Determinants of Aggregate Employment: An Example of the Food Retail and the Hotel and Catering Sectors

by

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This article deals with the explanation of aggregate employment in the service industries. A theoretical labour-demand relation is discussed briefly. In this relation the effect of average production scale is included. Empirical illustrations are given using Dutch data of the food retail and the hotel and catering sector over the years 1962–82.

INTRODUCTION

Employment in the service industries, including wholesaling and retailing, represents an important share in total market sector employment. See Gershuny and Miles [1983], Gripaios [1985] and Snel [1986]. An impression of the relative importance of employment in the service industries for various European countries is given in Table 1.

TABLE 1
EMPLOYMENT IN THE SERVICE INDUSTRIES AS A PERCENTAGE OF TOTAL MARKET SECTOR EMPLOYMENT, 1982

Country	Share of the service industries
Italy	42
Germany	43
France	49
Great Britain*	53
Belgium	57
The Netherlands	58

* 1981.

Source: National Accounts ESA [1984].

Employment in the services has been rapidly growing in recent years. For Great Britain, for instance, the percentage growth of employment over the period 1971–84 is +20 per cent for wholesaling, +7 per cent for

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retailing and +19 per cent for other services, whereas the percentage changes for manufacturing and construction are −31 per cent and −16 per cent respectively (see Distributive Trades EDC [1985]). The services are thought to have a considerable potentiality for job creation in the future. Employment growth in the services is particularly critical if manufacturing and other industries show decreasing employment and if state employment is stagnating (see Gershuny and Miles [1983]).

In this article we want to analyse the determinants of employment developments in two sectors of the service industries: the food retail and the hotel and catering sector. In terms of the classification of Browning and Singelmann [1978] we have one sector from distributive services and one from personal services. *Quantitatively* the food retail and the hotel and catering sectors do not play a dominant role in the employment in service industries. For example, in 1982 their share in total service industries employment in the Netherlands was 7.0 per cent and 4.5 per cent, respectively. However, employment in food shops, hotels, restaurants, cafés, etc. has two important *qualitative* aspects:

- employment is spatially widely distributed so that job opportunities are offered in areas where other employment sources are scarce;
- generally, no highly skilled labour is required in this part of the service industries. The famous information technologies do not play an important role yet in these two sectors. This means that there is a significant threat of unemployment in the untrained part of the labour force if employment in this part of the service industries decreases.

Throughout its seven volumes the *Service Industries Journal* has devoted considerable attention to employment and labour productivity problems in the retail and the hotel and catering sectors. (See, for example, Minter [1981], Sparks [1981], Minter [1982], Robinson and Wallace [1983], Reynolds [1983], Thurik [1984], Van der Hoeven and Thurik [1984] and Johnson [1985]). Our attempts to study employment developments in other parts of the service industries failed due to data limitations. The same problem is noted in Distributive Trades EDC [1985] where many interesting hypotheses are gathered but where no comprehensive quantitative explanation of changes in employment is given. Hence, the consequences of developments (innovation) of the provision of all services to households, firms and institutions for total employment and the quantitative description (behaviour model) of these consequences have as yet to be postponed. (For an accounting model see Gershuny and Miles [1983].)

LABOUR DEMAND RELATION

We assume that employment developments in the food retail and hotel and catering sectors can be explained by relative changes in

volume of value-added, in the degree of (dis)hoarding of labour, in the rate of capacity utilisation, in working time, in real wages, and by technical progress and increase of average production scale. (See Briscoe and Peel [1975], Driehuis en Van den Noord [1980 and 1982], Wennekers [1982], Van den Noord [1984] etc.)

Well-known further influences on employment growth such as the development of export share, i.e., the difference between the relative change in exports and in volume of value-added, and the development of research and development expenditures are not taken into account. Food retailing shops, hotels, restaurants and cafés are mainly producing for the domestic market; therefore, exports are small. Research and development expenditures are also small in these sectors with a low degree of utilisation of technical devices. We assume that an increase or decrease of exports and research and development expenditures has no influence on employment. Clearly, in an employment study in wholesaling we could not ignore the changes in export share. More formally we can write

$$\dot{l}_t = f(\dot{y}_t, \dot{c}_t, \dot{q}_t, \dot{h}_t, \dot{p}_t, \dot{r}_t, \dot{s}_t) \qquad (1)$$

where

$\cdot$ refers to relative change
t refers to year
l = employment (labour volume)
y = value-added (volume)
c = (dis)hoarding of labour
q = capacity utilisation
h = working time
p = real wages per employee
r = level of technical progress
s = average production scale

Similarities between the food retailing sector on one hand and the hotel and catering sector on the other support the use of an identical relation. The most important similarities (cf. Thurik and Van der Hoeven [1986]) are:

- production does not consist of tangible or material commodities only but of a 'bundle of services' which is difficult to define. For instance, it is impossible to store or to resell such a product;
- few highly skilled workers are required;
- small scale of production (shops, restaurants, etc. are usually of limited size);
- on the whole technological progress is limited. The technical progress of recent and coming years may be different: micro-electronic based computing and micro-electronic communications are general purpose and flexible in use and are developing

very rapidly. See Dawson and Sparks [1986: 8];
- markets are bounded (spatial monopoly, no exports);
- discrepancy between the opening and working hours.

Similarities between the retail and the hotel and catering industry were shown through econometric exercises on the level of individual enterprises in Van der Hoeven and Thurik [1984]. There are also differences. The most important (see Van der Hoeven and Thurik [1987]) are:

- a retail customer leaves the outlet with material goods which he is going to consume afterwards. A customer of a hotel or a catering outlet does not leave with a material good: the only thing he takes with him is (dis)satisfaction with the services rendered or the time spent;
- sometimes there is a control system of customers' arrivals (reservation system) in the hotel and catering sector;
- a busy establishment is often attractive in the hotel and catering sector, in retailing, however, it is usually unpleasant.

Equation (1) is expressed in relative changes. We are interested in the explanation of the relative (or percentage) employment change over a one-year period. It is questionable whether the relative changes of the explanatory variables should also be taken over a one-year period. It is not straightforward whether short-term (one-year period) or longer-term (several years period) effects prevail. Therefore, the influence of both a short-term period (one-year percentage change) and a longer-term period (three-year percentage change) is considered for the explanatory variable value-added which is assumed to play a dominant role in the explanation of employment. We shall leave it for the data to decide whether a short-run (business cycle) influence, a long-run (structural) influence or a combination occurs. In other words, we shall test whether labour (dis-)hoarding plays a dominant role in these sectors or not. No such procedure will be adopted for the remaining explanatory variables because they contain less variation (= information).

With the above-mentioned arguments in mind, we choose the following linear specification for the food retailing as well as the hotel and catering sector:

$$\dot{l}_t = \alpha_1 \dot{\tilde{y}}_t + \alpha_2(\dot{y}_t - \dot{\tilde{y}}_t) + \alpha_3 \dot{p}_t + \alpha_4(\dot{y}_t - \dot{n}_t) + \alpha_5 + \alpha_6 d_t \qquad (2)$$

where

~ refers here to a three-year-moving average
n = number of establishments
d = labour market dummy, variable with value 1 if total unemployment is low and 0 if total unemployment is high.

Relation (2) is a linear specification of (1). The coefficients of (2) can be

interpreted as elasticities. The use of the same specification of both sectors gives the advantage of comparability of the coefficients. Equation (2) needs further explanation.

- l_t is expressed in real working hours. Illness, holidays, etc. are excluded (see Bol *et al.* [1982 and updates]). Assuming that marginal productivity is not lower than average productivity in these sectors, h_t is omitted.
- Inspection of the estimated values of α_1 and α_2 has to show whether $\dot{l}$ is influenced by $\dot{\bar{y}}_t$ alone.($\alpha_2 = 0$), by $\dot{y}_t$ alone ($\alpha_1 = \alpha_2$) or by a combination of both $\dot{\bar{y}}_t$ and $\dot{y}_t$ ($\alpha_1 > \alpha_2 > 0$).

  Rearranging $\alpha_1 \dot{\bar{y}}_t + \alpha_t (\dot{y}_t - \dot{\bar{y}}_t)$ with $\dot{\bar{y}}_t = \frac{1}{3} (\dot{y}_t + \dot{y}_{t-1} + \dot{y}_{t-2})$ gives $(\frac{1}{3} \alpha_1 + \frac{2}{3} \alpha_2) \dot{y}_t + \frac{1}{3} (\alpha_1 - \alpha_2) (\dot{y}_{t-1} + \dot{y}_{t-2})$. The difference between the values of α_1 and α_2 is a measure of the degree of lagged adjustment of employment to value added. Such lagged adjustment is the result of the occurrence of adjustment costs, irreversibility of decisions taken and lack of control and information. (See Thurik and Kleijweg [1986] for retailing and Van der Hoeven and Thurik [1986] for the hotel and catering sector.) Such lagged adjustment is also often referred to as Okun's law. See Okun [1962] who deals with business cycle effects in the whole American economy.

- We take the increase of value-added per establishment, $\dot{y}_t - \dot{n}_t$, as an indicator of the average production scale. The influence of average production scale on employment is based on the occurrence of fixed threshold labour costs per establishment. The importance of these costs diminishes with increasing scale. If the production scale is large, these fluctuations are relatively smaller.
- We omitted the development in capacity utilisation, $\dot{q}$. Capacity utilisation is defined as the proportion of actual to maximal output (in our case value-added). The hypothesis is that the relation between value-added and employment becomes weaker if capacity utilisation is low. The reason is that first capacity utilisation is assumed to change and then employment if an output change occurs. Usually the elasticity of employment with respect to capacity utilisation is less than one due to (dis-)hoarding of labour. The effects of capacity utilisation and labour hoarding are not taken into account explicitly in equation (2). Implicitly they are covered by the use of both $\dot{y}_t$ and $\dot{\bar{y}}_t$. Let us assume for the sake of easy illustration that $\dot{p}_t = \dot{y}_t - \dot{n}_t = d_t = 0$ and $\alpha_5 = 0$ in equation (2). Then assuming $\alpha_1 > \alpha_2 > 0$, $\dot{l} < \alpha_1 \dot{y}_t$ if $\dot{y}_t - \dot{\bar{y}}_t > 0$ and $\dot{l} > \alpha_1 \dot{y}_t$ if $\dot{y}_t - \dot{\bar{y}}_t < 0$. Or in words: in an expanding market, $(\dot{y}_t > \dot{\bar{y}}_t)$, employment growth is below what is expected on basis of the values of α_1 and $\dot{y}_t$, whereas in a declining market, $(\dot{y} < \dot{\bar{y}})$, employment

growth is above what is expected. The discrepancy between expectation and actual growth may be attributed to the effects of the influence of capacity utilisation and labour hoarding, since the rate of capacity utilisation depends upon the market situation and the effect of capacity utilisation on employment is tempered by (dis-)hoarding of labour.

- The relative change in real wages per employee, $\dot{p}$, is used assuming that first the level of wages is an indicator of the quality of labour and secondly the urge to increase productivity rises if the level of wages rises.
- We use a constant, α_5, for remaining influences which are assumed to be constant in time. There are for instance technical and organisational improvements. The constant contains these improvements so far as they are not embedded in the other explaining variables.
- Furthermore, we assume that there will be a relation between the level of technical and organisational progress and the degree of scarcity on the labour market: the search for technical and organisational improvements is assumed to depend upon the scarcity on the labour market. Therefore, we introduce a labour market dummy, d_t, taking the value 1 if total unemployment is lower than 100,000 full-time equivalents (FTE) and 0 otherwise. Over the period 1962–1982 $d_t = 1$ from 1962 to 1971, and $d_t = 0$ from 1972 to 1982.

DATA

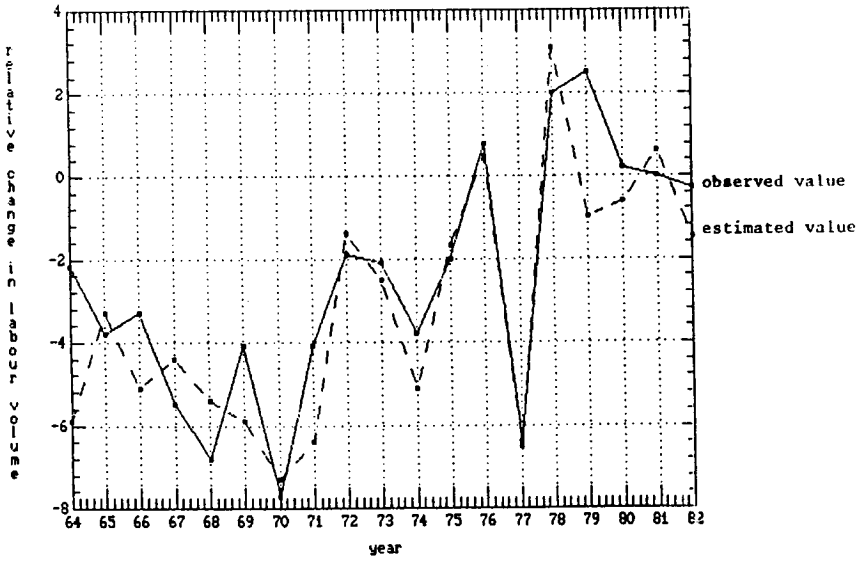
We use Dutch data for the years 1962–82. The sources are the national accounts of the Netherlands (Central Bureau of Statistics), the production statistics of the food retail and the hotel and catering sectors for the years 1977–82, 1978–82, respectively (Central Bureau of Statistics), the labour statistics of Bol *et al.* [1982 and updates] and the number of establishments of the food retailing from the 'Central Registration Office'.
Sometimes data are not available. The following solutions are chosen.

- For the food retailing no time series of value-added are available. The consumer spendings on food, beverages and tobacco are used instead.
- Developments of wages per sector are not always available. They are approximated by the developments of wages in the total market sector.
- For the hotel and catering sector no changes in the number of establishments are available. These changes are approximated by changes in the number of entrepreneurs.

In Figures 1 and 2 the values of l_t are plotted for the food retail and the hotel and catering sector. Over the period 1962–77 employment

decreased in the food retail sector. In 1978 and 1979 employment increased and from 1980 to 1982 it stabilised. In the hotel and catering sector, the periods of increasing and decreasing employment are not the same as in retailing. Over the period 1962–72 employment decreased, from 1972 to 1977 it stabilised, and from 1977 to 1982 it increased.

FIGURE 1
FOOD RETAILING



RESULTS

Apart from equation (2) three alternative specifications were formulated and estimated (See Kleijweg [1986]). Straightforward estimation of (2) is hampered by data and multicollinearity problems. Therefore, the results presented here are no exact estimation results, but they are plausible in the light of our entire specification search.

For the food retailing we have found.

$$\dot{l}_t = .9\ \dot{\bar{y}}_t + .7\ (\dot{y}_t - \dot{\bar{y}}_t) - .5\dot{p}_t - .3(\dot{y}_t - \dot{n}_t) + .5 - 3d_t \qquad (3)$$

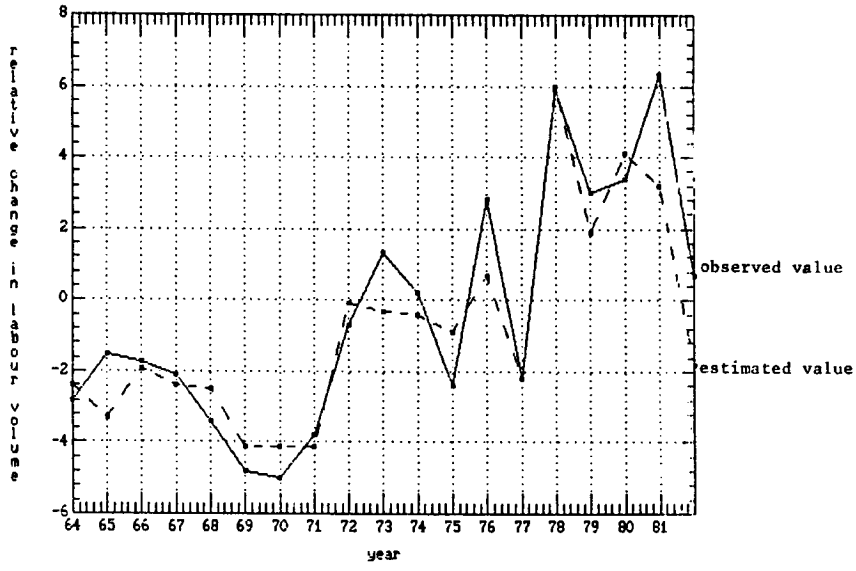
and for the hotel and catering sector

$$\dot{l}_t = .8\ \dot{\bar{y}}_t + .7\ (\dot{y}_t - \dot{\bar{y}}_t) - 0\ \dot{p}_t - .5\ (\dot{y}_t - \dot{n}_t) - 1.5 - d_t \qquad (4)$$

In words:
for the food retailing

– the elasticity of employment with respect to long-term (struc-

FIGURE 2
HOTEL AND CATERING SECTOR



tural) sales is about .9; the elasticity with respect to short-term sales is smaller (.7);
- the elasticity of employment with respect to real wages is –.5, the elasticity with respect to average production scale is –.3;
- over the period 1962–1971 employment decreased in an average rate of 2.5% per annum (*ceteris paribus*), whereas over the period 1972–1982 there is a minor increase of .5 per cent;

for the hotel and catering sector

- the elasticity of employment with respect to structural value-added is about .8 (*ceteris paribus*); the elasticity with respect to short-term value-added is almost the same (.7);
- the elasticity of employment with respect to real wages is zero. Presumably, this is caused by the lack of relevant data of wages per employee in this sector;
- the elasticity of employment with respect to average production scale is high (–.5 per cent);
- over the period 1962–71 employment decreased in an average rate of 2.5 per cent per annum (*ceteris paribus*), whereas over

the period 1972–82 there is a decrease of 1.5 per cent per annum.

In Figures 1 and 2 the calculated values of $\dot{l}_t$ from equation (3) and (4) are plotted for the food retail sector and the hotel and catering sector, respectively.

CONCLUSIONS

Data from the Dutch food retail and hotel and catering sector used in the framework of a simple linear model show that

- the short-run effect of value-added (consumer spending) on employment is as follows: a one per cent increase (decrease) in value added yields a .7 per cent increase (decrease) in employment;
- there is an additional long-run effect of about .2 per cent in the food retail and .1 in the hotel and catering sector;
- an increase of average production scale leads to a decrease in employment. Our results indicate that this effect is stronger in the hotel and catering sector than in the food retail sector. Clearly, all kinds of second order effects in the area of subcontracting and supply firms have been neglected here. For instance, it is possible that if firms grow larger, tasks such as security, maintenance, cleaning and further specialised tasks such as the attendance of a tobacco/newspaper shop in a hotel, are being contracted out to independent firms;
- a wage rate increase leads to a decrease in employment. Empirically, this effect is not found in the hotel and catering sector;
- apart from employment developments due to changes in production, in real wages and in average production scale, there is a nearly constant autonomous decrease of employment over the period 1962–82 in the hotel and catering sector. Further research has to found the determinants of this decrease;
- there is reason to assume that scarcity on the labour market influences productivity.

It would increase our knowledge of the service industries if we could dispose of reliable data for all sectors of the service industries so that we could perform comparable exercises for all sectors.

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