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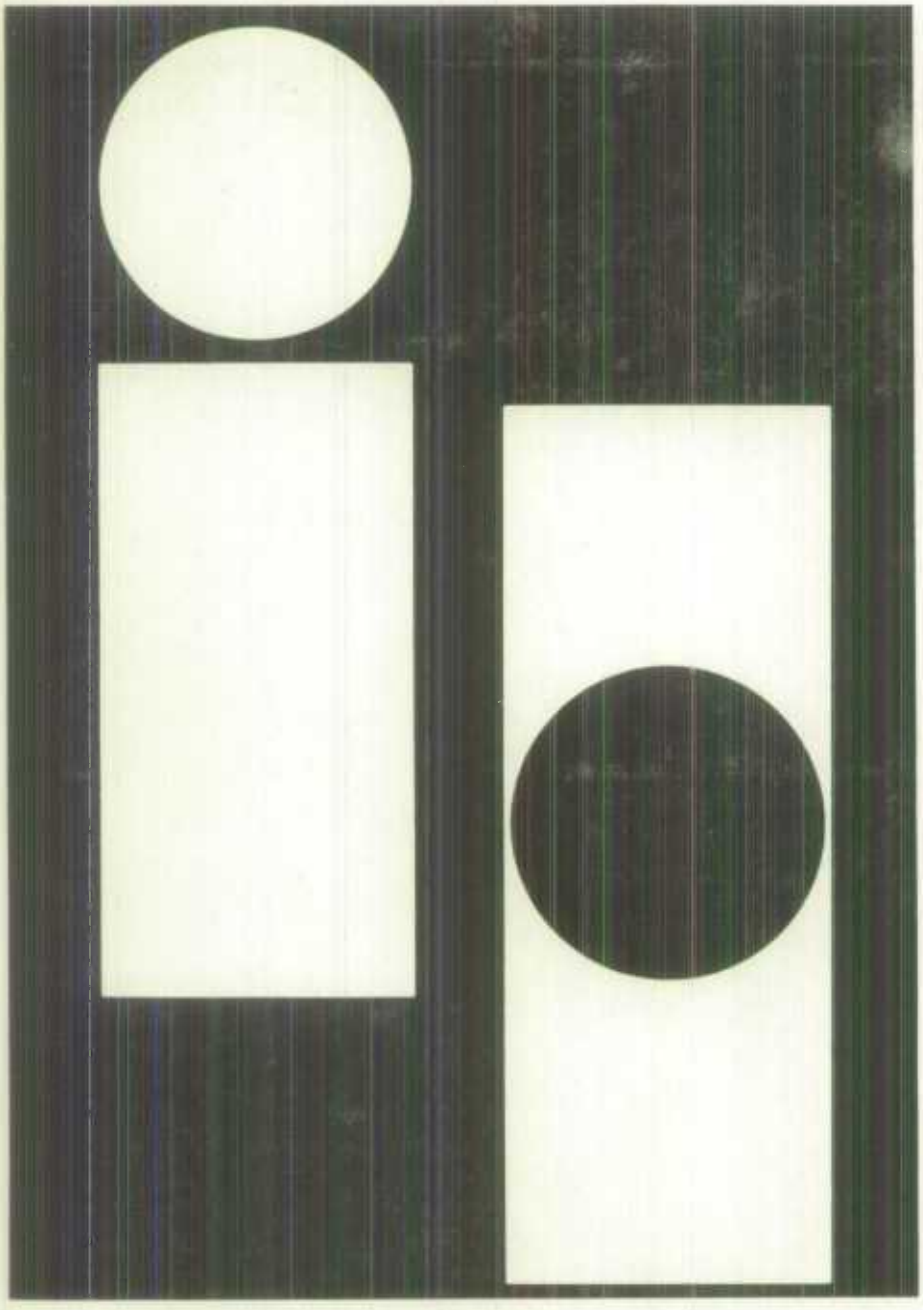

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June 27, 1990
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THE 1989 INCREASE IN LABOUR COMPENSATION PER PERSON:

WAS IT CAUSED BY WAGE DEMANDS?

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June 1990

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THE 1989 INCREASE IN LABOUR COMPENSATION PER PERSON: WAS IT CAUSED BY WAGE DEMANDS?

Introduction:

According to information released to the public in the Daily of April 30, 1989 as part of the regularly published productivity estimates, business sector labour compensation "per person" was 7.3% higher in 1989 than in 1988. The increase in labour compensation "per person-hour worked" was estimated at 8.2%, following a decline in the average number of hours worked in 1989. The increases in labour compensation per person and per person-hour are in part a reflection of a 9.7% raise in business sector labour compensation, and in part due to changes in employment, hours and compensation changes taking place at the level of the industries making up the business sector.

This note analyses the sources of business sector growth in labour compensation and also in labour compensation per person-hour. The note presents an assessment of the relative importance of the factors underlying the published estimates and, in particular, it answers the question of whether wages and salary gains were the main cause of the published increases. Three factors are analyzed: changes in the composition of employment among business sector industries, changes in pure labour compensation per person and changes in pure labour compensation per person-hour worked at the industry level.

GROWTH OF COMPENSATION PER PERSON

Business sector compensation per person increased 7.3% in 1989. The increase could be the result of large gains in labour compensation[1] per person in a few industries or be the result of more moderate labour gains in all industries. Thus one possible avenue for analysis is the industrial composition of compensation per person in order to evaluates whether the increase was concentrated or widespread across industries.

The available data allows us to go a little further. The increase in business sector compensation per person may in part be due to the migration of people from low paying industries to high paying ones, possibly in search for higher wages. If net employment creation occurs in high paying industries, business sector labour compensation per person may increase without corresponding increases in effective[2] wage and salary rates. Conversely, net employment moves towards low paying industries may reduce business sector labour compensation per person even if effective wages and salaries are kept constant. This suggest that one could analyze the growth rate in business sector compensation per person in terms of changes in pure labour compensation and pure changes in employment at the industry level.

Business sector compensation is the product of business sector compensation per person and employment. It is also the sum of compensation per person times employment at the industry level. This can be written as,

$$W = w\ e = \Sigma\ w_i\ e_i \qquad i = 1...n \qquad (1)$$

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[1] Labour compensation represents the total labour cost to an industry. It is calculated as the sum of wages, salaries and supplementary labour income. It includes an imputation for the wage component of unincorporated business proprietors and is inclusive of bonuses, commissions and employer and employee contributions to unemployment insurance, Canada and Quebec pension plans and Workmen's compensation insurance premiums.

[2] Effective wage and salary rates are defined as the per-person or per-hour rate which include the nominal basic rate as well as any other form of labour compensation, such as cost of living adjustments.

where W is business sector labour compensation, w is compensation per person, e is employment, and i refers to industries.

Business sector average compensation per person is given by,

$$w = \frac{1}{e} \Sigma w_i e_i \qquad (2)$$

Differentiating with respect to time and re-arranging, the growth rate of business sector average compensation per person can be decomposed into two main components, as follows,

$$\dot{w} = \Sigma \beta_i (\dot{e}_i - \dot{e}) + \Sigma \beta_i \dot{w}_i \qquad (3)$$

where a dot indicates growth rate and beta is the labour compensation share of industry i in business sector labour compensation.

In this decomposition, each of the terms in the first summation is the contribution of employment shifts by industry to the growth rate of business sector compensation per person. The total value of the first summation is the contribution of all business sector employment shifts to the growth in business sector compensation per person. Each of the elements in the second summation represents the contribution of the growth in pure compensation per person by industry to the growth rate of business sector compensation per person. The value of the second summation is the contribution of all pure compensation per person changes to business sector compensation per person.

The terms of equation (1) were calculated for the year 1989. The continuous time growth rates were approximated by their discrete counterparts. Share values refer to 1989. As a result, the sum of all terms in (1) differ slightly from the published growth rate. The published growth rate of compensation per person is 7.33% while that produced by equation (3) is 7.397%. The difference is not believed to be sufficient to invalidate the conclusions in this note. Results are presented in Table 1.

Several conclusions can be drawn from Table I. For the business sector as a whole, the 7.397% increase in labour compensation per person in 1989 is due almost entirely (7.290%) to increases in pure compensation per person (mainly wages and salaries) with employment shifts playing a much smaller role (0.107%).

TABLE I

COMPONENTS OF BUSINESS SECTOR
COMPENSATION PER PERSON 1988-1989
(PERCENTAGE)

Industry	$\beta_i^o(e_i^o-e)$	$\beta_i^o w_i$	Σ
Agriculture	-0.103	0.122	0.019
Fishing	-0.010	-0.027	-0.037
Logging	0.020	0.060	0.080
Mining	-0.132	0.272	0.140
Manufacturing	-0.304	1.796	1.492
Construction	0.353	0.810	1.163
Transportation	0.140	0.254	0.394
Communication	0.079	0.125	0.204
Other Utilities	0.054	-0.025	0.029
Trade	-0.222	1.505	1.282
Finance, I.R.E.	-0.151	1.240	1.089
Community, B.P.S.	0.382	1.158	1.540
Business Sector	0.107	7.290	7.397

Not all industries contributed equally to the business sector increase in compensation per person, as indicated by the third column of Table I. The largest gain originated in the Community, Business and Personal Service Industries which contributed 1.540%, followed by Manufacturing at 1.492%. In term of pure compensation per person, however, (second column on the table) Manufacturing has the largest increase, followed by Trade, Finance and Community B.P.S.. The Manufacturing gain (1.796%) accounts for 24.6% of the business sector gain (7.290%), even though Manufacturing had a 20% employment share in 1989. In Finance, the pure compensation per person gain (1.240%) accounts for 17% of the business sector, and it also exceeds its 7.3% employment share in 1989. In the Community B.P.S industries, compensation gains account for 16% of the total and it fell short of its 24.2% employment share. Thus, Manufacturing and Finance were the driving sectors behind the relatively large increase in pure compensation per person in 1989.

The small contribution of employment shifts masks larger fluctuations at the industry level. Employment shifts were high in Community and Construction. The contribution of Manufacturing is negative, reflecting employment losses in that industry. Had not been for this negative development, the contribution of Manufacturing to business sector growth would have been of 1.796%

instead of 1.492%.

GROWTH OF COMPENSATION PER PERSON-HOUR WORKED

Changes in compensation per person-hour worked for the total business sector of the economy may be explained in terms of three factors operating at the industry level. One is employment shifts, in a way analogous to that described above. A second factor that affects business sector compensation per person-hour is the industrial composition of hours worked. Hours worked vary with the business cycle and the year 1989 may have been the end of the expansionary phase of the business cycle for some industries. At the end of a cycle one expects a reduction in hours worked per person, especially in industries having high price elasticity of demand for output. It is possible for an industry's compensation per person-hour to increase as the result of decreases in hours worked. Industries with a high proportion of salaried employees, whose annual income is fixed, may work fewer hours in low demand years and increase hours worked in peak years. On the other hand, industries with a high proportion of unionizes workers paid by the hour may behave in the opposite direction, in which case compensation per person-hour increases with increases in hour worked due to the higher cost of overtime hours.

A third factor affecting business sector compensation per person-hour worked is the industrial distribution of compensation per person-hour worked. The observed increase at the business sector level may be concentrated in a few industries or be distributed among many.

Summarizing, the increase in business sector compensation per person-hour worked can be explained in terms of three effects taking place at the industry level: employment changes, hours worked per person per year changes and compensation per person-hour worked changes.

Total business sector labour compensation W can be seen as the product of the number of hours worked per person per year, employment and compensation per person hour. It is also the sum of each industry's product of hours worked per person per year, employment and compensation per person-hour, as follows,

$$W = h\ e\ \delta = \Sigma\ h_i\ e_i\ \delta_i \qquad i = 1...n \qquad (4)$$

where h is the number of person-hours worked, e employment and δ the average hourly rate (labour compensation per hour worked). Isolating δ, differentiating and rearranging, the growth rate of business sector compensation per person hour worked δ-dot is given

by a weighted average of hours worked, employment and hourly rates at the industry and business sector levels,

$$\overset{o}{\delta} = \Sigma\, \mu_i\, (\overset{o}{h_i}-\overset{o}{h}) + \Sigma\, \mu_i\, (\overset{o}{e_i}-\overset{o}{e}) + \Sigma\, \mu_i\, \overset{o}{\delta_i} \qquad (5)$$

where the symbols have the following interpretation:

- δ total business sector compensation per person-hour.
- μ_i ratio of industry labour compensation per person-hour to business sector labour compensation per person-hour.
- h_i hour worked per person per year in industry i.
- h business sector hours worked per person per year.
- e_i employment of industry i.
- e business sector employment.
- δ_i compensation per person-hour, industry i.

The first term of equation (5) is the contribution of hours-worked per person of the various industries. The term captures shifts in the distribution of hours worked among industries and it reflects, for example, changes in hours taking place as the result of business cycle fluctuations which do not affect all industries to the same extent and at the same time. The second term is the contribution of the employment composition of industry and takes into account the impact that employment gains and losses in the various industries have on the business sector compensation per person hour. The third term is the contribution of compensation per person-hour worked of each industry to the business sector compensation per person-hour worked. This terms isolates pure labour cost changes and it permits an evaluation of the importance of wage and salary increases by industry and the business sector.

Figure II shows the evaluation of equation (5) for 1989. The growth rate of business sector compensation per person-hour worked at 8.289% was mainly due to increases in wages, salaries and related labour costs (8,173%). The contribution of shifts in the industrial composition of hours and employment (.009% and .107% respectively) were not a factor in the 1989 increase. As the fourth column of Table II indicates, the largest contributors to the growth in business sector compensation per person hours originates in Manufacturing, Trade and in the Community, Business and Personal Services Industries. The combined contribution of these industries account for 4.289% of the 8.289% increase, i.e., for 58.6% of the business sector increase. The contribution of hours and employment shifts at the industry level is more pronounced than that observed at the business sector level. For the industries mentioned above, the dominating factor is the increase in compensation per person-

hour worked. In the case of Manufacturing, the contribution of compensation per person-hour to business sector compensation per person-hour would have been 2.1% instead of 1.72% has not been for a simultaneous reduction in the number of hours worked per person and employment share by the industry.

FIGURE II

COMPONENTS OF BUSINESS SECTOR
COMPENSATION PER PERSON-HOUR WORKED
1988-1989
(PERCENTAGE)

	$\bar{\mu}_i(\bar{h}_i-\bar{h})$	$\bar{\mu}_i(\bar{e}_i-\bar{e})$	$\bar{\mu}_i\bar{\delta}_i$	Σ
Agriculture	0.041	-0.103	0.097	0.035
Fishing & Trapping	-0.003	-0.010	-0.023	-0.036
Logging	-0.016	0.020	0.086	0.090
Mining	-0.004	-0.132	0.302	0.166
Manufacturing	-0.080	-0.304	2.104	1.720
Construction	0.029	0.353	0.884	1.265
Transportation	0.010	0.140	0.297	0.447
Communications	0.017	0.079	0.133	0.229
Other Utilities	-0.002	0.054	-0.014	0.038
Trade	0.031	-0.222	1.629	1.438
Finance, I.R.E.	0.036	-0.151	1.309	1.194
Community B.P.S.	-0.050	0.382	1.369	1.701
Business Sector	0.009	0.107	8.173	8.289

FURTHER ANALYSIS

It is possible to conduct the analysis at a more desaggregated level. Employment and hours data are separately produced for paid workers and for other-than-paid workers (includes working owners and partners operating their own businesses). This, however, would not provide additional insight as to whether the increases in pure compensation per person and per person-hour was the result of increases in wages, salaries and commissions (the main components of paid worker compensation), or the result of business owners increasing their annual compensation. This is because labour compensation of other-than-paid is imputed by assuming their average hourly earnings to be identical to that of paid workers in

the same industry.

Another avenue that cannot be pursued at present is to enlarge the industrial breakdown. The 1989 data on employment, compensation and hours is produced at the S level of aggregation, as shown in the above tables.

Given that the raise in labour compensation is overwhelming in this analysis, it could be worthwhile to focus further on the behaviour of its components. One possibility is to distinguish between wage settlements and other forms of compensation such as COLA adjustment, bonuses and commissions. It might be that the COLA adjustment is responsible for a significant proportion of the increase due to a relatively higher consumer price index in 1989. This analysis is beyond the intent of this note but it can be done if required.

DATE DUE
