

# Methods of Recording Retail Prices and Measuring the Cost of Living in Italy

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SINCE the outbreak of war the compilation of retail prices of articles of consumption and the calculation of changes in the cost of living have become matters of great importance. It is therefore both timely and desirable to consider methods of compiling such prices, transforming these data into composite index numbers of the total cost of living, and adjusting wages to these changes in different countries.

From the articles on *Retail Price Fluctuations* published in the *International Labour Review* (1) it is clear how great is the variety of methods in use in different countries, and the reader is very rightly warned against hasty comparisons between the index numbers of various countries without first studying the methods by which they have been established.

In the following short article dealing with Italy the subject may conveniently be divided into: (a) the collection of prices; (b) methods of calculating index numbers; (c) methods by which wages may be adjusted to variations in the cost of living; and, finally, (d) criticisms and conclusions.

## COLLECTION AND RECORDING OF PRICES

The practical and technical difficulties in the way of obtaining accurate statistics of retail prices are very great. The data available in the various districts of Italy are compiled, with few exceptions, by offices without special competence or practice in statistical records, and it is rarely possible to determine whether the figures represent prices at a fixed date or averages calculated over a certain period of time, or how the prices have been obtained. Detailed information is often lacking as to the quality of the particular commodities and the place, market, or shop, where they were offered for sale.

Moreover, the range of commodities in regard to which prices are recorded with a certain amount of regularity is usually very limited, so that information is wanting for many articles of great importance. For articles subject to official regulations, prices are given as they stand in the official price list of the Govern-

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(1) Vol. I, No. 1, Jan. 1921, p. 61, and following numbers.

ment or the municipality, instead of those actually paid, and this has more especially been the case since the war.

As the requirements of experts and others interested in retail prices and the cost of living became more exacting, statistical offices in Italy recognised the necessity of making special periodical enquiries into the prices of articles of food, for the purpose of correcting and supplementing what had previously been done.

#### CALCULATION OF INDEX NUMBERS

The first enquiries made with this object were initiated by the Department of Labour, which from July 1913 collected and published each month in its official *Bulletin* the prices of the following seven articles of food: wheaten bread, wheaten flour, macaroni, beef, bacon, oil, and milk. The information was supplied by municipal authorities, co-operative societies, chambers of labour, and chambers of commerce, for 43 towns, and the index numbers were calculated on the prices per unit (a kilogram for the first five articles, a litre for the other two), taking the average prices for 1912 as 100. The relative prices were calculated separately for each of the seven articles, taking as the monthly average price the arithmetical average of the local prices; and the final index number was the average of the seven index numbers so obtained.

The series of index numbers thus calculated up to the time of its discontinuance in April 1919 is as follows.

TABLE I. INDEX NUMBERS OF THE PRICES OF SEVEN ARTICLES OF FOOD IN 43 ITALIAN TOWNS  
(Prices of 1912 = 100)

	1914	1915	1916	1917	1918	1919
Jan.	95.7	102	125.1	136.0	192.2	263.8
Feb.	95.6	104.2	124.9	145.5	208.8	261.6
Mar.	95.7	105.8	125.4	151.4	223.3	262.8
Apr.	96.2	106.5	124.8	154.5	227.8	265.2
May	94.0	108.3	126.1	157.6	220.2	
June	94.8	108.3	125.7	161.0	228.7	
July	94.3	113.5	124.8	161.6	228.7	
Aug.	95.5	117.6	124.7	168.2	242.6	
Sept.	95.9	113.8	124.3	177.0	251.8	
Oct.	97.6	119.9	124.1	180.6	256.9	
Nov.	99.1	121.2	123.8	186.0	261.4	
Dec.	100.1	123.7	130.6	187.6	263.9	

Since April 1919 the Department of Labour has published monthly average prices and index numbers referring to 1913 for the principal Italian towns and for the following 21 articles: wheaten bread, wheaten flour, maize flour, rice, dried beans, macaroni, potatoes, fresh beef, fresh

pork, sausage, dried cod, eggs, bacon, cheese, lard, fresh butter, olive oil, sugar, roast coffee, milk, charcoal.

Local prices of each of the 21 articles are obtained each month and the arithmetical average local price for each article calculated from these. An arithmetic average for the whole country of the price of each article is then calculated each month. Subsequently the relative prices for each of the 21 articles are calculated, taking the average price for the year 1913 as 100. Finally, a general index number is made by taking the arithmetical average of the relative prices of the 21 articles.

This series the Department of Labour still continues to publish. Up to May 1921 the results were as follows.

<i>1913 yearly average = 100</i>		
1918	July	396.1
	December	388.3
1919	June	362.3
	December	383.4
1920	January	383.8
	April	415.5
	July	451.8
	October	507.4
	December	543.2
1921	April	564.2
	May	544.2

The municipality of Milan was the first of the local authorities to publish, from January 1915 onwards, a series of

TABLE II. INDEX NUMBERS OF THE AVERAGE PRICES OF NINE ARTICLES OF FOOD IN MILAN (1) AND FLORENCE, AND EIGHT ARTICLES OF FOOD IN ROME (2).

*(Prices for the first half-year of 1914 = 100)*

	Milan	Rome	Flor- ence		Milan	Rome	Flor- ence
1914 First half-year	100	100	100	1920 May	445	384	425
1915 Jan.	101	—	105	1920 June	477	376	456
July	105	—	111	July	485	375	485
1916 Jan.	121	123	127	Aug.	486	377	498
July	129	123	134	Sept.	509	377	498
1917 Jan.	146	152	148	Oct.	503	407	517
July	188	177	189	Nov.	551	428	608
1918 Jan.	217	218	221	Dec.	590	444	626
July	277	264	277	1921 Jan.	570	443	644
1919 Jan.	297	297	297	Feb.	568	495	633
July	281	267	289	Mar.	588	444	634
1920 Jan.	340	350	350	Apr.	617	456	612
Feb.	361	350	366	May	593	432	589
Mar.	396	350	381	June	481	399	514
Apr.	428	363	390	July	483	—	463
				Aug.	—	—	484

(1) The index numbers for Milan take 1912 as base = 100; in the table they have been recalculated on the basis of the first half-year of 1914 = 100.

(2) In Rome flour and butter are omitted, but potatoes are included.

index numbers calculated according to the method followed by the Department of Labour, and dealing with nine chief articles of food (rice and butter in addition to the seven articles dealt with by the Department).

As this series, notwithstanding the deficiencies referred to later, is being continued by the authorities which initiated it, and has recently received practical application, it appears desirable to reproduce it in its essential lines, for the cities of Milan, Rome, and Florence.

So far only the prices per unit of the various articles examined had been considered, without taking account of the relative importance of the articles themselves as articles of consumption, so that a pound of bread is of equal importance with a pound of butter or bacon. Hence the remarkable difference after January 1920 between the index number for Rome, which did not include butter, and the numbers for Florence and Milan, which did.

The first case of a more detailed enquiry, in which account was taken of the difference in importance of the various articles entering into consumption, appeared in the *Giornale degli Economisti e Rivista di Statistica (Journal of Economists and Review of Statistics)* of March 1916. Twenty articles of food were considered, and quantities were taken which were presumed to represent the weekly consumption of a family of five persons (two adults and three children). In view of the great variety in the quality and quantity of food consumed, not only in various districts but by various families in the same district, it was not claimed that the quantities taken represented any normal consumption, but it was believed that they were not inadequate to the requirements of a family in a modest position, spending in proportion to its means. On this weighted average calculation the municipalities of Milan and Florence, followed later by some others, established new series of index numbers. These are the series commonly known under the name of "Weekly Food Budget of a Family of Five Persons (two adults and three children) with unvarying consumption".

Table III gives the family budget adopted by the city of Florence, which served as a basis for subsequent enquiries with a view to the calculation of index numbers on a complete budget.

The city of Milan fixed the quantities of the various commodities on the basis of an enquiry carried out in July 1913 in that city by Professor Pugliese; instead of 17 articles, as in Florence, 25 were taken; but the differences between the two budgets as a whole are very small (in 1914 expenditure on the Florentine budget was 21.40 lire, on that of Milan

TABLE III. WEEKLY FOOD BUDGET OF A FAMILY OF FIVE PERSONS (TWO ADULTS AND THREE CHILDREN) WITH UNVARYING CONSUMPTION IN FLORENCE

	Quantity	1st half-year 1914		August 1921		Index numbers
		Prices per unit	Expenditure in lire	Prices per unit	Expenditure in lire	1 <sup>st</sup> half-year 1914 = 100
Bread (large loaves)	Kg. 10.0	0.35	3.50	1.55	15.50	443
Rice	" 1.0	0.59	0.59	2.25	2.25	382
Macaroni	" 2.5	0.57	1.43	2.40	6.00	420
Beef (with bone)	" 2.5	1.40	3.50	7.00	17.50	500
Sausage	" 0.3	4.75	1.43	23.50	7.05	493
Cheese	" 0.4	3.10	1.24	19.00	7.60	613
Eggs	" 10.0	0.10	1.00	0.60	6.00	600
Lard	" 0.3	1.90	0.57	9.50	2.85	500
Oil	" 0.5	2.15	1.08	10.00	5.00	463
Butter	" 0.3	3.45	1.04	19.00	5.70	549
Beans	" 1.0	0.45	0.45	1.50	1.50	334
Cod	" 0.5	1.00	0.50	3.50	1.75	349
Potatoes	" 2.0	0.22	0.44	0.70	1.40	318
Sugar	" 0.3	1.55	0.47	6.10	1.85	394
Coffee	" 0.2	5.00	1.00	26.00	5.20	520
Milk	litres 4.0	0.35	1.40	1.45	5.80	415
Wine	" 4.0	0.45	1.80	1.70	6.80	378
Total			21.44		99.75	466

25.58 lire), except for the inclusion in the Milan budget of green vegetables and fruit, so that the two series may be regarded as sufficiently suitable for comparison. The results are given in the following table.

TABLE IV. INDEX NUMBERS OF THE COST OF LIVING ON THE BASIS OF THE FOOD BUDGET OF A FAMILY OF FIVE PERSONS (TWO ADULTS AND THREE CHILDREN) IN MILAN AND IN FLORENCE

(Base : first half of 1914 = 100)

		Milan	Florence			Milan	Florence
1915	Jan.	—	108	1920	Jan.	412	329
	July	—	116		July	445	413
1916	Jan.	138	137	1921	Jan.	571	492
	July	151	147		Feb.	564	484
1917	Jan.	170	162		Mar.	582	517
	July	210	184		Apr.	598	522
1918	Jan.	272	229		May	598	523
	July	321	298		June	523	481
1919	Jan.	399	329		July	506	451
	July	304	278		Aug.	—	465

But when the cost of living had thus been measured by a weighted average, which took into account the nature of the articles consumed, it appeared, as a result of the many legislative and other limitations imposed during the war, that the quantities assumed no longer corresponded to facts. It was thought desirable, therefore, to adjust calculations month by month to the varying consumption resulting from such legislative restrictions and from the scarcity of supplies in the market, reducing the quantities of the articles which were scarce and replacing them by others which it was possible to purchase. In the selection of the articles and the determination of the quantities to be substituted, the criteria followed were economic, in the sense of giving the preference as far as possible to the cheapest articles and qualities, and physiological, in the sense of utilising the most recent studies on this subject and adjusting the quantities of the various articles selected to their nutritive value. New series of index numbers were thus obtained on the basis of the "Weekly Food Budget of a Family of Five Persons (two adults and three children) with modified consumption". Milan and Rome conducted this type of enquiry, and amply illustrated its method and practical execution in their *Bulletins* and other publications. The index numbers of this series were, however, very rarely used in wage negotiations.

Up to this point, enquiry into the cost of living was limited to a greater or smaller number of articles of food; it was argued that any higher percentage of increase in other articles of consumption would be compensated for by the small increase in rents, which were restricted by definite legal regulations. But the more extensive employment of index numbers of the cost of living soon made it necessary to devise a method by which it would be possible to include every kind of expenditure in the periodical calculations of these numbers. The Statistical Association of Italian Cities (*Unione statistica delle città italiane*), echoing the wishes expressed by the municipal Labour Offices which had been established during the last few years, assumed the task of devising a formula which would make it possible to set on foot a periodical enquiry into the cost of living on a broad and homogeneous basis in all the principal towns. At a series of meetings, beginning on 20 March 1920, of an expert committee appointed for the purpose, and including representatives of the various municipal offices of statistics, in particular those of Milan, Rome, and Florence, and also of the Laboratory of Social Statistics of Venice, general criteria were established, which were afterwards approved at the Congress of Statistical Offices and Municipal Labour Offices held at Milan from 6 to 8 July 1920. These criteria appear from the following resolution passed by the congress.

This meeting, having discussed the question of a statistical method for the formation of index numbers of the cost of living:

Considering that in this complex and delicate matter it is not possible

to obtain formulæ which can claim to correspond to actual facts, but only to suggest methods of compilation and calculation permitting of an approximation, profiting by the experience so far acquired by the various offices which have been engaged on such investigations :

Proposes

(a) that the measurement of fluctuations in the prices of articles of prime necessity should be based on a complete budget of a typical workingclass family, including articles of food, rent, lighting, heating, clothing, and miscellaneous items ;

(b) that articles of food should include the green vegetables in most general use and cheapest in price, in quantities proportionate to local consumption ; that, as regards fruit, while admitting the difficulties presented by the compilation of prices varying from day to day and by diversity in quality, the local offices shall decide whether or not they shall be included in the budget, according to the importance of fruit in the local consumption ; and that as regards articles liable to seasonal variations in price, the monthly average resulting from the prices of a normal year shall be adopted, applying in each month the differences over or under the average of the corresponding month ;

(c) that the series of index numbers shall commence with the month of July 1920, which shall be taken as equal to 100, and that the budget for the succeeding months shall be unchanged in its composition and its weights, without prejudice, however, to the series at present in use in certain Offices of statistics and labour.

The Statistical Association of Italian Cities was instructed to continue negotiations for obtaining the adherence and collaboration of the most important urban centres ; it prepared a form of monthly return of the cost of living and sent it to the various municipal Labour Offices, accompanied by instructions, in which the following were the most prominent points :—

(a) The starting date of the new series, i.e. July 1920.

(b) The possibility and desirability of introducing in the monthly return forms such modifications as to quantity and quality as would bring them into harmony with local conditions, without altering their actual fundamental lines.

(c) The need for keeping to the same qualities in the articles dealt with, and of selecting the qualities in most general and popular use.

The items in the model monthly budget proposed by the Statistical Association are given in Appendix I. They are now adopted, with some modifications, by all the statistical and Labour Offices engaged in the enquiry (2).

For the collection of prices recourse is had, in addition to the sources mentioned above (market lists and municipal lists), to special enquiries by individual offices, both for the

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(2) The index number of the cost of living is now periodically recorded in Italy on the lines laid down by the Congress of Milan and by the Statistical Association of Italian Cities in the following towns : Bari, Florence, Genoa, Messina, Milan, Rome, Turin, Trieste, Venice, Cesena, Como, Cremona, Lucca, Mantua, Perugia, Prato, and Rimini.

purpose of filling up the numerous gaps in the sources themselves and in order to get an idea of the real market prices as compared with those fixed by Government or by the municipality. As a rule, however, the fixed prices are adhered to, except where there is a complete, or almost complete, absence of goods obtainable at such prices.

Where prices are directly ascertained by the statistical offices from government or municipal shops, co-operative stores, and private shops, it is customary to obtain regular information as to the quality of each article by sending questionnaires; these questionnaires include the replies given for the preceding period. Periodical enquiries will not be made about rents so long as the present legislative provisions, fixing terms and percentages of increase, are in force. In the case of clothing, kitchen utensils, and certain other expenses, prices are generally revised every two or three months instead of monthly.

The following tables are a résumé of the figures of a complete budget, calculated in the manner above indicated for the month of July 1920, for the towns of Florence, Milan, Rome, Turin, Trieste, and Venice.

TABLE V. WEEKLY EXPENDITURE OF A FAMILY OF FIVE PERSONS (TWO ADULTS AND THREE CHILDREN) FOR JULY 1920 IN CERTAIN LARGE TOWNS IN ITALY

	Florence		Milan		Rome		Turin		Trieste		Venice	
	lire	percent. of total	lire	percent. of total	lire	percent. of total	lire	percent. of total	lire	percent. of total	lire	percent. of total
Food	93.68	62.2	105.02	60.7	109.02	62.8	115.56	62.7	139.84	63.0	118.76	60.2
Clothing	23.09	15.3	29.25	16.9	25.28	14.6	29.75	16.2	29.67	13.4	32.97	16.7
Rent	5.77	3.8	5.09	2.9	10.0	5.7	6.0	3.3	13.0	5.9	10.50	5.3
Lighting and heating	10.13	6.8	11.37	6.5	7.31	4.3	10.79	5.8	17.29	7.8	10.10	5.1
Miscellaneous	17.88	11.9	22.35	13.0	21.73	12.6	22.11	12.0	22.01	9.9	25.05	12.7
Total	150.53	100.0	173.08	100.0	173.53	100.0	184.21	100.0	221.81	100.0	197.38	100.0

The rather remarkable differences between the various index numbers are due to the differences in the family budgets taken as the basis in conformity with local customs, to the differences in the frequency with which the prices of certain articles (clothing and health expenses, etc.) are ascertained, monthly, bi-monthly, or quarterly; to the relatively different quantities of seasonal articles; and to the fact that the prices of the last named are in some towns (Milan, Turin) calculated after correction of the seasonal variations, while in other cases such correction is not made.



TABLE VI. INDEX NUMBERS OF COST OF LIVING IN CERTAIN TOWNS IN ITALY (*New Series*)

	Florence	Milan	Rome	Turin	Trieste	Venice
1920 July	100	100	100	100	100	100
Aug.	101	101	102	101	101	104
Sept.	103	106	105	103	105	105
Oct.	105	110	113	106	108	107
Nov.	116	112	120	112	115	112
Dec.	119	118	123	118	119	114
1921 Jan.	121	124	122	119	117	115
Feb.	121	126	124	119	118	115
Mar.	126	127	125	122	119	118
Apr.	129	131	129	122	119	118
May	129	132	124	118	113	116
June	119	118	121	112	108	107
July	114	114	—	105	103	108

The new series on the basis of a complete budget, as already stated, has been generally adopted; the Statistical Association of Italian Cities intended to place on the agenda of its last meeting, on 1 April 1921, a discussion on the desirability of calculating a national index number of the cost of living and the criteria by which such index number should be obtained. Meanwhile, however, the Ministry of Labour, by its Decree of 26 February 1921, affirming the desirability of regulating and co-ordinating investigations into the cost of living of the working classes in relation to corresponding variations in wages, instituted in the chief town of every province a special consultative committee, which may be called upon to give its opinion, at the request of public authorities or of industrial, commercial, or workers' organisations, on all questions expressly relating to the cost of living and corresponding variations in wages. Pending, therefore, the results which might be obtained from this new arrangement, the Statistical Association, at the meeting above referred to, after expressing its opinion as regards the composition and working of these committees, to harmonise with what had already been done by the Association itself and by individual offices, again urged that, in fixing national index numbers, the Ministry of Labour should make it obligatory for the large communes, to determine their numbers in accordance with the standards approved by the Congress of Milan of 6 to 8 July 1920, and that the Ministry should then compile, verify, and publish these numbers.

#### WAGES AND COST OF LIVING

The following are the standards adopted by the Congress of Milan of 6 to 8 July 1920, already referred to, for bringing

wages into harmony with variations in the cost of living.

(1) Wages shall be re-calculated at intervals of three months on the arithmetical average of the index numbers of the three preceding months.

(2) Where the amount of the fluctuation in the cost of living is found to have exceeded 5 per cent. of the total wage (including the agreed wage, i. e. the minimum wage of any class or grade of workers, but excluding piece-rates or overtime) together with the cost of living bonus, then the full amount of such fluctuation shall be taken into account in re-calculating wages for that period.

(3) Where the amount of such fluctuation is found to be less than 5 per cent., it shall be added to the fluctuation recorded in the following period, and shall be taken into account in that way.

(4) In the event of a fall in prices adjustment shall be made on a reduced scale and after a longer interval than was adopted during the period of rising prices.

The congress specially insisted that the expenditure indicated in the typical family budget could not and must not serve for determining minimum wages or for any other practical purpose, such figures being only a means of determining relative variations in the cost of living.

Now that these standards have been laid down by the Congress of Milan for the adjustment of wages to variations in the cost of living, the other methods adopted in some employment contracts should be abandoned, among them the method very generally used of the valuation of points, which assigns a fixed plus or minus value to every point of difference between the index numbers of the periods to be compared.

#### CRITICISMS AND CONCLUSIONS

The first index numbers, calculated, as has been seen, for seven, eight, or nine commodities, already represented an advance on the older and simpler method, but it cannot be said that they constituted an adequate solution of the problem. This is not so much due to the small number of commodities on which they were based, as because such commodities were all, or nearly all, subject to municipally fixed or government prices, and therefore failed to express the movement of other commodities; further, because very often they were scarce in the market, or only to be obtained by private speculators at contraband prices. Moreover, the calculation of unweighted prices without taking into account the very different consumption of articles, in other words, without giving them a weight corresponding to the relative consumption of each article in the family budget, put these supposed fluctuations out of adjustment to real variations

in the cost of living. Attention has already been drawn to the way in which the omission of butter in calculating the index number in Rome made the movement of that number entirely different from that of the index numbers obtained by parallel methods in Milan and Florence.

It is natural, therefore, that experts and observers should have shown an increasing preference for the more complex index numbers, which would take account of the great variety in consumption and would value every article according to its real importance in the domestic budget. It may even be that the movement in this direction has gone too far; that if, on the one hand, it ensures a theoretical determination of the cost of living more closely corresponding to reality, on the other hand, it complicates the enquiry by making it possible only where well-organised statistical offices exist, and introduces into the calculation certain elements, difficult of definition, which may give results alien to the real truth.

The introduction of green vegetables, and still more of fruit, among the articles to be taken into account, is especially liable to bring these disadvantages. The continual variation in the kind and quality of these products, not only from week to week, but even from day to day: the difficulty, not to say impossibility, of keeping pace with their constantly fluctuating prices which change even in the course of the same day and which differ enormously in different quarters of the same town: different methods of sale (by the piece, by weight, by the bunch, with or without shells, etc): all these inconsistencies make the choice of articles and the determination of averages an extraordinarily arduous task. At the same time the calculator is bound, and is, in fact, advised by the Statistical Association, to make a point of limiting, on occasion, even by reductions and substitutions, the too violent fluctuations which expenditure on this item would introduce into the budget. A subjective element, though only a slight one, thus has to be introduced into an enquiry otherwise entirely based on objective data.

Again, in estimating expenditure on items other than food, it would be dangerous to go further than is actually done in the model return for a complete family budget. The expenditure there analysed represents at least four-fifths of a complete budget, while the expenses not specifically particularised include a number of miscellaneous articles and wants difficult of exact definition, the prices of which may legitimately be presumed to follow the general curve indicated by the budget. Every additional element, therefore, would only increase the difficulty and risks of the investigation.

What has been said as to the nature of the necessaries and comforts to be included in the budget is equally applicable to the quantity of the commodities considered, in other words, to the weight to be assigned to each. Here, too, it would seem that any attempt to arrive at perfect precision and absolute

correspondence with facts would be an illusion which would impair the simplicity of the periodical recalculation in a way that would be positively disadvantageous.

The tendency to pursue enquiries of a more detailed nature, more closely corresponding to an assumed reality, appears in the form of three distinct proposals :

(1) to establish a consumption budget based on records of actual family expenditure or on the physiological requirements of the family;

(2) to establish a type or several types of family, in conformity with the real distribution and nature of the population;

(3) to take into account natural or enforced changes in actual average consumption due to legislative restrictions, the state of the market, or even to changed living standards.

Some remarks will be made on each of these proposals. No one can dispute the importance of enquiries directed to domestic expenditure, but such enquiries cannot possibly be included among those capable of being carried out with any real certainty, quite apart from their inherent difficulty. The natural diffidence of men and their dislike of giving a correct account of their own expenditure, which is the same thing as giving an account of their income and their requirements, are superimposed on the real difficulty of keeping account of such expenditure methodically and correctly. In any case, the complications introduced by classifying types of families from the point of view of their distribution as to sex, age, and conjugal condition, of occupation, of social conditions, of educational standards and mental endowments, to which must then be added accidental and transitory types, make it almost impossible to draw any really profitable use from the budgets obtained. Such budgets, even on the most extensive enquiries, are too few to furnish significant averages within a single group, and too summary and superficial to serve as a basis for individual family histories. While every effort to improve and deepen these enquiries into the living standards of the various classes of society should be welcomed, no real advantage would be obtained by substituting for the round quantities of the commodities from which calculations are to be made on the basis of the probable consumption of a family of five persons, calculations which any one may verify, other quantities which would only give an illusion of greater exactness because they ran into a large number of decimal points.

There are two further considerations which support these arguments in favour of basing calculations on a summary and comprehensive knowledge of environment and custom. It must not be forgotten that, while practical necessity requires that a relatively small number of articles be mentioned in the budget, these do, in fact, include in the quantities theoretically assigned to them other similar commodities not specifically

described, which must be supposed to be following the same movement of prices. Thus the consumption of beef, put at  $2\frac{1}{2}$  kilograms per week, is understood to include and absorb the consumption of every other kind of meat. Even if the investigator claimed to have obtained particulars of consumption and of requirements from the multiform details of actual budgets, it would still be necessary to re-adapt these details and re-convert them into a more limited list of items.

In the second place, our general argument is supported by the consideration that the real financial budget of a family over a given period, especially in times of rapid change like the present, often does not correspond to a standardised economic budget; it does not take into account the consumption of commodities bought at other periods in the consumer's life, such as furniture, clothing, etc., the proper renewal of which is prevented by high prices. It would be necessary, if we wanted to achieve our purpose and complete our budget, to use artificial and arbitrary items to supplement our purely money data.

Nor is it desirable that the quantities of commodities on which our calculations are to be based should be determined by a so-called physiological budget, in other words, by the minimum number of calories necessary to support life. Such researches are of the greatest possible interest to observers, apart altogether from those war conditions which gave them a special importance, and it is to be hoped that they will be followed up and perfected. But in our case it seems dangerous to make use of them for fixing the quantities which are to be taken as a basis for the simple calculation of a weighted average, more especially as the conclusions of various observers differ very considerably. Such enquiries—for example, that carried out at Milan by Professor Pugliese in 1913, which is frequently and deservedly cited—tend to prove how insufficient is the real food budget of the working classes for supplying the energy required by the human body. They only add to our doubts as to the desirability of basing any calculations on average values computed from enquiries into the budgets of working-class families.

The question of the composition of the typical family whose consumption shall be taken as a measure of the cost of living also seems to be of small importance. Our object is not to establish absolute average figures of expenditure capable of furnishing standards for the determination of minimum wages, but to record the variations in price, from one period to another, of such a sufficient number of commodities as will allow us to estimate the really essential part of the budget of a family of whatever type. Investigation has proved that the percentage of the whole income absorbed by expenditure on food rises continually and gradually as we pass from single couples to larger families, just as it diminishes in passing from families with small incomes to families with

higher incomes. But, just as it would be impossible to attempt to calculate separate index numbers for each group of families classified according to income, so also would it be impossible to obtain or distinguish different indices of variation in the cost of living according to the age and sex constitution of families.

During the period of the war there was a certain tendency for enquirers to agree in theory that the quantities and qualities of commodities, on which calculations were to be based, should be to some extent made to harmonise with the changes imposed on consumers by legislative restrictions and by actual deficiencies in the supply of certain articles; there was, however, very little agreement as to how to apply this principle in practice. Help was sought from the investigations on the physiological budget referred to above, and articles, supplies of which were not available, were replaced by other articles which were obtainable in the market, and which were supposed to be equally valuable in supplying energy. Here the points we have already raised in reference to the computation of family budgets on the basis of physiological food values hold good for these substitutions; it may be added that, with these substitutions, important subjective and arbitrary elements are introduced into the calculation, which very much increase its difficulty and the responsibility of the calculator. Moreover, as the market gradually returns to freedom of trade, the principal reason which suggested the computation of index numbers on the basis of modified consumption is disappearing. Other observers, however, maintain that, in estimating cost of living, the alterations which have really taken place since the pre-war period in quality and quantity of commodities consumed should be followed, and argue that budgets based on the consumption of 1914 no longer correspond to the actual family budgets of today. We need only repeat the arguments already advanced as to the value of index numbers calculated on a normal budget, from which a weighted general number can be calculated, as a valuable rough method for any type of family budget. Could the proposed periodical enquiry be carried out with the required completeness and precision, it would indeed be of great scientific and practical importance, but it would furnish, not so much data for determining the cost of living, as invaluable information on changes in the standards of living of various classes of society. Thus a separate enquiry made by the present writer into the budget of a family of salaried employees<sup>(3)</sup> showed that, between the summer of 1914 and the summer of 1918, the combined consumption (over a fortnight) of bread, macaroni, beef, poultry, sausage, cheese, oil, butter, fruit, sugar, and wine was reduced by 34.1 kilograms, while the consumption of rice, bacon, eggs, beans, potatoes, cocoa, fish, and dried cod was only

(3) *Bolletino del Comune di Firenze*, Nos. 8-9, 1918.

increased by 16.2 kilograms. The food expenses of this particular family were, as a result of these changes and reductions, increased by only 128 per cent. as compared with those of 1914, while the combined increase in the cost of the various articles of food for the same period was 209 per cent.; there is no doubt that the latter is the figure which measures the effective increase in the cost of living, and not the figure previously indicated, which expresses only the result of economies and reductions imposed by failure to obtain an increase of income corresponding to the decreased value of money.

Again, calculation of the price variations of seasonal articles, such as eggs, potatoes, green vegetables, and fruit, might be theoretically justifiable with a view to eliminating fluctuations; but it would add nothing practically to the value or trustworthiness of periodically determined index numbers. As a matter of fact, data for establishing the normal seasonal rhythm of the huge number and varied qualities of green vegetables and fruit are mostly lacking; current prices are not, as a rule, recorded with sufficient completeness; finally, it has already been argued that the introduction of these articles has been more harmful than helpful to precise calculation. As regards eggs and potatoes, the seasonal variation of the first is counterbalanced to some extent by the seasonal variation of the second. In other respects, too, the introduction of theoretical prices into a budget based on actual market prices appears to be not without inconveniences.

In conclusion, it may safely be asserted that methods of determining cost of living are sufficiently elaborated for all practical purposes. Further refinements of technique and method are less to be desired than rapid progress in the extension of such enquiries to districts where they are still entirely unknown, or than a supply of good observers trained to record social and economic phenomena and to make comprehensive and systematic records of sale prices of articles of consumption.

Index numbers of the cost of living, even when most admirably calculated, will never express with absolute precision all price fluctuations or their effects on the domestic economy of particular families or of particular classes of the population. What they may and should express is the general course of prices in foods and other necessaries. While recognising the present and future value of periodically determined index numbers, we must avoid all exaggeration in claiming for them efficacy as absolute standards of wages. At bottom, the accusations directed against the technique of the calculator and the demands on him for an ever-increasing refinement of method only spring from the practical difficulties which arise when a rigid and almost automatic adjustment of wages to fluctuating index numbers is attempted. So long as government prices hold the field and the public authorities are, as they were during the war,

the supreme regulator of exchange, so long as industry can immediately and fully recoup itself for increased wages by raising the prices of products, while unrest among the working classes is suppressed by a régime of war legislation, wages rates and cost of living can be made to correspond fairly easily. But it is not to be supposed, when all or a great part of the restrictions of the war period are relaxed, when the world once more returns to a more normal economic routine, that then standards of wages can forthwith be established, independently of the natural play of economic forces, by the simple solution of a problem of arithmetic. Such a false idea may give rise to serious inconveniences and may even interfere with the true and useful functions which index numbers of the cost of living will always be able to perform as an invaluable factor in helping to solve disputes between employers and employed.

#### APPENDIX

#### Weekly Expenditure of a Working Class Family of Five Persons (Two Adults and Three Children)

*Budget as proposed by the Statistical Association of Italian Cities (4)*

##### *Food :*

Under this heading are included the 17 articles in Table III, page 49, with the addition of 4 kilograms of green vegetables in common use and 4 kilograms of fruit. The quantities indicated represent one week's consumption.

##### *Clothing :*

3 men's shirts	1 woman's vest
3 chemises	4 pairs women's cotton stockings
3 pairs men's drawers	4 pairs men's cotton socks
3 pairs women's drawers	1 man's suit
1 dozen cotton handkerchiefs	1 woman's costume
1 man's vest	
1 pair men's boots, 2 pairs men's shoes	
1 pair women's boots, 2 pairs women's shoes	
1 man's felt hat, 1 man's straw hat	

The quantities indicated represent one year's consumption ; the total expenditure is therefore to be divided by 52 to reduce it to one week's expenditure.

##### *Rent :*

The yearly rent is for of a dwelling of four rooms including kitchen. The total sum is divided by 52 to reduce it to weekly expenditure.

(4) See p. 51.



*Heating and Lighting :*

Charcoal	7 quintals
Small charcoal	1 quintal
Oil	36 litres
Candles	48

This expenditure is for a year and reduced to the weekly amount as above.

*Miscellaneous.**Washing :*

6 sheets
15 shirts
15 pairs of drawers
20 towels
2 tablecloths
20 handkerchiefs

This expenditure is for one month and is reduced to weekly amounts by dividing it by four.

<i>Tram Fares :</i>	21 journeys per week
<i>Newspapers :</i>	7 per week
<i>Education and Schools :</i>	60 exercise books
	10 books
	1 kilogram of ink
	10 pencils
	6 dozen nibs

The expenditure is calculated for a year and reduced to a weekly amount by dividing it by 52.

*Health :*

6 doctor's visits	1 kilogram cream of tartar
5 hectograms castor oil	1 kilogram mustard (in powder)
1 kilogram cod-liver oil	1 hectogram tincture of iodine

The expenditure is for one year and is reduced to weekly amounts as above.

*Glass, Crockery, etc. :*

2 bottles	10 glasses
4 enamelled iron saucepans	10 majolica plates
	10 earthenware plates

The expenditure is for one year and is reduced to weekly amounts as above.

## BIBLIOGRAPHICAL NOTE

A great deal of information on enquiries into the cost of living and on the many experiments in the application of the index numbers to the fixing of wages in Italy will be found in the *Bulletin La Città di Milano*, a veritable mine of information on the cost of living in Milan; in the *Bollettino dell' ufficio municipale del commune di Roma* (*Bulletin of the Municipal Office of the Municipality of Rome*), in the more recent *Bulletins of Turin and Genoa*, and in the bi-monthly *Bulletin of the city of Como*. Other towns, such as Florence, Venice, Messina, Mantua, Rimini, etc., publish monthly information on the cost of living in separate form. Among publications illustrating cost of living should be mentioned the article

already quoted <sup>(5)</sup> in the *Giornale degli Economisti e Rivista di Statistica* of March 1913, and the following articles by Prof. Aldo CONTENUTO in the same periodical: *La Guerra e l'aumento regionale dei prezzi* (*The War and local Increase of Prices*), May 1918; *La misura delle variazioni del costo della vita* (*The Measuring of Fluctuations in the Cost of Living*), January 1921.

Specially interesting for their abundant documentation and the copious practical examples and explanations contained in them are the following publications:

UFFICIO DEL LAVORO E DELLA STATISTICA DEL COMUNE DI MILANO (OFFICE OF LABOUR AND STATISTICS OF MILAN): *Le variazioni dei salarie in rapporto al rincaro della vita* (*Variations in Wages in relation to Increased Cost of Living*) by Dr. A. SCHIAVI, Milan, first edition, Sept. 1918; second edition, Nov. 1920. *Come si calcolano le indennità caro viveri* (*How Cost of Living Allowances are calculated*), by Dr. A. MOLINARI, Milan, March 1921.

LABORATORIO DI STATISTICA SOCIALE DI VENEZIA (LABORATORY OF SOCIAL STATISTICS OF VENICE): *Gli indici di variazione del costo della vita* (*Indices of Variations in the Cost of Living*) by Dr. R. GALLO, Venice, April 1921.

*Le oscillazioni del costo della vita in Italia* (*Variations in the Cost of Living in Italy*), by F. A. REPACI in the monthly *Bulletin*, *La Città di Torino*, No. 6, June, July 1921.

Verbatim reports of the discussions of the Technical College of the Statistical Association (*Collegio tecnico dell'Unione Statistica*), with documents and circulars relating to the determination of the cost of living, are collected in the *Bollettino dell'Unione Statistica delle città Italiane* (*Bulletin of the Statistical Association of Italian Cities*), Florence, Alfani and Venturi.

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(5) See p. 48 of this article.