
| Ind. 1 | Field crop cultivation | Agriculture |
| Ind. 2 | Cultivation of fruits and vegetables | Agriculture |
| Ind. 3 | Agricultural livestock production and horticultural services | Agriculture |
| Ind. 4 | Crude petroleum production | Petroleum and gas |
| Ind. 5 | Manufacture of bakery products | Manufacture of food |
| Ind. 6 | Manufacture of non-alcoholic beverages | Manufacture of food |
| Ind. 7 | Printing, publishing and allied industries | Manufacture of paper |
| Ind. 8 | Manufacture of industrial chemicals | Manufacture of chemicals and petrochemicals |
| Ind. 9 | Petroleum refineries | Manufacture of chemicals and petrochemicals |
| Ind. 10 | Manufacture of cement and concrete products | Manufacture of non-metallic mineral products |
| Ind. 11 | Iron and steel basic industries | Manufacturing in basic metal industries |
| Ind. 12 | Manufacture of fabricated metal except machinery and equipment | Manufacture of fabricated metal products |
| Ind. 13 | Electricity and other energy | Electricity, gas and water |
| Ind. 14 | Waterworks and supply | Electricity, gas and water |
| Ind. 15 | Construction, maintenance and alteration of buildings | Construction |
| Ind. 16 | Construction and maintenance of roads and bridges | Construction |
| Ind. 17 | General contractor | Construction allied |
| Ind. 18 | Wholesale merchants and distribution | Wholesale |
| Ind. 19 | Food, beverages and tobacco (retail) | Retail |
| Ind. 20 | Mineral fuels and lubricants (retail) | Retail |
| Ind. 21 | Textiles, apparel and footwear (retail) | Retail |
| Ind. 22 | Light and heavy machinery, vehicles and equipment (retail) | Retail |
| Ind. 23 | Chemicals, drugs, pharmaceuticals and cosmetics (retail) | Retail |
| Ind. 24 | Miscellaneous (retail) | Retail |
| Ind. 25 | Restaurants and cafeterias | Restaurants, hotels and guesthouses |
| Ind. 26 | Hotels and rooming houses | Restaurants, hotels and guesthouses |
| Ind. 27 | Land transport | Transport and storage |
| Ind. 28 | Water transport | Transport and storage |
| Ind. 29 | Air transport | Transport and storage |
| Ind. 30 | Communication | Communication |
| Ind. 31 | Financial institutions | Financial and insurance |
| Ind. 32 | Insurance | Financial and insurance |
| Ind. 33 | Business services | Real estate and business services |
| Ind. 34 | Public administration and defence | Public administration |
| Ind. 35 | Sanitary and similar services | Sanitary and similar services |
| Ind. 36 | Education services | Social and related community services |
| Ind. 37 | Medical, dental and other health | Social and related community services |
| Ind. 38 | Recreation and cultural services n.e.c. | Recreation and culture |
| Ind. 39 | Repair services | Personal and household services |
| Ind. 40 | Domestic services | Personal and household services |
| Ind. 41 | Miscellaneous personal and household services | Personal and household services |

n.e.c.: not elsewhere classified.

**APPENDIX 2**

## Profit maximization in a generalized efficiency wage framework[12]

In the generalized efficiency wage framework, firms go through a two-stage optimization process in determining their profit-maximizing output.

A firm faces the production function:

$$Q = F(L, K) \tag{A1}$$

where $L$ is labour measured in efficiency units and $K$ stands for capital; other inputs into the production process can be ignored with no loss of generality.

Efficiency labour, $L$, is the product of worker efficiency/effort/productivity and the number of workers hired, $N$.

$$L = \rho(W, \delta)\, N \tag{A2}$$

where $\rho(W, \delta)$ is the function determining the effort/productivity of workers, $W$ is the wage rate and $\delta$ is a vector of given parameters such as taxes that also influence the productivity function. The effort/productivity function $\rho(W, \delta)$ is assumed to be concave with respect to $W$.

In the first stage of the optimization problem, firms choose a wage rate that minimizes the per unit cost of efficiency labour. This is represented in the following equation:

$$\underset{W}{Min} \frac{W}{\rho(W,\delta)} \tag{A3}$$

Equation (A3) yields the following first-order conditions:[13]

$$\frac{\rho(W,\delta) - W\rho'(W,\delta)}{\rho(W,\delta)^2} = 0 \tag{A4}$$

Equation (A4) can be easily solved for the efficiency wage $W^*$. The second stage of the optimization problem is the familiar equating of marginal products to marginal costs to determine optimal factor utilization. In the case of labour, this yields:[14]

$$PF_L^{'}\rho(W^*, \delta) = W^* \tag{A5}$$

[12] See Riveros and Bouton (1994) for a more extensive treatment of this topic.

[13] Assuming the firm does not face a binding labour constraint.

[14] Equation (A2) is substituted for L in equation (A1), after which the production function is differentiated with respect to $N$ to get the marginal product of labour.

*(Original: English)*

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