Economic Aspects of Alcohol Consumption in the Republic of Ireland

BRENDAN M. WALSH
DERMOT WALSH*

Grattan: I will show that the brewer has been sacrificed to the distiller, and to the obstinate and insane whimsies of the revenue empirics.

Beresford (Chancellor of the Exchequer): It is of very little consequence to the morals of the people (if they will get drunk) what they get drunk with: it is however the duty of the legislature, as much as in them lies, to make the means of intoxication as difficult to come by as they possibly can: this can only be done by laying duties as high as the article will bear.

Exchange in the Irish Parliament, 2 February 1792.[1]

CONSIDERABLE difficulties beset international comparisons of the incidence and prevalence of "alcoholism". This reflects the absence of a universally accepted definition of the illness and of a yardstick by which its occurrence can be objectively established. Some of the various measures that have been proposed or used to compare national rates of alcoholism are obviously of doubtful validity. A brief discussion of these indices is sufficient to establish this point.[2]

National data on the quantity of alcohol consumed per person reveal little about the prevalence of excessive drinking in different countries, and less about the frequency with which such drinking impairs normal personal and social

*We wish to acknowledge helpful comments from Dr. Geoffrey Dean, Medico-Social Research Board, Dr. M. P. Flynn, Westmeath County Medical Officer, and John L. Pratschke, The Economic and Social Research Institute. The authors alone are responsible for the views expressed in the paper.

1. Quoted in Patrick Lynch and John Vaizey, *Guinness's Brewery in the Irish Economy, 1797–1876*, Cambridge, 1960, p. 63.

2. These problems have been discussed in R. Lynn and S. Hampson, "Alcoholism and Alcohol Consumption in Ireland," *Journal of the Irish Medical Association*, 63,392 (February 1970) and D. Walsh, Letter to the Editor, *Journal of the Irish Medical Association*, 63,394 (April 1970).

activities. The use of this statistic as a measure of alcoholism has been decried by the World Health Organisation:

> Per capita consumption rates, even the most refined ones, should never be interpreted as indicating a high or low degree of alcoholism or changes in the incidence of alcoholism.[3]

The validity of deaths rates from "alcoholism" as an index of the incidence of the disease is dependent on the proclivity of individuals in various countries to die at a uniform rate on reaching a given stage of the disease, and on a uniform recognition and certification of death as being from this cause. These preconditions are most unlikely to be present in any large sample of countries. Cirrhosis of the liver is in some cases a consequence of excessive alcohol consumption, but the association is uncertain and probably varies greatly between countries. Two major intervening variables are the composition of the alcohol intake (especially the percentage of the total derived from spirits and wine) and the adequacy of the drinker's nutrition. Death rates from cirrhosis of the liver may also be subject to varying degrees of underreporting due to the popular association of this condition with alcoholism.

Prosecution rates for dunkenness are unlikely to help in international comparisons of alcoholism: aggressive and extroverted behaviour consequent on heavy drinking is clearly not necessarily closely related to the incidence of excessive drinking in the whole population. There are also obvious differences between cultures as to what is considered offensive ("drunken") behaviour and as to the efficiency with which this behaviour is penalized.

In our opinion, the most useful single index of the incidence of alcoholism is the hospital first admission rate for "alcoholism" and "alcoholic psychosis". This index—alone among those available—is a reflection of the frequency with which physicians diagnose "alcoholism" as the cause of a serious disruption in the patient's life (viz. hospitalization). Nevertheless, hospital data suffer from obvious defects,[4] since many cases of "alcoholism" may never be admitted for hospital treatment and the extent to which this occurs must vary between countries depending on the availability and use of hospital facilities and on community tolerance of "alcoholism". The question of the uniformity of the symptoms that are diagnosed as "alcoholism" in various countries may also be raised.

There is wide recognition that the impact of "alcoholism" is not confined to its medical consequences for the drinker himself. The social implications of excessive drinking are far-ranging: industrial absenteeism and road traffic deaths are obvious examples, but probably the most serious problem of this type is the

3. World Health Organization, Technical Report Series, No. 48, Expert Committee on Mental Health, Alcoholism Subcommittee, *Second Report*, (Geneva, 1952), p. 20. This Report contains a survey of the various indices used in connection with the measurement of alcoholism.

4. The exact relationship between hospital first-admission data and the true incidence of a psychiatric disorder is discussed by Morton Kramer, *Applications of Mental Health Statistics*, (World Health Organization, Geneva, 1969), pp. 21–28 and Annex 2.

effect of excessive drinking on the mental and even physical well-being of the alcoholic's family. The depressive illnesses of the alcoholic's spouse and the neurotic and behavioural problems of his children are well-known to the clinical psychiatrist. In addition to the data on hospitalized "alcoholism" in Ireland, there is compelling evidence (based on survey work in the Dublin area) of the serious and life-long damage that can be inflicted on the alcoholic's dependents by his behaviour.[5] One of the most serious problems created by dependence on alcohol, and one frequently prominent in the etiology of serious depressive psychiatric illness in the poorer socio-economic groups, is shortage of money and consequent heavy indebtedness. If expenditure on alcohol is a sizeable percentage of total income, the amount available for food, rent, clothing and other necessities may be insufficient to meet even basic needs.

This paper focuses attention on the economic aspects of alcohol consumption in Ireland, with relevant international comparisons. It is not claimed that the various measures discussed here are in themselves indices of the prevalence of "alcoholism", but it is believed that they constitute important, and up to now neglected, evidence in the compilation of an overall picture of the role played by alcohol consumption in the community. Our discussion also has the merit of raising the question of the impact of taxation policy on patterns of alcohol consumption.

Alcohol and Income

The proportion of total expenditure allocated to alcoholic beverages appears relevant to a discussion of "alcoholism" because "alcoholism" is more than a medical concept; dependence on alcohol becomes excessive from a social viewpoint if other important needs are sacrificed in order to supply the requirements of drinking and, obviously, the percentage of total income spent on alcohol is relevant as a measure of excessiveness in this sense.

There are two main sources of information about the income-consumption patterns of different national populations. The Household Budget Inquiry (HBI) is a widely used tool of economic analysis whose primary purpose is to allow economists to assess the relative importance of various commodities in national consumption patterns, thus obtaining information which is needed for the construction of price indices. The second source is the National Income Accounts data collected for a variety of purposes and reported on a uniform basis to the United Nations by member countries.

The information provided from these two sources sheds light on different aspects of expenditure on alcohol, and different problems arise in connection with each source. We shall consider them separately.

5. N. Kearney, M. P. Lawlor and D. Walsh, "Alcoholic Drinking in a Dublin Corporation Housing Estate", *Journal of the Irish Medical Association*, Volume 62, No. 382, April 1969, pp. 140–142, and Ian Hart, "A Survey of Some Delinquent Boys in an Irish Industrial School and Reformatory", *Economic and Social Review*, Volume 1, No. 2, January 1970, pp. 185–214.

Household Budget Inquiry Data

Household Budget Inquiries differ in construction and scope from country to country. The only Irish inquiries relevant to our purposes were undertaken in 1951–2 and 1965–6, and attempted to obtain a picture of the income-expenditure patterns of the *urban* Irish population. A heading "Alcoholic Beverages" was included in both HBI, with more detail obtained for this item in the 1965–6 inquiry. The United Kingdom conducts a continuous survey, providing an annual picture of consumption patterns. In Ireland and the UK, expenditure on alcoholic beverages is evaluated in a similar manner, namely by measuring the cost of alcohol purchased for home consumption plus the retail value of alcohol purchased in bars and restaurants. Unfortunately, the practice in the European Economic Community countries is to have one heading for "Home-Consumed Alcoholic Beverages", and a separate item for "Food and Drink Away from Home", with no breakdown of the latter as between food and drink.[6] Thus the potentially rich source of comparative statistics from the HBIs of the EEC countries is useless for our purposes.

A major problem arises in connection with the validity of the data for Alcoholic Beverages reported in HBIs. International experience has shown that stated expenditure on Alcohol and Tobacco is always very much lower than what would be expected from national data on sales of alcohol and tobacco. To make matters worse, it is likely that the extent of under-reporting varies from country to country. When official Consumer (or Retail) Price Indices are being compiled on the basis of national consumption patterns as reflected in HBI data, an adjustment is always made to allow for under-reported expenditure on alcohol and tobacco. For these reasons not much validity can be expected from international comparisons of HBI data on alcohol consumptoin. Nevertheless it is interesting to record that the weight of Alcoholic Beverages in the Irish Consumer Price Index (CPI) was 6.90 per cent for the series introduced in 1953, and 8.71 per cent for the 1968 series.[7] The weight of Alcoholic Beverages in the UK retail price index in 1968 was 6.3 per cent.[8] Thus the importance of the price of alcohol in the general cost of living was judged to be some 38 per cent higher in Ireland than in the UK in 1968.

A household budget inquiry provides details of the patterns of consumption within a country, and one may be justified in placing more trust in purely internal, than in international, comparisons. In particular HBI data may be a reliable guide to variations in consumption patterns between social classes in a country. Table 1 presents comparisons of expenditure on "Wine", "Ale, Beer and Porter", and

6. Statistisches Amt der Europaischen Gemeinschaften, Sozialstatistik, *Wirtschaftsrechnungen*, 1963–4, Sonderreihe No. 7.

7. These weights were based on the adjusted returns for Alcoholic Beverages in the two HBI referred to above. Cf. *Irish Statistical Bulletin*, March 1969, p. 27.

8. *Monthly Digest of Statistics*, 1968.

"Spirits", and of the percentage of total household expenditure devoted to "Total Alcohol" by the six social classes distinguished in the 1965–6 Irish HBI.[9]

TABLE 1: *Expenditure on Alcohol by Category and Social Class, Ireland, 1965–6*

Social Class (Urban Only)	*Average Expenditure on:*				*Total Alcohol. As % of Total Expenditure*	*"True" % on Alcohol*
	Wine	*Ale, Beer, Porter*	*Spirits*	*Total Alcohol*		
	Shillings per week					
Professionals, employers etc.	2·15	10·99	12·66	25·80	3·81	8·92
Salaried Employees	1·08	9·00	3·86	13·94	2·99	7·00
Other non-manual employees	0·45	11·91	1·75	14·11	3·57	8·35
Skilled manual workers	0·52	14·52	2·34	17·38	3·96	9·27
Semi-skilled manual workers	0·34	16·36	1·21	17·91	5:14	12·03
Others	0·43	4·85	1·36	6·64	3·27	7·65
All groups	0·80	11·40	3·59	15·79	3·72	8·71

Basic Source: HBI 1965–66, Tables VII, 5a.

Many marked contrasts between the expenditure patterns of the social classes are apparent from the data of Table 1, but the most important is the relatively large percentage of total expenditure devoted to alcohol by the group "Semi-skilled Workers" (which includes all manual workers below the "skilled worker" level) and the relatively small percentage by the group "Salaried Employees". Whether these differences in expenditure proportions reflect genuine differences in consumption patterns, or are merely the result of differences between the social classes in regard to the degree of under-reporting contained in their stated expenditures on alcohol, cannot be decided on the basis of available evidence, but the pattern revealed in the Table at least conforms to impressionistic evidence. It may be seen that the "Professional, Managerial" group had the largest reported total cash outlay on alcohol, but that even in absolute terms the "Semi-skilled Workers" are second. The "Semi-skilled Workers" report that most of their alcohol consumption took the form of "Beer, etc." whereas the "Professional, etc." group

9. These social groups are not directly linked to average income earned, and thus the data of Table 1 should not be compared with the findings on income elasticities discussed below.

report that their main alcohol consumption took the form of Spirits: they spent over three times as much on Spirits as the next highest group ("Salaried Employees"). An unfortunate gap in these (HBI) data is the absence of any information on rural alcohol consumption patterns.

If we (perhaps implausibly) assume that under-reporting is of equal (percentage) importance in each social group, then we can accept the last column of Table 1 as an approximation to the "true" expenditure proportions in each group. This column represents the stated expenditure proportion grossed up by the ratio of the CPI weight for alcohol to the stated HBI weight (all social groups) (viz. 8.71/3.72=2.34). This "true" expenditure proportion varies from 7.00 for "Salaried Employees" to 12.03 for "Semi-skilled Workers". This last figure may well be questionable—suggesting as it does that £0.12 of every £1 spent by families of this class is spent on alcohol—but, nonetheless, it represents the most authoritative estimate that can be made of the actual figure.

At least the HBI figures for Ireland establish fairly firmly the following points, both of which are relevant to the study of the incidence of "alcoholism". There are considerable inter-class variations in both the proportion of total expenditure devoted to alcohol and in the division of this expenditure between beer, wine and spirits. The "lower" socio-economic groups appear to spend a considerably larger proportion of total expenditure on alcohol than is the case in the "higher" groups, but spirits and wine constitute a far larger proportion of the "higher" groups' expenditure on alcohol. The HBI also reveals that expenditure groups such as "Transport" (i.e. cars, public transport) and "Services and Other Expenditure" (i.e. health, recreation, education) are proportionally far more important in the Budgets of the "higher" socio-economic groups than of the "lower", these being items that appear to increase in relative importance as Alcohol (and other items, such as Food) decline.

Household budget inquiries provide us with some information on the dispersion of alcohol consumption about a national average figure and, unreliable though the HBI data on alcohol may be, this information should not be completely dismissed. In Table 2 we show the percentage of all households recording expenditure on various types of alcohol in the Republic of Ireland, Northern Ireland, and the United Kingdom (including Northern Ireland). The comparison between Northern Ireland and the UK is easier than that between the Republic and either Northern Ireland or the UK due to the uniformity of definitions between these two areas. It is notable, however, that only 52 per cent of households in the Republic recorded any expenditure on beer, etc., compared with 59 per cent in the UK (and only 37 per cent in Northern Ireland). Only 23 per cent of households in the Republic recorded expenditure on spirits (due to the amalgamation of wine and spirits in the UK definition, this cannot be compared with the UK situation). For those families recording expenditure, the variation in the amounts recorded were also quite considerable, especially in the case of "wine" and "spirits". The marked contrast between Northern Ireland and the UK in expenditure proportions, percentage of households reporting expenditure, and variability of

reported outlay is worthy of careful attention, suggesting as it does that a low national average reported expenditure proportions on "spirits, wines" is consistent with high reported expenditure proportions by a minority of all households.

TABLE 2: *Household Budget Inquiry Evidence on the Dispersion of Alcohol Consumption about the National Average (1966–7)*

Items	*Stated Expenditure on Item as % of Total Expenditure (National Average)*		*Standard Error of the National Average (as % of Average)*		*Number of Households Reporting Expenditure on Items as % of all Households**	
	UK	*Northern Ireland*	*UK*	*Northern Ireland*	*UK*	*Northern Ireland*
Alcoholic Drink:						
Beer, Cider, etc.	2·80	1·77	2	10	59	37
Wines, spirits, etc.	1·28	0·72	4	15	32	18
Drinks, not defined	0·13	0·27	13	22	4	5
All Alcoholic Drink	4·21	2·76	2	9	65	43
	Republic		*Republic*		*Republic*	
Alcoholic Drink:						
Wine	0·19		8		10	
Ale, Beer, Porter	2·69		4		52	
Spirits	0·85		8		23	
All Alcoholic Drink	3·72		n.a.		n.a.	

n.a. = not available

*During two periods, each of 14 consecutive days, with six months interveneing.

Sources: UK: Department of Employment and Productivity, *Family Expenditure Survey: Report for 1967*, (HMSO, 1969), Appendix V.
Northern Ireland: *Northern Ireland Family Expenditure Survey: Report for 1967*, (HMSO, 1968), Appendix V.
Republic of Ireland: *Household Budget Inquiry*, 1965–6, Appendix 3, Table B.

National Income Data

Turning to information drawn from National Accounts data, we reach more secure ground for the purposes of international comparisons. The UN has devoted considerable effort to the preparation of uniform national accounts, and the results

may be taken as highly reliable.[10] In the *UN National Accounts Yearbook* the Table for Personal Expenditure contains an item "Beverages" which refers (in almost all cases) to "Alcoholic Beverages" plus "Non-alcoholic Beverages" (viz. mineral waters, soft drinks, etc. but *not* tea, coffee, milk, which are included as "Food"). The expenditure on "Beverages" includes all purchases of drink for home consumption *plus* the retail value of expenditure away from home on beverages.[11] Thus the only defect of these data for the purposes of international comparisons of outlay on alcohol is the inclusion of non-alcoholic beverages in the figure for "Beverages". This defect is not serious, however, since outlay on non-alcoholic beverages is generally a trivial proportion of total expenditure: non-alcoholic beverages accounted for 0.51 per cent of total expenditure in Ireland, and in the EEC countries ranged from 0.63 per cent in Germany to 0.29 per cent in Italy.[12] It might even be argued that some of the expenditure on non-alcoholic beverages should be included with alcohol, since the two are occasionally complements (e.g. gin and tonic). However, where possible we have used the UN figure for alcoholic beverages alone.

Before presenting international comparisons of the proportion of "Beverages" in total personal expenditure, it is important to clarify what is measured by this figure. First, by relating expenditure on "Beverages" to total personal expenditure we avoid some problems that would be introduced by using GNP in the denominator (e.g. the varying proportions of GNP devoted to depreciation, investment, income taxation and personal savings). Secondly, distortions are introduced to the extent that in some countries health or education services may be financed out of tax receipts and in others out of personal expenditure. The differences between our sample countries in this regard are not negligible, but neither are they very great. The figure for expenditure on "Beverages" does not, of course, measure the value of national resources devoted to producing and distributing beverages since our data are valued at market prices, not at factor cost, and in some countries up to half the market price of alcohol is accounted for by indirect taxation. The UN figures also exclude the value of the labour employed serving alcohol in bars and restaurants, as well as any (imputed) rental of establishments devoted to public consumption of alcohol. The ratio of expenditure on alcohol to total expenditure does nonetheless provide an accurate index of the importance of expenditure on alcohol in the total household budget.

A final, and important, point about this concept must be clarified. "Personal expenditure" in the UN national accounts refers to expenditure by a country's residents, regardless of where this expenditure occurs. A figure for "expenditure by residents abroad" is added to all the items in the list of personal expenditure, and a figure for "expenditure (in the country) by non-residents" is subtracted. Unfortunately, no breakdown of these two figures by commodity group is

10. For a discussion of methodology, cf. *A System of National Accounts and Supplementary Tables*, UN Studies in Method, Series F, No. 2.

11. *Op. cit.* Appendix 2.

12. Cf. sources quoted above relative to HBI material.

provided. Thus if a country experiences a net inflow from tourism, dividing the figure for personal expenditure on "Beverages" (or on any commodity group) by the figure for "Total personal expenditure" results in an overstatement of expenditure by residents. (If the country experiences a net outflow through tourism, the result is an understatement). This is especially important in the case of Ireland since tourism is more important to the Irish economy than to that of any other OECD country.[13] In comparing Irish expenditure on "Beverages" with that of other countries, due allowance will have to be made for the impact of tourism on the Irish figures.

TABLE 3: *International Data on Expenditure on Alcohol as a Percentage of Total Personal Expenditure*

	Expenditure on beverages as a percentage of total personal expenditure on goods and services				*Expenditure on alcoholic beverages as percentage of total personal expenditure on goods and services*			
Country/Year:	1953	1965	1966	1967	1953	1965	1966	1967
Australia					7·00	6·46	6·51	6·65
Austria	7·50	7·90	7·73	7·68				
Belgium	5·65	5·07	4·87	4·99				
Canada	5·43	5·07	4·95	5·23				
Ceylon	3·12	4·32	4·40	4·30				
Ecuador (1959)	6·97							
Finland	4·93	4·61	4·91	5·03				
France	7·78	6·45	n.a.	n.a.				
Greece	3·88	3·08	3·10	3·39				
Iceland (1961)	4·70							
Ireland (Republic)	8·96	10·35	10·57	11·14	8·11	9·66	9·73	10·11
Israel	2·15	2·11	2·06	2·05				
Italy	5·73	5·32	5·26	5·02				
Malta	n.a.	2·81	3·10	3·70				
Netherlands	3·10	3·88	3·64	3·64				
Norway	5·01	4·88	5·05	5·12				
Puerto Rico	6·04	5·67	5·57	5·62				
South Africa	3·99	4·45	4·65	4·74				
Spain	n.a.	3·10	3·04	n.a.				
Sweden	5·65	6·18	6·59	6·60				
Taiwan	1·71	2·66	2·99	3·57				
UK					6·94	6·24	6·23	6·27
USA					3·86	2·99	2·93	2·93

Data Source: UN *Yearbook of National Account Statistics*, 1968, 1966. Ireland, *National Income and Expenditure*, 1968.

13. Cf. the data on tourist receipts as a percentage of GNP in *Tourism in OECD Member Countries*, 1969, Report of the OECD Committee on Tourism, Paris, 1969, p. 24.

Notes: (a) "Total personal expenditure on goods and services" is equal to personal income minus personal income tax and personal savings.

(b) The ratios were calculated using magnitudes measured at current market prices in both numerator and denominator.

(c) In 1968 the Irish ratio of alcohol to total expenditure had risen to 10·44.

(d) Data in UN Yearbook for Poland and other Soviet-type economies not comparable in definitions to the sample above.

(e) Data for Switzerland and Denmark (1967) available only for "Beverages + Tobacco" = 10·13 and 10·54 per cent respectively. Tobacco amounted to 3·2 per cent of personal expenditure in Sweden, 3·4 in Italy, and 1·7 in France, so the actual outlay on beverages alone may have been about 7 per cent in Denmark and 8·5 per cent in Switzerland. The Irish percentage of total expenditure devoted to "Alcoholic Beverages + Tobacco" was 18·3 in 1967.

In Table 3 the international data on percentage of personal expenditure devoted to "Beverages" are presented. The position of Ireland as the country with the highest percentage is unambiguous: in fact it may be seen that Ireland's outlay on "Alcoholic Beverages" is much higher than that of any other country on "Beverages" (alcoholic plus non-alcoholic) in all the years for which data are recorded. Indeed, if we take the official weight of alcoholic beverages in the Irish Consumer Price Index (8·71) as an accurate, tourist-adjusted percentage expenditure (for the urban population), it is still higher than the unadjusted percentages for "Beverages" for all other countries in Table 3.[14] Not only is the figure for Ireland in Table 3 the highest recorded but also it is rising quite rapidly while in a majority of countries the trend is downward. The Irish ratio rose by 24 per cent of its 1953 value over the period 1953–67.

It must be emphasised that the data of Table 3 refer to expenditure on alcohol, and not to quantities consumed. Since expenditure equals price times quantity, the data suggest either that the price of alcohol in Ireland is very high (relative to national income) or that the quantities of alcohol consumed are high. The latter is not the case: data for the mid-1950's show Ireland below most western nations

14. We can be fully satisfied that Ireland's prominent position in Table 3 is not merely a reflection of the impact of tourism on the data by considering the following figures. The net inflow from tourism amounted to at most 6 per cent of total personal expenditure in Ireland in the mid-1960's. If 20 per cent of this inflow were spent on alcohol—an extremely high proportion, higher than that suggested by the results of small surveys carried out by Bord Fáilte (cf. *Report* for the year ended 31 March 1963, p. 13)—the expenditure by Irish residents on alcohol would be reduced by 1·2 per cent of total personal consumption (that is, by 20 per cent of 6 per cent). This would lower the figure in Table 3 from 9·6 to 8·4 in 1965, still leaving it the highest in the Table. If expenditure on alcohol had been related to GNP rather than to total personal expenditure, Ireland's position would be even more exceptional, since personal consumption expenditure forms 69 per cent of Irish GNP, compared with an average for OECD countries of 62 per cent (1968).

TABLE 4: *Quantities of Alcohol Consumed per Head of Population aged 15 and over, 1966*
(Litres of Pure Alcohol*)

Country	*Source of Alcohol*			*Total*
	Beer, etc.	*Wine*	*Spirits*	
USA†	3·5	0·6	3·5	7·6
France‡	2·2	16·6	2·0	20·8
Germany (West)	6·5	1·8	3·0	11·3
UK	4·3	0·5	1·1	5·9
Ireland (Republic)	4·0	0·3	1·5	5·8

These figures are per head of total population in the specified age group: it has not been possible to calculate figures on consumption per drinker.

Sources: *Statistical Abstract of the U.S.A.*, 1967, Table 1133.
Annuaire Statistique de la France, 1967, Chapter 30G.
Statistisches Jahrbuch für die Bundesrepublik, 1969, Section XXIII, Table 3.
U.K. Monthly Digest of Statistics, Dec. 1967, Table 44.
Statistical Abstract of Ireland, 1968, Table 359.

*These quantities are approximate in the case of France, Germany and the U.S., due to the necessity of using various assumptions as to the average strength of beer and wine.
†Relates to the population aged 14 and over.
‡Cider included with "Beer, etc.".

in terms of alcohol intake per person.[15] A limited comparison of data for the mid-1960's is sufficient to establish that the situation has not changed greatly over the intervening decade. In general, the position of Ireland is very close to that of the UK both in the total intake per person and in its distribution between beer, wine, and spirits. German consumption per person appears to be about twice that of Ireland (with a somewhat greater importance for wine in the total), whilst French intake is about four times that of Ireland, and is predominantly in the form of wine. This evidence points to the high price of alcohol as the reason for Ireland's high position in Table 3.

It is difficult to obtain international data on alcohol prices, due to variation in the definitions used in collecting household budget data, and the tentativeness inherent in all international price comparisons.[16] For the EEC countries, however, a limited amount of information is available which may be related to Irish data.

15. Cf. Lynn and Hampson, *op. cit.* Table I.
16. This question is discussed in detail by M. Gilbert and Associates, *Comparative National Products and Price Levels*, (Paris, OECD, 1958).

These data are restricted to beer, which accounts for over two-thirds of Irish alcohol consumption (although it is much less important in France and Italy).

Table 5 records the price of a litre of domestic beer in the EEC countries and in Ireland, and GNP per person, in 1967, in terms of US $ (converted at the official exchange rate). Obviously "Domestic Beer" may differ in strength and other attributes between countries, and there is no indication as to whether the price quoted for the EEC countries refers to home or restaurant consumption, but the contrast between Ireland and the EEC in this matter is much too great to be seriously eroded by any such adjustments to the data. In approximate figures, a year's GNP would purchase 6,000 litres of beer for every member of the population in the Netherlands, compared with about 1,600 in Ireland! Beer prices in the UK are definitely lower than in Ireland, but income per person is some 80 per cent higher. Beer prices in the US may be 20 to 40 per cent higher than in Ireland, but income per person is almost 400 per cent of the Irish level. There is little doubt that in relation to income alcohol is extremely expensive in Ireland.

The reasons for these price differences are outside the scope of this paper, but it is relevant to the later sections of our study to stress the role of indirect taxation in the picture. Ireland tends to rely more heavily on indirect taxes (viz. sales, excise, custom taxes, etc.), and especially on selective taxation of alcohol, tobacco, and hydrocarbon oils, than is the case in the EEC. In the Netherlands, for example,

TABLE 5: *International Comparison of the Cost of a Litre of Domestic Beer and the Level of GNP per Head, in US $ at Official Exchange Rate*

	West Germany	*France*	*Italy*	*Netherlands*	*Belgium*	*Luxembourg*	*Ireland*
(1) Cost of a litre of domestic beer, 1967	0·37	0·48	0·45	0·30	0·43	0·42	0·59
(2) GNP per head, 1967	2,030	2,190	1,280	1,810	2,050	2,020 (1965)	959
(3) = (2) ÷ (1) (litres)	5,486	4,563	2,844	6,033	4,767	4,810	1,625

Notes: For the EEC countries, the beer was specified as a "light domestic beer". For Ireland, the public bar price of stout in Dublin was used.
In converting the Irish price and income data to dollars, the post-devaluation parity was used.

Sources: Statistisches Amt der Europäischer Gemeinschaften, *Allgemeines Statistisches Bulletin*, 1967, No. 9, p. 44.
OECD, *Main Economic Indicators*, Jan. 1969, p. 134.

total taxation on a standard barrel of beer amounts to £0·53, compared with £18·00 in Ireland, and receipts from beer taxation provide only 1 per cent of total tax revenues, compared with 6 per cent in Ireland.[17]

While international comparison of expenditure proportions is suggestive of a very prominent position for alcohol in the Irish hierarchy of needs, this is not, of course, conclusive evidence that "alcoholism" is unusually widespread in Ireland. Clearly, countries where alcohol is very inexpensive in relation to average income could combine low expenditure proportions on alcohol with a high prevalence of "alcoholism": the United States might be a case in point. The expenditure proportion data refer to national averages, and our limited evidence on dispersion about this average suggests that there are considerable variations between households in the importance of alcohol in the household budget, and it seems that a relatively small minority of the population accounts for the vast majority of alcohol consumption. It may be argued that a very high national expenditure proportion for alcohol is unlikely to arise unless a relatively large number of the country's households is devoting a considerable percentage of their total income to the purchase of alcohol.

Time Series Data

In view of the importance of alcohol in Irish household budgets, and the fact that this appears to be increasing, it is worthwhile trying to establish, using formal econometric techniques, the determinants of alcohol consumption and expenditure over time in Ireland.

The first requirement is a time series for quantities of alcohol consumed. This is readily available from the returns of the Revenue Commissioners. We have confined our attention to beer and spirits, since wine is a negligible, although rapidly increasing, part of national alcohol consumption. The Revenue Commissioners give details of quantities of beer and spirits "retained for home use" each fiscal year. For beer, the unit of measurement for tax purposes is the standard barrel, for spirits the proof gallon: thus, the original or bulk data are adjusted to allow for changes in average alcoholic content.[18] The figure for spirits is net of industrial alcohol, perfume etc.[19] The calendar year data were estimated from

17. Data from Alan Tait, "Are Irish Sales Taxes Unfair?", *Public Affairs*, June/July 1970, pp. 6–7. Tait's article raises issues regarding Irish taxation policy that are very relevant to the theme of the present paper. In 1968/9 customs and excise taxation of alcohol accounted for 15 per cent of total central government tax revenue in Ireland.

18. The standard barrel of beer contains 1·730 gallons of pure alcohol; the proof gallon of spirits contains 0·5725 gallons of pure alcohol. We are indebted to Mr. R. O. V. Lloyd for this information.

19. It also excludes illicit distillation, of course. Illicit distillation is probably quite important as a source of alcohol in some areas of Ireland. The only data available on this are the figures for detections of illicit stills issued by the Revenue Commissioners: between 1959 and 1964 an annual average of 185 stills were seized.

fiscal year data by assuming that, for example, consumption in calendar year 1953 = ¼ consumption in fiscal 1952/3 + ¾ consumption in fiscal 1953/4.[20] The total quantities per year thus obtained may be converted to a consumption per person figure by dividing by the estimated mid-year population. (Ideally, the adult population would be used, but age-specific annual population data are unobtainable for intercensal years.) The time series thus obtained, along with figures for total alcoholic intake per person from beer and spirits, are recorded in Table 6.

The Table reveals a very steady growth in *per caput* consumption of both beer and spirits: the quantity of the former rose by 26 per cent and of the latter by 71 per cent between 1953 and 1968. If beer and spirits are converted to a common yardstick of alcoholic content, these figures imply a rise of 36 per cent in Irish alcohol consumption per person from these two sources over this 16-year period. The rising intake of alcohol has been accompanied by an increase in the percentage

TABLE 6: *Annual Consumption of Beer and Spirits per Head of (total) Population Ireland, 1953–1968*

Calendar Year	*Beer per person (standard barrels)*	*Spirits per person (proof gallons)*	*Gallons of pure alcohol per person*
1953	0·297	0·267	0·67
1954	0·297	0·289	0·68
1955	0·306	0·296	0·70
1956	0·310	0·283	0·70
1957	0·300	0·266	0·67
1958	0·293	0·276	0·66
1959	0·303	0·288	0·69
1960	0·307	0·307	0·71
1961	0·327	0·365	0·78
1962	0·328	0·346	0·77
1963	0·336	0·367	0·79
1964	0·348	0·398	0·83
1965	0·351	0·412	0·84
1966	0·353	0·406	0·84
1967	0·359	0·412	0·86
1968	0·374	0·457	0·91

Basic Data Source: Annual *Reports* of Revenue Commissioners.

Note: "Beer" includes all brewed alcoholic beverages such as ale, stout, lager, etc.

20. One advantage of this estimation procedure is that it should remove the effects of forestalling (i.e. accumulation of stocks) prior to the budget, which would tend to distort the fiscal year data, especially for spirits. We may therefore feel confident that our data correspond closely to actual consumption.

of the total derived from spirits—from 23 per cent in 1953 to 29 in 1968 (excluding wine from both totals).[21]

Growth in alcohol consumption would account for some of the increased proportion of total expenditure devoted to alcohol, but price trends must also be taken into account. The concept of a price index for spirits and beer needs careful definition. The problem of changing "quality" is particularly important in this context, since consumer expenditure may change merely due to an upgrading of the type of beer or spirits consumed (more brandy, less whiskey, for example), or a switch from home to public consumption, or a change from public bars to lounge bars. In addition, the average strength of a particular brand of beer or spirits may change.[22] The only price information available is compiled by the Central Statistics Office for inclusion in the Consumer Price Index and records

TABLE 7: *Price and Income Variables, Ireland, 1953–67*

Year	*(Beer Price Index) ÷ (Consumer Price Index)*	*(Spirits Price Index) ÷ (Consumer Price Index)*	*(Beer Price Index) ÷ (Spirits Price Index)*	*Personal disposable income per head 1953 prices £*
1953	100·0	100·0	100·0	143·3
1954	100·0	99·9	100·1	144·1
1955	97·6	97·4	100·2	149·8
1956	98·0	98·0	100·0	145·9
1957	100·3	98·3	102·0	147·1
1958	97·4	95·6	101·9	143·6
1959	99·7	97·2	102·7	153·4
1960	100·8	105·9	95·2	161·5
1961	98·3	103·2	95·2	170·8
1962	110·6	109·0	100·7	175·3
1963	108·3	107·2	100·9	178·9
1964	115·3	108·2	106·5	190·8
1965	118·1	110·1	107·2	190·5
1966	122·5	111·5	109·9	193·2
1967	122·9	111·0	110·7	197·9

Notes: (a) All price indices to base 1953 = 100·0.
(b) For notes on definitions etc. of price variables, cf. text.
(c) Personal disposable income = personal income less taxes on personal income: source, *National Income and Expenditure*, 1968.

21. These figures are not corrected for tourism. However net tourist receipts as a percentage of total personal income only rose from 3·9 per cent in 1953 to 4·1 per cent in 1968, so very little of the change in alcohol intake is likely to be due to this factor.

22. These topics are discussed in an Irish context, using whiskey as an example, in R. C. Geary and J. L. Pratschke, "Some Aspects of Price Inflation in Ireland", (Economic and Social Research Institute Paper No. 40,) p. 43.

national average prices (mid-August) paid, in the case of spirits, for a glass of (Irish) whiskey in a public bar and, in the case of beer, a pint of stout, a bottle of stout and a bottle of ale in a public bar. The spirits price is adjusted to reflect the reduction in the proof strength of whiskey in 1962. The three separate prices available for beer allow us to capture the effects of any major shifts in beer consumption patterns on average price paid over the sample period, since we have weights for each of these components of beer consumption in 1953 and in 1968, and the index we have used is the geometric mean of the indices derived by using weights from these two base years. The spirits price variable may be misleading because it fails to take into account the shifts between various types of spirits. This shortcoming, however, could not be too serious since all spirits prices move closely together over time. Thus while our price indices for alcoholic beverages are not comparable in quality to the official Consumer Price Index they are probably reliable enough for our present purpose. From the viewpoint of standard economic theory of consumer behaviour it is not the absolute price of a commodity that matters, but its price relative to that of other commodities.[23] We therefore divide the price index of beer (spirits) by that of the general cost of living (CPI), and also calculate the price of beer relative to the price of spirits.[24] In addition to price variables, the level of personal disposable real income per person should be included as a variable affecting *per caput* consumption of alcohol.[25]

In Table 7 the price and income variables, 1953–67, are presented. It may be seen that the price of beer relative to the CPI rose by 23 per cent over the period, and the price of spirits relative to the CPI by 11 per cent. The price of beer relative to the price of spirits rose by about 11 per cent. The increase in the relative price of beer has been especially noticeable in the years after 1961: between 1961 and 1967 the price of beer appears to have risen by some 16 per cent more than the price of spirits. During this period there were some sharp increases in excise tax rates on alcohol. In 1960 net tax receipts (customs *plus* excise) from alcohol amounted to 31 per cent of total personal expenditure on alcohol compared with 44 per cent in 1966.[26]

23. Technically, we are assuming a linear homogeneous demand function. A discussion of the economic and econometric points at issue here may be found in Richard Stone, "The Analysis of Market Demand", *Journal of the Royal Statistical Society*, CVII (III–IV), (1945).

24. To test whether these items are complements or substitutes.

25. Both alcohol variables and the income variable have been expressed in *per caput* terms, as is normal practice in econometric studies of this type. The alternative—using total consumption and total income—assumes a unitary income elasticity of demand for the product, which is implausible in the present context.

26. *Reports* of the Revenue Commissioners and *National Income and Expenditure*. This implies that taxes rose from 45 per cent of other (non-tax) costs and profits in 1960 to 79 per cent in 1966. These proportions are roughly in keeping with the claim by the Licensed Vintners' Association of Ireland that taxation on alcohol in 1969 represented "about 52 per cent of the total takings of the trade" (*Irish Times*, 16 May 1970). Detailed data on the break-down of the retail cost of alcoholic beverages between taxation, wages and salaries, and publican's margin are available in the *Report of Enquiry* by the Fair Trade Commission into the retail prices of intoxicating liquor and soft drink (Pr. 8591) (The Stationery Office, 1965).

The data of Tables 6 and 7 may be used to analyse the effects of income and prices on beer and spirits consumption, through the use of (ordinary least squares) multiple regression techniques. The prices and income data may be assumed "independent" variables, inasmuch as the direction of causation is clearly from income and price to alcohol consumption, rather than *vice versa*. The sample of 15 observations encompasses a fairly restricted range of experience, especially with regard to the relative price variables, and this may tend to reduce the reliability of our conclusions, particularly as far as their application to prediction is concerned. The aggregation of the consumption of stout, ale and lager into a single "beer" variable, and of whiskey, gin, brandy etc. into a single "spirits" variable reduces the detail available from the results, but is necessary in view of the limited availability of price data. We have not devoted much effort to testing alternative specifications of the relationship between the variables, restricting ourselves to the linear and double-log forms that are most widely used in this context.[27] In addition to the income and price variables, we have included a simple, linear trend variable in some of the equations. The regression results are presented in Table 8. The most serious problem evident from the data is the high inter-correlation between the price and income variables.

By the usual tests of significance and goodness-of-fit, the statistical results are satisfactory. The income variable is very highly correlated with the consumption figures, accounting on its own for over 90 per cent of the variance in both of the dependent variables. The choice between linear arithmetic or linear logarithmic functions appear of little importance since both specifications yield highly consistent conclusions.[28] The price variables for beer and spirits have the expected (negative) coefficients in all cases for spirits and in three out of six cases for beer, but none of these coefficients is statistically significant. The coefficient of the price of beer relative to the price of spirits variable consistently suggests complimentarily between these two commodities, although the statistical significance of this coefficient was generally very low. It is at least important to record no evidence of substitution between the two types of drinks. The trend variable is significant, in most cases, although only at the 20 per cent confidence level, and its coefficient is uniformly negative. Inspection of the residuals showed no evidence of non-randomness with respect to time in any of the equations.

The commentary on these results is facilitated by the use of elasticity concepts.[29]

27. On a technical point, it may be borne in mind that neither of these equation-forms specifies a satiety level (an income level corresponding to maximum consumption). The low *per caput* consumption of alcohol in Ireland, however, means that this question will not be relevant in the near future.

28. For this reason, no attempt has been made to convert the R^2s from the different specification to an adjusted R^2 with a common metric.

29. Economists refer to the price (income) elasticity of a commodity as the ratio of the percentage change in the quantity consumed to the percentage change in price (income). In the case of the double-log equations the regression coefficients are estimates of the elasticities; in the case of the arithmetic equations, the elasticities have been calculated by multiplying the regression coefficients by the ratio of the mean of the price (income) variable to the mean of the dependent variable.

TABLE 8: *Regression of Quantities of Beer and Spirits Consumed per Head of Population on the Relative Price of Beer and Spirits, and on Income per Person, Ireland, 1953–67*

(*t*-ratios beneath coefficients)

Specification	*Dependent Variable: quantity of beer per person* — *Coefficients and Elasticities of:*					*Dependent Variable: quantity of spirits per person* — *Coefficients and Elasticities of:*				
	Personal income per person	*Price of beer ÷ CPI*	*Price of beer ÷ Price of spirits*	*Trend*	R^2	*Personal income per person*	*Price of spirits ÷ CPI*	*Price of beer ÷ Price of spirits*	*Trend*	R^2
A	0·00152	−0·00051	0·00090	−0·0015	·974	0·00412	−0·00224	−0·00077	−0·00349	·974
	(4·86)*	(0·85)	(1·43)†	(1·58)†		(5·46)*	(1·49)†	(0·89)	(1·48)†	
(mean) elasticity	0·78	−0·17				2·06	−0·67			
L	0·789	−0·167	0·325	−0·0052	·971	2·035	−0·639	−0·193	−0·0109	·970
	(4·65)*	(0·81)	(1·55)†	(1·59)†		(5·03)*	(1·29)	(0·70)	(1·40)†	
A	0·00112	−0·00023	0·00062		·968	0·00323	−0·00164	−0·00740		·968
	(5·63)*	(0·37)	(0·96)			(6·71)*	(1·07)	(0·80)		
(mean) elasticity	0·58	−0·08				1·61	−0·51			
L	0·570	−0·067	0·211		·964	1·576	−0·433	−0·223		·964
	(5·41)*	(0·32)	(1·00)			(6·41)*	(0·88)	(0·79)		
A	0·00126	0·00022		−0·00113	·970	0·0030	−0·00124			·966
	(4·74)*	(0·64)		(1·17)		(7·58)*	(0·87)			
(mean elasticity)	0·65	+0·07				1·51	−0·39			
L	0·626	0·105		−0·003	·964	1·4825	−0·327			
	(4·44)*	(0·91)		(1·06)		(7·02)*	(0·70)			
A	0·00100	0·00026			·964	0·0039	−0·00182		−0·0034	·972
	(6·45)*	(0·76)				(5·56)*	(1·28)		(1·47)†	
(mean elasticity)	0·52	+0·09				1·94	−0·57			
L	0·503	0·108			·960	1·9735	−0·5566		−0·01131	·968
	(6·15)*	(0·93)				(5·11)*	(1·18)		(1·49)†	

A = All variables in original, arithmetic values.
L = All variables in common logarithms, trend = (T−1953).

* = Coefficient significantly different from zero, ·01 level.
† = Coefficient significantly different from zero, ·20 level.

The evidence on income elasticity of demand from Table 8 is very consistent: the elasticity for beer is rather low, that for spirits is high. In the traditional terminology of economists, beer is a necessity, spirits a luxury. The estimates for beer range from 0·50 to 0·79: this implies that a 10 per cent rise in income per person results in a 5 to 8 per cent rise in the quantity of beer consumed per person, assuming the relative price remains unaltered. For spirits, the estimates of income elasticity range from 1·48 to 2·06, implying that for every 10 per cent rise in income, the quantity of spirits consumed rises by between 15 and 20 per cent. In choosing between these estimates of elasticity, we would give priority to the specifications including the trend variable, first on the grounds that this inclusion serves to purge the remaining independent variables of their trend component, and secondly in view of its consistently significant coefficient. Concentrating on equations including trend, the range of income elasticities narrows to 0·63—0·79 for beer, and 1·94—2·06 for spirits.

The correlation between the income variable and both the price of beer and the price of spirits variable is greater than 0.9, thus raising serious doubts as to the validity of the individual coefficients, despite, in the case of income, very large *t*-ratios. However, if the dependent variables are regressed on income alone (linear specification), the coefficients obtained are 0·0011 (beer) and 0·0038 (spirits), very similar to the values recorded in Table 8 for the regressions on income and (own) price. This result raises our confidence in the estimates of income elasticities. It is not feasible to estimate values of price elasticities on the assumption of an "extraneous" estimate of the income elasticities, since the available estimates of income elasticities based on cross-section data refer to "alcoholic beverages" as a total, and not to beer and spirits separately.

The negative coefficient of the trend variable is a little surprising. If the number of abstainers in Ireland has been falling, this would show in our data as a positive trend in the consumption per head data. Tourism did increase somewhat in importance over the period, and this might also warrant the expectation of a positive trend. On the other hand, the age distribution of the population shifted towards a higher percentage of younger people in the population, and with rising incomes and a greatly increased variety of consumption goods and recreation activities available, tastes may have moved away from alcohol. In any event, our results do point to the possibility that alcohol consumption per person would have declined by between 0·5 and 1·0 per cent annually if incomes and prices had remained constant. A serious gap in our knowledge of consumption trends is the absence of time series data on the proportion of abstainers in the country, or data showing how much of the increased consumption is occurring among young drinkers.

The contrast in income elasticities between beer and spirits accounts for the rising importance of spirits in total alcohol consumption over the sample period. It also points to the prospects for a continuation of this trend as national living standards rise. This has serious implications from a medical viewpoint, since the sequelae of dependence on alcohol differ greatly between beer and spirits con-

sumption. It has been found in Denmark, for example, that there is a high, positive correlation between the consumption of distilled spirits per person and the incidence of delirium tremens. The Danish study arrived at the following conclusion, which is of great relevance to the developing Irish situation: "Alcoholism is always a disease whatever type of liquor or beverage is used, but the frequency of complications and of serious sequelae of alcoholism depends to a great extent on the consumption of distilled spirits, and not so much on the consumption of beer and wine".[30]

It would be very useful to have comparable studies of income elasticity for beer and spirits in other countries, but the number of such studies is very small. The Stone article referred to above provides almost exactly comparable results for the UK over the period 1920–38. For spirits Stone estimated an income elasticity of 0·54, while for beer the influence of income was both trivial and non-significant statistically. A study of the demand for all alcoholic beverages in the US, 1929–60, implies an income elasticity of 0·68.[31] A final comparison, based on HBI data is possible. Pratschke found an income elasticity of demand for alcoholic beverages in Ireland (1965–6) of 1·69, while the roughly comparable estimates found by Prais and Houthakker for the UK (pre-war) were 1.63 for working class families and 0·96 for middle class families.[32] Thus, estimated Irish income elasticities of demand for alcoholic beverages are higher than the limited number of comparable elasticities that have been calculated for other countries.

Turning our attention to the performance of the price variables, it is clear that their role in the equations of Table 8 is very much less important than that of the income variable. In the case of spirits, the range of estimates of (own) price elasticity is from −0·77 to 0·33, with −0·57 occurring in an equation that is in many ways the most satisfactory of those estimated.[33] This implies that a 10 per cent rise in the price of spirits (relative to the general cost of living) would occasion a 6 per cent fall in the quantity of spirits consumed. More importantly from our

30. "Delirium Tremens in Copenhagen" by Johannes Nielsen, *Acta Psychiatrica Scandinavica*, Supplementum 187 (1965), p. 21. Adam Smith remarked on the need to encourage beer at the expense of "spirituous liquors" . . . "on account of (liquor's) supposed tendency to corrupt the morals of the common people", *The Wealth of Nations*, Book V, Chapter II.

31. H. S. Houthakker and Lester D. Taylor, *Consumer Demand in the United States*, 1929–1970, (Cambridge, Mass. 1966). We have used the static equation on p. 60 for this estimate of elasticity, but it should be noted that this equation, and indeed the result for alcohol generally, was not very satisfactory.

32. John L. Pratschke, *Income-Expenditure Relations in Ireland*, 1965–1966, (ESRI Paper No. 50), p. 18, and S. J. Prais and H. S. Houthakker, *The Analysis of Family Budgets*, (Cambridge, 1955), p. 107. These estimates, based on HBI, are "long-run" elasticities, which would normally be higher than the "short-run" estimates based on time series data.

33. These estimates must be treated very cautiously, since the regression coefficients on which they are based are significant only at rather low confidence levels. A recent study of the demand for spirits in the United Staes estimated a median price elasticity of −0·79 for a cross-section of states: Julian L. Simon, "The Price Elasticity of Liquor in the U.S. and a Simple Method of Determination," *Econometrica*, 34, (Jan. 1966), 193–205. This indicates a greater sensitivity to price changes in the US than appears to be the case in Ireland.

viewpoint, it implies that total expenditure on spirits would rise by about 4 per cent in this case: thus the rising price of spirits (relative to the CPI) tends to increase expenditure (in real terms) on spirits. For beer the results are more conclusive: the estimates of price elasticity range from +0·17 to −0·11, and in all cases the regression coefficient is not significantly different from zero at any relevant confidence level. Thus it appears reasonably safe to conclude that a rising relative price of beer has little or no effect on the quantity of beer consumed, but does lead to a proportional increase in expenditure on beer.

The price of beer relative to the price of spirits does not appear to exert an important influence on the quantities of either consumed. The sign of this variable's coefficient in all equations suggests complementarity between beer and spirits, although the coefficient is significant (at the 20 per cent level) only in the case of two of the beer equations. It is somewhat surprising to find evidence that beer and spirits are not substitutes for each other, but the statistical reliability of our findings on this point is low. The possibility cannot be ruled out that a wide divergence between the rate of change of beer and spirits prices would cause drinkers to switch from one to the other.

These results allow some inferences to be drawn as to the causes of the rising percentage of personal expenditure being devoted to alcohol in Ireland. The high income elasticity of demand for spirits, and the low, but by no means zero, elasticity for beer are in themselves enough to ensure that rising incomes will not result in lower percentage outlays on alcohol. A weighted average of the most plausible estimates of income elasticities for beer and spirits (using weights from the HBI, all social groups, as recorded in Table 1 *supra*) yields an estimated elasticity of 1·01 for both combined, which would lead to constancy in the percentage outlay on alcohol as income rises. (This combined income elasticity is appreciably lower than the 1·69 estimated by Pratschke on cross-section data, a result in keeping with a priori expectations regarding the relationship between long- and short-run elasticities). The low price elasticities estimated for both beer and spirits imply that, given the generally upward trend in beer and spirits prices relative to the cost of living, the main reason for the rising proportion of total expenditure devoted to alcohol is the rising relative prices of these items over time.

The income elasticities estimated here facilitate further international comparisons of quantities of alcohol consumed. Ireland had the lowest level of income per person of the five countries included in Table 4. On the basis of our estimates of income elasticities it is possible to project Irish alcohol consumption on the assumption of various income levels. Clearly, this type of projection is merely illustrative and subject to serious reservations, since our regressions are based on a fairly limited range of income levels (from £143 to £198). However, in Table 9 projections based on UK real income per person (£330) are presented. The results serve to underline the importance of the income level as a determinant of Irish consumption patterns. On the basis of the UK income level (and ignoring the existing price differential in alcohol between Ireland and the UK), Ireland's alcohol consumption rises by 59 per cent, due to a 153 per cent increase in spirits

and a 24 per cent increase in beer consumed. At the projected consumption levels, spirits amount to 44 per cent of total alcohol consumption. It is possible, and even likely, that as income levels rise further the pattern of Irish alcohol consumption will change from that prevailing over the 1953–67 period. Nevertheless, the possibility of a continaution of the rapid rise in total alcohol consumption, and of an increasing importance of spirits in this total, cannot be ruled out.

TABLE 9: *Actual Irish and UK Consumption of Beer and Spirits per Head of Population Aged 15 and Over, and Hypothetical Irish Levels on Assumption of UK Income per Person* (in Litres of Pure Alcohol)

	Beer	*Spirits*	*Total*
Actual: Ireland, 1966	4·04	1·54	5·58
Actual: UK, 1966	4·30	1·10	5·40
Projected: Ireland on Assumption of UK income	4·99	3·89	8·88

Sources: Actual Data from Table 4, *supra.*
Projected Irish figure based on 1966 level of UK personal disposable income per person, and actual Irish values of price variables.

Note: The projection is based on the fifth equation for beer and spirits, respectively, in Table 8. The projection was made for consumption per head of total population and then grossed up to a figure per head of population aged 15 and over on the basis of the 1966 population age structure.

The evidence of low price elasticities for beer and spirits is very important from a policy point of view. There are two issues at stake: one is the tax yield from alcohol as the tax rate changes, the other is the impact of changes in tax rates on total consumer expenditure. A low price elasticity of demand indicates that the item in question is a "good" object of taxation from the viewpoint of raising more revenue through higher rates of taxation: the low price elasticity indicates that as the price rises quantities consumed will not fall sufficiently to offset the higher tax rate, and consequently total tax yield rises.[34] But the other side of the coin is, of course, an increased expenditure on the commodity in question. Thus when the price of beer rises (relative to the CPI) due to higher rates of excise taxation, the total tax yield from beer tends to rise (in real terms) because of the rising (real) outlay by consumers and, if income is static, the percentage of total expenditure devoted to beer will also rise. What is good from the fiscal viewpoint

34. This situation prevails whenever the relevant elasticity is less than unity in absolute value.

may have adverse repercussions from a social viewpoint. The very success of this taxation in rising revenue is merely a reflection if its ineffectiveness as a deterrent to consumption. Since the percentage of total personal expenditure devoted to alcohol in Ireland is already the highest of any country for which data are available, and has been rising, the impact of increases in the price of alcohol relative to the cost of living is most probably to aggravate a situation which is already exceptional by international standards.

A comparison with the demand for tobacco is instructive. O'Riordan has estimated price and income elasticities for tabacco in the range −0·69 to −0·90 for price, and 0·48 to 0·57 for income.[35] Thus the price elasticity for tobacco is unambiguously higher, and the income elasticity unambiguously lower, than for either beer or spirits. If tax rates remained unaltered (and there were no increases in production costs) tax receipts from alcohol would rise more rapidly than those from tobacco as income rises. On the other hand, increased tax rates would tend to discourage consumption by a larger percentage (and thus cause revenue to rise by a smaller percentage) in the case of tobacco than in the case of alcohol. If one were to rank the three commodities in increasing order of tax yields with rising tax rates, beer would be first, spirits next and tobacco last, but the order is exactly reversed from the viewpoint of discouraged consumption as a result of rising tax rates. There is a clear conflict of interests between the fiscal goal of rasing extra revenue most efficiently and the social goal of moderating the percentage of income devoted to items such as alcohol. However, the statistical results on which these remarks are based are tentative, and a full evaluation of the appropriateness of different taxation policies would require an attempt to assess the social costs associated with alcohol and tobacco consumption.

Conclusion

We have tried to evaluate the importance of alcohol consumption in Ireland using Household Budget Inquiry and National Income data. The national income data support the view that an unusually high percentage of Irish personal expenditure is devoted to alcohol. While this is mostly due to the very high price of alcohol in Ireland relative to income per person, it does imply that the Irish attach great importance to alcohol consumption. The effect of prices and income on alcohol consumption over time in Ireland corroborates this conclusion inasmuch as both beer and spirits were estimated to have high income elasticities and low price elasticities. The prospect is that, with rising levels of real income, the quantity of alcohol consumed per head of population will grow rapidly, and most of this growth will be due to a very rapid growth of spirits consumption. If the price of

35. W. K. O'Riordan, "Price Elasticity of Demand for Tobacco in Ireland", *Economic and Social Review*, Vol. 1, no. 1 (October 1969). These estimates apply to the same period as our estimates for alcohol, and refer to pipe and cigarette tobacco combined.

alcohol continues to rise more rapidly than the general price level, it appears likely that the percentage of total expenditure devoted to alcohol will also continue to rise. These findings raise important questions about taxation policy, although no firm recommendations are warranted on the basis of our tentative results. Our findings do, however, merit serious consideration in connection with any assessment of the prevalence of "alcoholism" in Ireland.