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RETAIL PRICE DISTRIBUTION OF ALCOHOLIC BEVERAGES FOR ON-PREMISE CONSUMPTION IN MICHIGAN

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16. Abstract

Under sponsorship of the Michigan Department of Public Health, Office of Substance Services, a survey of Class C Bars and Taverns in Michigan was conducted. The objective of the study, which was part of an ongoing analysis of alcohol availability in Michigan, was to measure the price variability and price distributions of drinks by-the-glass and to identify the correlates and determinants of price levels. Price was conceptualized to represent the basic component of economic availability of beverage alcohol.

Greater price variation than expected was found for most drinks containing distilled spirits and for wine. Beer was consistently the least costly and most uniformly priced. Analyzed and discussed are effects of price incentives, degrees of urbanism, food services, other establishment characteristics, and associations between county-level average prices and selected alcohol-related health and social problems. Policy and research recommendations are offered.

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RETAIL PRICE DISTRIBUTION OF ALCOHOLIC
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1.0 INTRODUCTION

This is the final technical report of a research project con-
ducted by the Highway Safety Research Institute (HSRI) under contract
with the Michigan Department of Public Health, Office of Substance
Abuse Services (OSAS). This project is one study of several which
have been sponsored by the OSAS dealing with policy-related research
beginning in 1976.

The relationship of alcohol availability to the public health
and the consequences of alcohol abuse have been the focus of colla-
borative research at The University of Michigan since 1973. In 1976,
the Michigan Department of Public Health initiated efforts to gain
additional policy-relevant information concerning the legal drinking
age issue as it related to a variety of factors, including other
aspects of retail alcohol availability and traffic casualties. The
Highway Safety Research Institute (HSRI) aided by the Michigan State
Police, Office of Highway Safety Planning, conducted analyses which
helped change public policies and initiate new legislation. The
assistance of the Michigan State Liquor Control Commission and the
Michigan Beer and Wine Wholesaler's Association led to the collection
of previously unanalyzed data sets. Volume I of the 1976-1977
contract report demonstrated that certain factors of law, regulation,
and control activities indeed appears to be related both to specific
kinds of alcohol distribution and consumption and also to alcohol-rela-
ted casualties (as measured by the frequency of alcohol-related traffic
accidents).* A second volume of that year's effort critiqued the

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*Douglass, R. L., and Freedman, J. A. Alcohol-Related Casual-
ties and Alcohol Beverage Market Response to Beverage Alcohol
Availability Policies in Michigan. Volume I. Final Report to the
Michigan Department of Public Health, Office of Substance Abuse
Services. The University of Michigan, Highway Safety Research
Institute, Ann Arbor, August 1977.

methods of social cost estimates of alcohol-related problems from the standpoint of applied economic analysis and concluded that the state of the art precluded wholesale reliance on such techniques for policy development at the present time.*

In 1979, the Highway Safety Research Institute, continuing to investigate the relationship of retail alcohol availability to a wide range of social problems associated with alcohol abuse, published a second project report which analyzed a wide range of alcohol-related social and health problems, alcohol distribution, and changes in physical alcohol availability.** This research found that of the many kinds of activities conducted by the Michigan Liquor Control Commission, some are associated with increases in specific kinds of beverage alcohol distribution increases and some are not. Also, certain actions of the Liquor Control Commission are associated with both increases in alcohol distribution and specific kinds of alcohol-related social and health problems. The principal conclusion was that beer distribution is most likely, among all types of alcoholic beverages, to be statistically associated with alcohol-related problems; the problems most likely to be directly associated with such alcohol distribution include all types of alcohol-related accidental mortality; and that beer distribution is the least likely, compared to wine and distilled spirits, to respond to modification in regulatory policies and activities of the Michigan Liquor Control Commission. Also, certain limitations in data collection were identified which, if remedied, would improve the potential for policy-

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*Freedman, J. A., and Douglass, R. L. A Critical Review of Social Cost Estimation of Alcohol Problems. Volume II. A study of Alcohol-Related Casualties and Alcohol Beverage Market Response to Beverage Alcohol Availability Policies in Michigan. Final Report to the Michigan Department of Public Health, Office of Substance Abuse Services. The University of Michigan, HSRI, Ann Arbor, September 1977.

**Douglass, R. L., Wagenaar, A. C., and Barkey, P. M. Alcohol Availability, Consumption, and the Incidence of Alcohol-Related Social and Health Problems in Michigan. Final Report to the Michigan Department of Public Health, Office of Substance Abuse Services. The University of Michigan, HSRI, Ann Arbor, May 1979.

relevant research in the future.

The intent of the present study was to extend and expand upon the previous work by investigating several key questions raised in the earlier research, specifically, the variability of prices of alcoholic drinks at on-premise establishments, other factors at the point of sale and the variability of drinking places in Michigan areas which have not been seriously researched to date. Several investigations of alcohol availability in Canada, Europe, and the United States have included price as a variable of importance.* To date, the studies of Michigan data have included state licensing, wholesale distribution, social services, and population data. Price as an operational variable has not been analyzed, however, because no secondary data of retail price levels of all kinds of beverage alcohol have been identified. The price of retail alcohol at the point of sale is likely to interact with other factors to relate demand and consumption to the complex issue of alcohol availability. To investigate this problem, it was necessary to collect data in the field through telephone survey procedures.

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*Smart, R. G. "The Relationship of Availability of Alcoholic Beverages to Per Capita Consumption and Alcoholism Rates." Journal of Studies on Alcohol, Vol. 38, No. 5, 1977, pp. 891-896.
_____. "Availability and the Prevention of Alcohol-Related Problems." Paper presented at the NIAAA Seminar on Normative Approaches to the Prevention of Alcohol-Related Problems, San Diego, California, April 1977.

2.0 CONCEPTUAL BACKGROUND

Numerous investigations by economists and others into the
determinants of the demand for alcoholic beverages have identified
product price as a significant factor in determining the amount of
alcohol an individual chooses to consume. Johnson and Oksanen* found
price coefficients from a demand model estimated from pooled time-
series and cross-sections of Canadian provinces to have the expected
sign and to be highly significant. In other words, the variations
in price among the jurisdictions studied were directly linked to the
demand (consumption) of alcoholic beverages. This finding, according
to the authors, was independent of the effects of income and several
other sociological variables. The relationship of price and consump-
tion was consistent for beer, wine, and spirits, with the strongest
relationship being with spirits. In an experimental setting,
Babor et al.** found reduction in price to be highly correlated with
increases in consumption. Most countries recognize this and levy
taxes on the sale of alcoholic beverages that are at least partially
intended to modify their use. Indeed, some jurisdictions have inter-
vened in the market and established public monopolies to directly
control pricing. Beyond predicting aggregate demand, an understand-
ing of price variability can be expected to add to the understanding
of beverage alcohol retailing in a more general perspective.

Economic theory can be modified to account for the simultaneous
existence of several prices for a given product on a competitive

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*Johnson, J. A., and Oksanen, E. H. "Estimation of Demand
for Alcoholic Beverages in Canada From Pooled Time Series and Cross
Sections." The Review of Economics and Statistics, Vol. LIX, No. 1,
February 1977, pp. 113-118.

**Babor, T. F., Mendelson, J. A., Kuchnle, J. D., Greenberg, I.
"Experimental Analysis of the 'Happy Hour' Effects of Purchase
Price on Drinking Behavior." Paper presented at the 39th Annual
Scientific Meeting of the Committee on Problems of Drug Dependence,
Cambridge, Massachusetts, July 9, 1977.

market.* Through casual inspection of the market for alcoholic
beverages one easily sees that variation in beverage prices is common.
The amount of price dispersion, in selected areas, however, can be
predicted to vary directly with the competitiveness of the local mar-
ket, the homogeneity of the product and the way it is sold, and most
importantly, with differences in retail availability of alcoholic
beverages. We are turning our attention to beverage alcohol sold
for on-premise consumption because, unlike package sales in Michigan,
all types of on-premise alcohol (beer, wine, and distilled spirits)
are subject to retail price variation. The formulation of a measure
of price dispersion has the potential of not only revealing something
about the stability and structure of the alcohol market, but promises
to provide information about cross-sectional differences in a basic
component of retail availability as well.

2.1 DETERMINANTS OF PRICE

The price of alcoholic beverages for sale for on-premise
consumption is essentially determined by the interaction of supply
and demand. Factors determining supply include the basic costs in
acquiring and maintaining premises, hiring employees, purchasing
wholesale alcoholic beverages, and licensing/legal fees, to which
the costs of additional items such as entertainment or elaborate
decor may be added. Individual demand for alcohol is determined by,
among other factors, the preferences of consumers, which are in turn
related to their social, economic, and religious backgrounds. Other
factors include income and the demand for complementary goods, such
as entertainment or meals at restaurants.

Even in highly competitive situations, prices for the same
beverage in a defined area can vary, for several reasons. The first
and most intuitive reason is that the total product being consumed
may differ according to the location and type of establishment, and
the price paid for a drink may reflect the price of additional

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*Pratt, J., Wise, D., and Zeckhauser, R. Price Variations in
Almost Competitive Markets. Harvard Discussion Paper Series, Number
37D, December 1975.

provisions beyond the drink itself--live entertainment, "atmosphere," and other intangibles. Secondly, variations in price may be due to disequilibrium; beverage retailers may not respond simultaneously to increased operating costs, or they may be involved in active price competition. Lastly, prices can be expected to vary even in the long run due to positive search costs incurred by consumers. Search costs involve the expenses in finding a product for sale; the time spent looking for and traveling to the place of sale, plus the cost of the transportation itself. Since the total cost of obtaining a drink includes the price of the drink plus the cost of travel to the establishment, the uneven spread of establishments within a specific area implies variation in price for alcohol beverages. This is so because single establishments in outlying areas have a spatial monopoly on their local customers; they can safely charge a price equal to the price charged by surrounding establishments, plus the travel costs to those establishments. It is in this way that measures of price dispersion can provide a measure of geographic density of establishments, with subsequent consequences for availability.

Further, the variation of price of different types of beverages within the same area may vary according to the responsiveness of individuals to changes in the prices of these products. For instance, Johnson and Oksanen found consumption of spirits to be four times more responsive to changes in price than the consumption of beer.* This not only demonstrates that the price of spirits is likely to exhibit less variation than that of beer, but also that proportionately equal price increases in both these beverages are likely to shift the pattern of consumption towards beer and away from spirits. Pressure for price increases are usually a result of increases in taxation of operating costs, and if the reason is taxation, it is to the government's advantage to be able to anticipate the probable effects on consumption.

The present study is the first attempt to determine the extent

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*Johnson and Oksanen, 1977, op cit.

and types of price variation for beverage alcohol, for on-premise consumption in Michigan. The principal research questions were

1. To what extent is there retail price variability in Michigan for alcoholic beverages sold for on-premise consumption?

2. What are the factors associated with retail price variation and to what extent are these variations determined by the market area drinking population, or other influences?

3. What are the characteristics of alcohol beverage retailers for on-premise consumption that are associated with price variation and distribution?

These research questions relate to previous studies on alcohol availability as seen in Figure 2.1, which was first presented by Douglass and Freedman in 1977. The area of price will add one more piece to the puzzle which will eventually describe the dynamics and influence upon alcohol availability in such a way that interventions for public health purposes can be developed.

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Changes in Alcohol
Beverage Legislation,
Policy, Relevant Court
Decisions

Changes in Area
Demographics
- 18-20 & 18-34
  year-old Popula-
  tion Density
- *Per Capita Income*
- *Urbanization*
- *Economic Growth*

Changes in the Number,
Classification, Hours
of Operation of Alcohol
Distributing Units

Changes in
Quantities of
Beverage Alcohol
Consumed

*Changes in After-
Drinking Behavior*

Changes in
Alcohol-Related
Problems

CHANGE IN BEVERAGE
ALCOHOL AVAILABILITY

*Changes in Social
Environments and
Norms of Drinking*

*Changes in
Situational
Drinking
Environments*

*Changes in the Type
of Beverage Alcohol
Products Marketed*

Changes in the
Cost of Beverage
Alcohol Products

*Changes in the Avail-
ability, Cost Stigma,
of Non-Alcoholic
Alternatives*

*Changes in the Level
of Enforcement of
Existing Liquor
Control Regulations*

FIGURE 2.1

A Conceptual Model of the Relation-
ship of Demand and Elaborated
Availability Variables with Alcohol
Consumption and Alcohol-Related
Problems.*

*Changes in the Type
of Alcohol Distribu-
ting Units (i.e.,
Discos, Bars,
Restaurants, Hotels,
etc.)*

*Adapted from Douglass and Freedman, 1977.

3.0 METHODOLOGY

The absence of any secondary data source for retail prices of alcoholic beverages for on-premise consumption required the development of a primary data collection plan. This necessitated the creation of a sampling frame, determination of adequate sample sizes, jurisdiction selection, instrument development, and formulation of an analysis plan. The data collection approach was decided upon as a telephone survey of appropriate respondents in sampled Class C bars and Taverns in a sample of counties in Michigan. This chapter documents the methodological decisions and details of the final research design.

3.1 JURISDICTION SELECTION

The development of any research design requires decisions about what populations are to be studied and what criteria are relevant for making such decisions. In the present case it was possible to use the entire state of Michigan or some subset of it. Due to limits imposed by cost considerations and time constraints it was decided that selected subsections of the state would be used. Further, the subsets that made most sense included those analytic jurisdictions for which complementary data files had been previously developed for measures of alcohol distribution and alcohol-related problems (Douglass et al., 1979). Thus, seven analytic jurisdictions were identified: Genessee, Ingham, Macomb, Oakland, Kent, and Wayne Counties, plus a set of 13 sparsely populated counties combined to create a "rural" jurisdiction.

The original intention was to use the same systematic sample of small counties that were used by Douglass and Freedman (1977a). However, the sampling frames were to be constructed from lists of Class C and Tavern licensees (Class C licensees can sell all types of alcoholic beverages, while Taverns can sell only beer and wine), and lists for all counties were not available for 13 small counties which were aggregated to form a rural jurisdiction in the previous research. A new set of counties was selected, including Alger, Antrim, Arenac,

Baraga, Benzie, Clare, Gladwin, Gratiot, Iron, Keweenaw, Ocena, Oscoda, and Schoolcraft Counties. The use of these study jurisdictions permits a reasonable representation of the state of Michigan with all regions and all major population centers included. The design also allows reasonable continuity with the current series of projects on alcohol availability in Michigan.

3.2 SAMPLE DESIGN AND SELECTION

The object of the present research effort was to examine factors that influence the retail price variability of beverage alcohol sold for on-premise consumption in the State of Michigan. Since the population of establishments that market beverage alcohol for on-premise consumption is too large to study by way of a census, it is critical that a representative sample of such establishments be selected for detailed study. Furthermore, probabilistic sampling methods must be employed* so that the study results can be generalized to the larger population of on-premise establishments in selected counties of the State of Michigan. A probability sample must also be selected so that sampling errors can be determined, providing an assessment of the precision of sample estimates.

To achieve the above goals, a proportionate stratified random sample was selected of Class C and Tavern licensees in the six most populous counties included in the sample frame. That is, a simple random sample was selected within each of the seven strata** with a uniform sampling fraction applied across all strata.

The sampling frame, purchased from the Michigan Liquor Control

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*Probabilistic sampling methods require that each element in the population to which one wishes to generalize must have a known, non-zero probability of inclusion in the sample.

**The seven strata are: (1) Wayne County, (2) Oakland County, (3) Macomb County, (4) Genessee County, (5) Kent County, (6) Ingham County, and (7) a group of 13 of the smallest counties in Michigan. the 13 small counties are: Alger, Antrim, Arenac, Baraga, Benzie, Clare, Gladwin, Gratiot, Iron, Keweenaw, Ocena, Oscoda, and School-craft.

Commission, consisted of a list of all Class C and Tavern licenses in the State of Michigan as of August 1978, with the exception of a few of the smallest counties in the state for which the list was unavailable. As a result of the missing small counties, the small county stratum in the sample is not strictly the 13 least populous counties, but rather the 13 smallest counties included in the sampling frame. However, since the small counties included in the stratum as substitutes for the missing counties were not significantly more populous than the missing counties it is unlikely that this problem in the sampling frame, and as a consequence in the sample, will appreciably affect analyses involving the small county stratum.

3.2.1 Calculation of Sampling Error*

Since this stratification design uses a uniform sampling fraction, no adjustments need to be made in the usual calculations of point estimates for means and proportions. However, the standard formulae for the estimation of the sampling error for means and proportions must be modified. The process of stratification reduces the sampling error because the population variation between strata, which as a result of stratification is exactly reflected in the sample, is not included in the sampling error. Only the variation within the strata remains as sampling error. The sampling error in stratified samples is a weighted average of the error within each stratum. Thus, for proportions, instead of estimating the sampling error with the estimate used assuming simple random sample,

$$\sqrt{\frac{p(1-p)}{n-1}}$$

one would take into account the stratification by using

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*The discussion of sampling error is based on Moser, C., and Kalton, G., Survey Methods in Social Investigation, Chapters 4-7, New York: Basic Books, 1972. The symbols used in this discussion are defined as follows: p=total sample proportion; p_i=sample proportion of stratum i; N=total population size; n=total sample size; n_i=number of sample elements in strata i; s=standard deviation of entire sample; s_i=sample standard deviation of strata i.

$$\sqrt{\frac{1}{n^2} \quad \frac{n_i^2 \quad p_i(1-p_i)}{n_i-1}}$$

Similarly, the standard error of a mean of a stratified sample is estimated with

$$\sqrt{\frac{\Sigma n_i s_i^2}{n^2}}$$

instead of the usual simple random sampling formula

$$\sqrt{\frac{s^2}{n}}$$

Although the formulae above have been adjusted for the effects of stratification, the usual assumption of sampling from an infinite population remains. However, as a result of sampling without replacement, and because the population of Class C and Tavern establishments is finite, the finite population correction can be used (Moser and Kalton, 1972). The use of the finite population correction involves multiplying the obtained sampling error by the factor $\sqrt{(1 - n/N)}$. Thus, the formula used to estimate the sampling error of a proportion based on the entire sample is

$$\sqrt{\frac{1}{N^2} \quad \frac{n_i \quad p_i(1-p_i)}{n_i-1} \quad (1-n/N)}.$$

Similarly the sampling error of a mean based on the entire sample is

$$\sqrt{\frac{n_i s_i}{n^2}(1 - n/N)}.$$

It should be noted that the above formulas apply to proportions and means based on the entire sample. Estimates of the precision of proportions and means within each strata are straightforward since

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a simple random sample was selected within each stratum.*

A primary sample was selected using a sampling fraction of one-twelfth. Available variables describing each sampled establishment** were then coded, placed on file and used to assess the adequacy of the sample size in terms of the precision or sampling error of the estimated proportions and means. The sampling errors for the overall sample were calculated in two ways. First, the stratification and the finite population correction were taken into account by using the appropriate formulae discussed above. Second, the overall sampling errors were calculated using the simple random sampling formulae, ignoring reductions in sampling error due to the stratification and finite population correction. The differences between the two results were small, with the reductions in sampling error obtained by considering the stratification and the finite population correction rarely exceeding 10 percent for the variables available prior to contacting the establishments. Because the use of the more complex formulae indicated only a marginal reduction in obtained sampling error, because our primary interest is in the within-stratum parameter estimates, and because (as will be seen shortly) the use of disproportionate sampling† became necessary, the decision was made to disregard the adjustments to sampling errors due to the stratification and the finite population correction by restricting our attention to within-stratum parameter estimates, where the simple random

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*The standard errors within strata can still be reduced by the finite population correction, since the elements were sampled from a finite population without replacement.

**The following variables were available prior to contacting the establishment: average monthly sales, Class C versus Tavern license, Sunday sales permit yes/no, SDM license yes/no, dance permit yes/no, entertainment permit yes/no, bowling yes/no, golf yes/no, adjacent area permit yes/no (i.e., are alcoholic beverages allowed to be taken from bar onto an adjacent area, for example, bowling lanes?), food permit yes/no (i.e., is food served when bar is closed?), number of bars, number of months since last transfer of license, and number of months since the license was newly issued.

†Disproportionate sampling involves using different sampling fractions in the various strata and significantly complicates the calculation of sampling errors for the overall sample.

sampling formulae remain appropriate. We turn now to a discussion of the stratum-specific sampling errors obtained for the primary sample.

It was evident from descriptive statistics obtained for the primary sample that the sampling errors were unacceptably large for several of the smaller strata (see Table 3.2.1). As a result, it was decided to select a secondary one-twelfth sample from all the county strata except Wayne, for which an acceptable small sampling error was obtained in the primary sample. This secondary sample was then used to assess the representativeness of the primary sample by comparing the point estimates for available variables between the two samples. The distributions for license/permit variables were very similar between the two samples (see Tables 3.2.1 and 3.2.2). The comparability of the two samples increases one's confidence that the primary sample is not characterized by non-representativeness due to the chance inclusion of radically atypical establishments. The similarity between the two samples on available measures provides evidence that the sampling process produced representative samples of Tavern and Class C establishments in the selected counties of the State of Michigan.

However, although the descriptive statistics for the secondary sample increased our confidence in the representativeness of the primary sample, the sampling errors for the primary sample appeared too large for precise parameter estimation of surveyed variables. The decision was made to increase the number of cases in each of the strata of the primary sample, except for Wayne County, for which sufficient cases were already included for precise parameter estimation. This was done by randomly selecting a portion of the cases from the appropriate stratum of the secondary sample and adding these cases to the primary sample, creating the final sample to be surveyed. The characteristics of the final survey sample are depicted in Table 3.2.3.

TABLE 3.2.1

DESCRIPTIVE STATISTICS FOR PRIMARY SAMPLE OF CLASS C AND TAVERN LICENSEES IN
SELECTED COUNTIES OF THE STATE OF MICHIGAN

County	Number of Cases*	Mean Monthly Sales (Standard Error)**	% Holding License or Permit (95% Confidence Interval)			
			Class C†	Sunday Sales	SDM License	Dance
Genessee	24	$ 756 (114)	100% (88,100)	88% (68,97)	88% (68,97)	63% (41,81)
Ingham	13	$1583 (469)	92% (64,100)	77% (46,95)	62% (32,86)	39% (14,68)
Kent	22	$1748 (348)	82% (60,95)	0%	73% (50,89)	32% (14,55)
Macomb	28	$1625 (410)	96% (82,100)	93% (77,99)	64% (44,81)	36% (19,56)
Oakland	39	$2144 (294)	100% (93,100)	92% (79,98)	54% (37,70)	46% (30,63)
Wayne	186	$ 809 (70)	97% (94,99)	81% (74,86)	38% (31,46)	24% (18,31)
Small Counties	23	$ 742 (226)	96% (78,100)	87% (66,97)	87% (66,97)	57% (35,77)

*The total number of cases in the sample. The descriptive statistics for most variables in most strata are based on slightly fewer cases due to missing data.

**Sales in dollars of distilled spirits for on-premise consumption, sales are recorded as purchases from state liquor stores (wholesale).

†Sampled establishments without a Class C license had a Tavern license.

TABLE 3.2.2

DESCRIPTIVE STATISTICS FOR SECONDARY SAMPLE OF CLASS C AND TAVERN LICENSEES IN SELECTED COUNTIES OF THE STATE OF MICHIGAN

County	Number of Cases*	Mean Monthly Sales (Standard Error)**	% Holding License or Permit (95% Confidence Interval)			
			Class C†	Sunday Sales	SDM License	Dance
Genessee	22	$ 763 (118)	100% (88,100)	88% (68,97)	75% (53,90)	46% (26,67)
Ingham	13	$ 1262 (363)	92% (64,100)	92% (64,100)	69% (39,91)	31% (9,61)
Kent	22	$ 1381 (322)	81% (58,95)	0	81% (58,95)	38% (18,62)
Macomb	28	$ 1987 (370)	100% (90,100)	90% (73,98)	55% (36,74)	41% (24,61)
Oakland	39	$ 1679 (220)	97% (87,100)	90% (76,97)	49% (32,65)	46% (30,63)
Small Counties	23	$ 322 (74)	100% (88,100)	96% (79,100)	92% (73,99)	67% (45,84)

*The total number of cases in the sample. The descriptive statistics for most variables in most strata are based on slightly fewer cases due to missing data.

**Sales in dollars of distilled spirits for on-premise consumption, sales are recorded as purchases from state liquor stores (wholesale).

†Sampled establishments without a Class C license had a Tavern license.

TABLE 3.2.3

DESCRIPTIVE STATISTICS FOR FINAL SURVEY SAMPLE OF CLASS C AND TAVERN LICENSEES IN SELECTED COUNTIES OF THE STATE OF MICHIGAN

County	Number of Cases*	Mean Monthly Sales (Standard Error)**	% Holding License or Permit (95% Confidence Interval)			
			Class C†	Sunday Sales	SDM License	Dance
Genessee	30	$ 781 (97)	100% (91,100)	90% (74,98)	83% (65,94)	60% (41,77)
Ingham	26	$1422 (292)	92% (75,99)	85% (65,96)	65% (44,83)	35% (17,56)
Kent	30	$1553 (261)	87% (69,96)	0	70% (51,85)	40% (23,59)
Macomb	30	$1706 (388)	97% (83,100)	93% (78,99)	63% (44,80)	37% (20,56)
Oakland	50	$1903 (245)	100% (94,100)	94% (84,99)	48% (34,63)	48% (34,63)
Wayne	186	$ 809 (70)	97% (94,99)	81% (74,86)	38% (31,46)	24% (18,31)
Small Counties	30	$ 688 (183)	97% (83,100)	90% (74,98)	87% (69,96)	60% (41,77)

*The total number of cases in the sample. The descriptive statistics for most variables in most strata are based on slightly fewer cases due to missing data.

**Sales in dollars of distilled spirits for on-premise consumption, sales are recorded as purchases from state liquor stores (wholesale).

†Sampled establishments without a Class C license had a Tavern license.

3.3 VARIABLE CONCEPTUALIZATION AND SELECTION

Prior to the development of a survey instrument, key variables were conceptualized which would provide descriptive information about respondents and their establishments, patrons of the establishments, and factors which are potentially associated with on-site availability, including but not limited to the retail price of specific alcoholic beverages.

The literature provided virtually no guidance regarding factors of retailers or retail establishments which might be associated with the price of specific drinks. Thus the initial conceptualization of the measures, as well as the operational alternatives from which elements of the instrument were selected, were based on the pragmatic considerations dictated by the study design, such as the length of the interview and the ability to ask complex questions on the telephone; on the rudimentary understanding of the beverage alcohol retail market place; and a set of common sense hunches about the set of variables to be included.

The basic model which guided the variable selection was that price determination is associated with factors of the establishment and its market place, in addition to more global factors of laws, regulations, and business practices which are beyond the purpose of this study. The model is schematically shown below.

$$
\text{Alcoholic Beverage Price Determination} = \left\{
\begin{array}{l}
\text{Establishment factors} \\
\quad \text{Time open for business} \\
\quad \text{Staff characteristics} \\
\quad \text{Patron capacity} \\
\quad \text{Non-alcohol business} \\
\text{Patron Factors} \\
\quad \text{Proximity to establishment} \\
\quad \text{Age} \\
\quad \text{Sex} \\
\quad \text{Income} \\
\quad \text{Occupation} \\
\quad \text{Reasons for selecting the} \\
\quad\quad \text{establishment}
\end{array}
\right.
$$
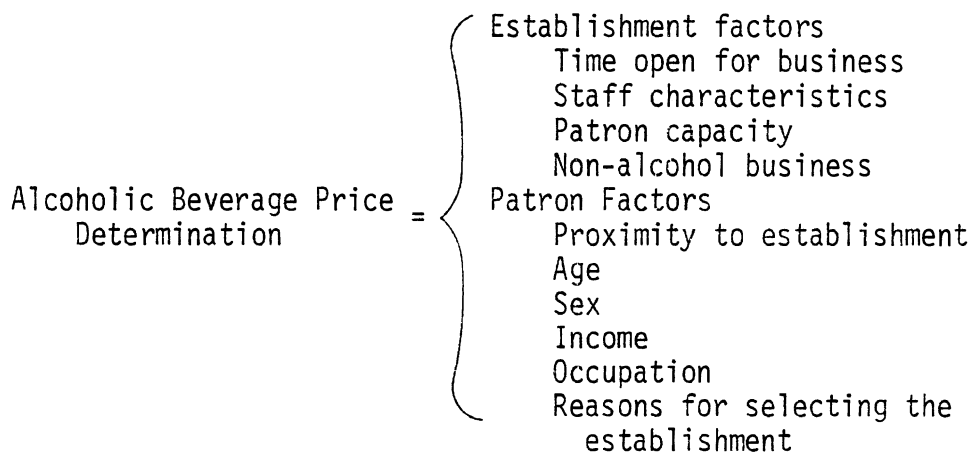
Specific price variables were selected after an initial field study of establishments in Washtenaw County, Michigan. The selected variables include the regular price of:

-bottle or draught beer;

-one shot of bar whiskey;

-eight most popular mixed drinks;

-a glass of red or white wine;

-pitcher beer;

discounts, specials, or happy-hour prices.

Establishment characteristics included:

-Length of time (years in business);
-Hours of operation;
-Number of employees;
-Training of bartenders;
-Maximum customer capacity;
-Presence of areas in which alcohol cannot be served;
-Existence of cover charges;
-Existence of entertainment (live music);
-Availability of dancing;
-Games or game rooms;
-Bowling or other recreation;
-Food services and employment of cooks;
-Weekly availability of reduced prices for drinks.

Customer factors were less developed than establishment or price measures because the respondents would be employees of the selected licensees. Travel distance was considered to be important because it would suggest the degree to which customers invested their own resources to patronize a specific establishment; thus respondents were asked to estimate the number of miles that most customers travel from their home to the bar or tavern. Other customer factors were requested in an open-ended question in which the customers were to be described in the respondents' own words.

3.4 QUESTIONNAIRE DESIGN

The questionnaire represents a conscious attempt to incorporate all of the concepts outlined in Section 3.3 within the confines of a telephone interview. As such, the accuracy of any response to a question, as well as the validity of any given question in tapping an underlying theoretical construct, was balanced against the probability of obtaining a usable response in the choice and design of the questionnaire. In other words, questions had to be judged in terms of

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their likelihood of actually being answered in addition to the accuracy of the answers they might generate. The former criterion played an extremely important role in the final composition of the questionnaire.

The design of the questionnaire called for the simultaneous attainment of three tasks. First was the selection of questions based on their likelihood of eliciting a usable response. Secondly, questions had to be designed so that they could be understood by respondents, and so that the answers they were likely to provide were meaningful measures of the variables deemed important in explaining retail price variation. Finally, questions had to be ordered in a way that would keep respondents interested, at least enough to dissuade them from preliminarily terminating the interview.

In selecting the questions for the questionnaire, attention was paid to two possible ways in which they might fail to elicit usable responses from respondents. First, respondents simply may not have the information that the question requires, or it may not be possible for the information to be made available within the brief time span of the interview. For example, accurate accounts of advertising and entertainment expenditures may only be computed for tax purposes, and might not be kept currently by all establishments. Secondly, the information sought in the survey may be regarded by respondents as inappropriate for public disclosure. This concern is heightened by the necessity of collecting the data for this study through the relatively impersonal process of telephone interviews for certain financial aspects of each establishment's operation. The existence of these two potential pitfalls in the data collection process effectively eliminated a number of conceptually relevant lines of inquiry. Thus, the questions that could be included in the interview were limited in scope and detail.

The questions that were not included in the interview for one or both of the reasons listed above included:

> Questions concerning the quality of the services offered; e.g., the experience and/or friendliness of the employees, the attractiveness of the physical surroundings;

Detailed financial questions regarding the expenditures on advertising, entertainment, or maintenance of the premises;

Questions requiring a substantial amount of subjectivity on the part of respondents; e.g., judging the "strength" of mixed drinks served, or the "class" of the clientele.

The decision to rule out these questions in no way diminishes their importance in the explanation and prediction of the prices for alcoholic drinks in the licensed establishments. Indeed, the information that these questions seek to gather may be of crucial importance in formulating and estimating complete models of the pricing of drinks. Their exclusion is based solely on pragmatic grounds. The degree of confidence one can put in the empirical results is therefore contingent on one's views on how important these omitted variables are in explaining pricing practices.

The questions that were selected for the questionnaire were those for which all respondents would be able to provide an adequate response. As can be surmised from the questionnaire itself (see Appendix A), these amounted to a series of relatively objective questions detailing the operations and the pricing practices of the establishment. Many questions require survey participants to respond affirmatively or negatively to inquiries about their activities (e.g., Do you serve food? Do you have live entertainment?); at the most, respondents were requested to provide details of the establishment's operations that they were very likely to be familiar with (i.e., prices of drinks).

The design of the individual questions reflected the desire to obtain consistent responses from participants that were valid measures of the relevant theoretical constructs. This required that the questions be understandable to respondents, and that their ambiguity be limited to the greatest extent possible. Curiously, these seemingly common sense goals often were in conflict. For instance, efforts to reduce the latitude for interpretation in some questions necessitated the usage of more precise, but to respondents less familiar, language. Conflicts of this sort were usually resolved by adding additional questions to follow ambiguous

questions so as to insure that the original question's inter-
pretation was uniform. In most cases, the design of the
questions was straightforward. Information on such subjects
as hours of operation, number of employees, and prices for
drinks was obtained by direct questioning.

There was some concern regarding information on the physical
size of establishments that inconsistencies would occur from differ-
ing individual definitions of the concept "size." In some cases,
the licensee was part of a much larger establishment, like a
restaurant, hotel, or a recreational facility. In cases where alco-
holic beverages were served throughout the premises (by the glass),
it seemed appropriate to consider these areas to be part of the
licensee's "area," but it was thought necessary to inquire whether
alcohol was actually served in these areas. There is another
problem in operationalizing the concept of size. From the discussion
in Section 3.3, it can be inferred that by size we mean the number
of patrons that an establishment can serve at any given time. The
establishment's seating capacity would therefore seem to be a good
indicator of size, except for those places that have a substantial
fraction of their space reserved for standing customers. The errors
in measurement that would occur in this case were not considered
worth the considerable effort that would be required to successfully
discriminate these "standing room" establishments, so that seating
capacity was employed as the measure of size.

The size of the population of potential patrons of any
establishment would be an important factor in the determination of
the prices that the establishment would charge. In this sense,
advertising, popularity and the reputation of an establishment were
thought to be important determinants of sales. One such measure of
these variables was employed in the questionnaire where respondents
were asked to estimate the distance most customers travelled to
reach the establishment. While the subjectivity of such an estimate
from the respondents requires that the answers be interpreted

cautiously, it seems reasonable to hold that they provide some useful information of an establishment's potential sales area.

Finally, there is the important matter of the provision of goods and services that are complementary to the consumption of alcoholic beverages, especially food and entertainment. In this regard, the potential for variation among establishments is very large. Measuring these variations with a survey instrument that is employed in a telephone survey would be a most difficult task. In the questionnaire utilized in this study, measurements of these variables were largely limited to those of a categorical nature. In other words, respondents were only asked if their establishment conducted any of a list of activities (e.g., serving food, providing live entertainment, dancing, etc.), and were not asked to judge their quality or relate the effort and/or financial commitment devoted to each. A small exception to this procedure was made in the questions concerning the serving of food, where respondents who had answered affirmatively to a question "Do you serve food" were further asked "Do you employ a cook?" in the expectation that those that responded negatively would have less of a commitment to providing a full range of food services.

Questions were ordered in roughly inverse order to their expected probability of being answered. The questions that were thought least likely to be answered by survey participants, namely, those requiring information concerning prices of specific drinks, were held back for the end of the interview. Less threatening questions, such as those asking for details of operating hours, length of time in business, and so forth, were asked at the onset of the interview. This was done for two reasons. First, if respondents elected to terminate the interview when the relatively more sensitive information regarding prices was requested, it would be more desirable if they would have already provided the descriptive information about their establishments, so that more detailed analysis of the non-respondents could be conducted. Secondly, it was thought that if respondents knew that the last information that was needed from them to complete the interview was

the prices of the sample list of drinks, the momentum of the interview might be sufficient to coax them into providing this information.

4.0 DATA COLLECTION

Data collection in this study involved several sets of activities conducted between January and June 1979. Certain variables were obtained from the Michigan Liquor Control Commission in the form of secondary data. These statistics included annual purchase of distilled spirits, by establishment, for Class C licensees. The principal data set was produced as primary data through the telephone survey described in preceding sections of this report.

4.1 PRETEST OF SURVEY INSTRUMENT

Prior to the actual data collection, a pretest of the survey instrument was conducted. Pretesting the instrument entailed interviewing employees of a sample of Washtenaw County, Michigan Class C and Tavern establishments.

The specific objectives of the pretest were:

(1) To determine the most appropriate times of the day for interviewing;

(2) To determine if parts of the questionnaire requested information that cannot reliably be given by respondent;

(3) To assess the uniformity of respondents' understanding of each question;

(4) To identify any possible objections that respondents might have for any or all of the questions of the survey effort;

(5) To measure the practical issues of the time duration of each interview, probable non-response rates, and unforeseen logistical problems.

From the pretest it was learned that respondents were most likely to participate in the interview if they were contacted (a) in the early morning (9 AM. - 11 AM.), and (b) in the late afternoon (2 PM. - 4 PM.). These times reflect periods in the day when establishments were least likely to be busy. Although a majority of

the interviews could be conducted in the morning and afternoon hours, some establishments were not open at these times. This required some interviewing to be conducted in the evening hours.

The survey did not contain items which proved to be difficult for respondents to answer. One question asking for general description of patrons, however, was eliminated from the instrument. Responses obtained from this question tended to lack specificity, and thus were deemed inadequate for purposes of the study.

Initially, a decision was made to interview the person "in charge" (i.e., managers and owners) of each establishment. This measure was based upon the assumption that these individuals, as opposed to other employees, would not only provide more accurate and reliable data, but would also be more likely to have time available to participate in the interview. However, it became evident in the pretest that it would not always be possible to contact these persons. Thus the decision was made to include all employees (those who answer the telephone) as eligible respondents in order to insure an adequate response rate. One consequence of the decision was an increase in the heterogeneity of the respondents.

In general, respondents appeared to comprehend each question in the pretest. Only a few questions required rewording for clarification and uniform interpretation.

All of the pretest respondents initially agreed to participate. One interview was terminated because the respondent felt that the questions being asked were too personal. Only one respondent refused to supply drink prices because she believed that it would be illegal to do so over the telephone.

Several respondents were not free to answer questions at the time of contact. When this occurred, the interviewer arranged a convenient time to call again. This approach increased the response rate, and thus was utilized throughout the final study.

Each interview took approximately five minutes to administer. In consideration of the population participating in the study, this

length of time was judged to be reasonable. It was essential to keep the survey as brief as possible, due to the working schedule of the respondents.

4.2 INTERVIEW PROCESS AND AN ANALYSIS OF NON-RESPONSE

After revisions of the instrument were completed, the actual data collection phase of the project began and was completed within a two-month period. The brief interviews were most likely to be completed by respondents in small towns. Specific problems, such as refusing to reveal prices of specific drinks, were largely confined to metropolitan areas.

As is typical in survey research, acceptable interviews were not obtained for all sampled establishments. Non-response, in a telephone survey such as that conducted here, is caused by a number of factors, including the respondent's refusal to be interviewed or refusal to answer specific questions; the respondent's telephone could be disconnected; interviewer's inability to obtain respondent's correct telephone number; and some establishments had no listed telephone number. Since the present research required reliance on publicly available telephone listings of the respondents in the sampling frame, a proportion of the sampled respondents could not be interviewed.

After the interviewing was underway, it became evident that the response rates for Genessee, Macomb, Oakland, and Wayne Counties were lower than the response rates for the other sampled sites. To insure cases for analysis, a decision was made to increase the sample size for these counties by selecting additional establishments from the secondary sample selected in the sample design stage and adding them to the final survey sample. Five additional cases each were added to Genessee, Macomb, and Oakland Counties. Because Wayne County had a relatively low initial response rate, 50 additional establishments were added to the final Wayne County sample. The resulting changes in sample sizes can be seen by comparing Tables 3.2.3 and 4.4.1.

TABLE 4.2.1

RESPONSE RATES AND REASONS FOR NON-RESPONSE BY JURISDICTION

	Jurisdiction							
	Genesee	Ingham	Kent	Macomb	Oakland	Wayne	Small Counties	Total Sample
Total number of sampled establishments	35	26	30	35	55	236	30	447
Number of interviews completed	19	18	21	19	27	99	17	220
Number of interviews partially completed	2	0	0	2	5	10	1	20
Number of sampled establishments refusing to be interviewed	3	0	2	7	10	52	1	75
Number of sampled establishments with disconnected telephone	2	1	1	1	1	9	0	15
Number of sampled establishments for which an incorrect telephone number was obtained	1	1	1	1	1	5	2	12
Number of sampled establishments not answering telephone upon repeated calling	0	1	1	1	0	7	0	10
Number of sampled establishments for which no telephone listing was available	8	5	4	4	11	54	9	95
Response rate* as percent of total sample	60%	69%	70%	60%	58%	46%	60%	54%
Response rate* as percent of total sample for which a telephone listing was available	78%	86%	81%	68%	73%	60%	86%	68%

*Response rate classifying completed and partially completed interviews as respondents, rest as non-respondents.

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Table 4.2.1 presents the response rates by jurisdiction, as well as the distribution of the reasons for non-response. Although the response rates indicated are not as high as they ideally should be, they are not substantially divergent from the response rates of between 50 and 75 percent that appear to be the norm for surveys not using a personal face-to-face interview. Although response rates of approximately 60 percent are often reported in the literature, we were somewhat apprehensive about simply accepting the responses of 60 percent of the sample as representative of the total sample. For this reason a detailed analysis of the characteristics of non-respondents was conducted.

As discussed above, a number of substantive variables were obtained for each sampled establishment prior to the actual interview. These variables were thus available for all the sampled establishments, both establishments which were successfully interviewed, and those for whom no interview was obtainable. This information provided an opportunity to examine the non-respondents, assessing whether they are significantly different from respondents. Major differences between the respondents and the non-respondents would suggest a potential bias in the survey results.

The potential of non-response bias was assessed using Analysis of Variance and Chi-square tests for independence. Within each of seven counties, a separate Analysis of Variance or Chi-square test were computed for each of 13 available variables. The results of the 91 tests are summarized in Table 4.2.2. Using the conventional level of significance of 0.05, it is observed that only six of the 91 tests conducted indicated a significant difference between respondents and non-respondents. Since one expects to find five "significant" differences out of any 100 tests simply by chance, the results can be interpreted as convincing evidence that non-response bias is unlikely in interview variables related to the test variables analyzed here.

Although the summary evidence presented does not indicate a substantial non-response bias, it should be noted that four of the six significant differences apply to Wayne County, the jurisdiction

TABLE 4.2.2

ATTAINED SIGNIFICANCE LEVELS FOR DIFFERENCES BETWEEN SAMPLED ESTABLISHMENTS SUCCESSFULLY INTERVIEWED, PARTIALLY INTERVIEWED, AND NOT INTERVIEWED*

	Jurisdiction						
	Genesee	Ingham	Kent	Macomb	Oakland	Wayne	Small Counties
Average monthly liquor sales**	.32	.47	.57	.38	.78	.01	.42
Number of months since last transfer of ownership**	.71	.15	.36	.58	.88	.01	.52
Number of months since license newly issued**	.58	.88	.78	.57	.42	.44	.51
Number of bars in establishment**	.01	.55	.14	.67	.16	.86	--
License Type: Class C vs. Tavern	--	.33	.35	.65	--	.60	.46
Sunday Sales Permit: Yes/No	.31	.79	--	.41	.53	.68	.28
SDM License: Yes/No	.71	.84	.26	.39	.31	.08	.86
Dance Permit: Yes/No	.06	.11	.63	.23	.06	.47	.43
Entertainment Permit: Yes/No	.65	.54	.89	.73	.81	.94	.67
Bowling: Yes/No	.65	.50	.23	.85	.76	.03	--
Golf: Yes/No	.41	.33	.51	.65	.59	.94	.67
Adjacent Permit: Yes/No	.65	.54	.81	.85	.89	.02	.46
Food Permit: Yes/No	.05	.10	.59	.37	.96	.46	.93

*Reasons for missing interviews include refused, telephone disconnected, no answer, and no telephone listing available.

**Significance levels are for Analysis of Variance between means; all other variables tested with Chi-square statistic. Cells for which no significance level is provided indicate that no test was possible because of inadequate variance in the test variable.

with the lowest response rate. Furthermore, detailed examination
of the bivariate relationships within each county revealed what could
be interpreted as a potential non-response bias for Wayne County.
The significant relationship between response status and average
monthly sales for Wayne County (as seen in Table 4.2.2) revealed
that establishments with low average sales are more likely to be non-
respondents. Although the differences are not great, the potential
bias in favor of the more stable, higher volume establishments in
Wayne County should be kept in mind when interpreting the results
subsequently reported.

5.0 ANALYSES AND FINDINGS

This section will present the analyses and statistical findings
of this study. The analyses incorporate the primary survey data with
secondary data and a variety of descriptive and inferential
statistical procedures.

Only survey variables with a high completion rate were analyzed. For
instance, the open-ended question requesting descriptive information
about the customers of establishments was poorly and inconsistently
answered, thus it was not included in the statistical analyses.

5.1 DESCRIPTION OF SAMPLED ESTABLISHMENTS

One of the basic objectives of this study was to provide a
general statistical description of the population of Class C and
Tavern licensees, in terms of their size, sales volume, clientele,
and marketing practices. Since there is evidence indicating that the
drinking environment is an important determinant of drinking behavior,
data on the characteristics of retail establishments are valuable
from the public health perspective. This section presents a statis-
tical summary of the establishments licensed to sell alcoholic
beverages for on-premise consumption for Michigan's six largest
counties, and a composite of 13 of the least populous counties.

The data presented below fall into three distinct categories.
The first category represents the core data set for this analysis--
the information obtained from the surveyed establishments. These
data are limited to the establishments that were successfully inter-
viewed. The second category contains information about sampled
establishments provided by the Michigan Liquor Control Commission.
These data include measures of the status of licenses and permits,
records of wholesale purchases of spirits from state liquor stores
and summaries of licensing activity. Finally, there are data com-
piled from other sources for the counties analyzed in this study;
included in this category are some variables analyzed in Douglass
et al., 1979.

Selected descriptive statistics on the surveyed establishments are presented in Table 5.1.1. The physical size of establishments, as measured by average seating capacity, appears to be markedly smaller for Wayne and the smallest (least populous) counties. The average seating capacity of the sampled Kent County bars and taverns, the largest, is more than twice that of the small county.

The volume of business conducted in the establishments is measured by average monthly sales and number of employees, although the latter indicator is undoubtedly also related to the specific nature of the establishment (e.g., restaurant, singles bar, local bar, etc.). Average monthly sales is an imperfect measure of business volume, for two important reasons. First, these figures reflect sales of distilled spirits (by the glass) only, and to the extent that beer and wine sales contribute to an establishment's total volume, these figures will understate actual sales volume.* Secondly, the dollar figures reported in Table 5.1.1 represent wholesale purchases from state liquor stores by individual establishments, rather than actual monthly gross sales to patrons. While data on wholesale purchases are attractive, since the prices charged at state stores are the same for all retailers (and thus the figures represent actual volumes, rather than revenues generated from varying prices), fluctuations in inventories held by individual retailers can make them misrepresent actual gross sales volumes.** While the amount of error in using wholesale, rather than retail, sales volume is unknown, it is assumed to be small enough to be safely ignored in this study.

Returning again to Table 5.1.1, it can be seen that by both indicators of business volume (average monthly sales and number of employees), Wayne, Genesee, and the small counties rank substantially lower in average sales volumes than the other counties examined in this

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*This deficiency will be seen to be potentially serious. The results below indicate that beer is the favorite beverage in over half of the surveyed establishments.

**For a more detailed exposition of a similar problem, see Douglass et al., 1979, pp. 57-58.

TABLE 5.1.1

SELECTED DESCRIPTIVE MEASURES ON SURVEYED ESTABLISHMENTS, BY COUNTY, MICHIGAN, 1979

County	Average* Monthly Sales	Average Seat- ing Capacity	Average Weekly Operating Hours	Average Number of Employees	% Having Trained Employees	% Having Specials
Genesee	$ 789.20	192.6	103.7	13.3	23.8	35.0
Ingham	1422.10	210.7	93.3	34.0	38.9	33.3
Kent	1552.60	217.4	91.5	18.2	20.0	42.9
Macomb	1697.70	173.4	104.8	22.5	25.0	20.0
Oakland	1924.70	166.6	94.8	23.8	17.2	16.7
Wayne	777.15	114.9	103.1	12.0	5.9	22.9
Small	687.54	103.6	103.1	6.3	0.0	27.8

SOURCE: Michigan Liquor Control Commission. All other data are compiled from survey responses.

study. The highest average monthly sales were found in Oakland
County establishments, which were more than two and one-half times
greater than sales for the small county licensees. However, by
another measure of business volume, number of employees, Oakland
County ranks substantially behind Ingham County. This may be an
indication that these measures of business volume, especially average
number of employees, are imperfect and may be measuring other things
as well.

The remainder of Table 5.1.1 contains descriptive data on
average weekly operating hours, the percentage of establishments with
employees who have attended bartending school, and the percentage
having specials, or happy hours, on alcoholic beverages. It is
interesting to note that the establishments in Oakland County, which
have the highest average monthly sales, also rank near the bottom in
weekly operating hours and are the least likely to have specials.
A surprisingly high fraction (38.9%) of the establishments in Ingham
County employ graduates of bartending schools, while the comparable
fraction is negligible for Wayne and the smallest counties.

These data obtained from the interviews become more interest-
ing when viewed in conjunction with the licensing, sales,and income
data presented in Table 5.1.2. The table gives the figures for
various licensing statistics expressed as population rates, obtained
by dividing the raw figures by the respective county populations as
of 1977. Thus the effects of different county populations are con-
trolled for when cross-country comparisons are made. BARLIC rate
is a composite of license types, subsuming Class C, Tavern, A and B
Hotel and Club licenses.* The number of each of these types of
licenses in the separate counties as of 1977 are summed, then
divided by the respective populations. The Table Top sales rates
represent the 1977 totals for wholesale purchases of distilled
spirits for on-premise consumption from state liquor stores by
establishments in the various counties. The new Class C rates are

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*For descriptions of these license categories, see Douglass
and Freedman, 1977, p. 58.

calculated as the yearly total of new Class C license issues, by county, divided by the county's population.

TABLE 5.1.2

LICENSING, SALES AND INCOME DATA, BY COUNTY

County	BARLIC* Rate	Median Family Income	Table Top Sales Rate	New C* Rate
Genesee	68.6	$11,255	6.56	1.57
Ingham	--	11,191	--	--
Kent	61.9	10,692	7.25	0.70
Macomb	46.6	13,110	7.54	0.89
Oakland	43.3	13,826	8.70	1.24
Wayne	121.4	11,351	8.76	0.65
Small	217.9	7,228	11.32	2.93

*Per 10,000 population. See text for definition of terms.
SOURCE: U.S. Census, Michigan Liquor Control Commission.

A comparison of Tables 5.1.1 and 5.1.2 reveals an apparent negative relationship between average establishment business volume, measured by Average Monthly Sales, and establishment density, indicated by BARLIC rate. Indeed, Oakland County, with the highest sales volume per establishment, has the smallest density of establishments, while for the small counties, which have the lowest volume of sales, the reverse is true. While increased establishment density may or may not increase total alcohol consumption, the above data indicate that the profitability of individual establishments is adversely affected. The close restriction of the number of outlets may be in each license holder's economic self-interest.

In some instances, the Table Top sales rate appears to be positively related to outlet density (i.e., Wayne and the small counties). We would not expect such a simple model to fully explain the variation in Table-Top sales. Other intervening variables, such as median family income and age of customers, would also have to be

taken into account in the analysis.

It can be seen from Table 5.1.2 that there is considerable variability in outlet density, ranging from 43.3 per 10,000 population in Oakland County to 217.9 in the small counties. While the rate of increase of outlets, measured by New C rate, in Wayne County (a high outlet density county) is small as expected, the New Class C rate for the small counties is extremely large, a somewhat surprising finding, since the small counties already exhibit the largest outlet density, by a wide margin.

5.2 COMPARATIVE PRICES FOR SPECIFIC RETAIL DRINKS, BY COUNTY

One of the questions addressed by the present investigation centers on the hypothesis that availability is in part determined by price. If prices for a specific drink, such as a pitcher of beer, are uniform, then the relative availability of pitcher beer would be more significantly influenced by other factors (such as the distance necessary to travel to the bar or tavern in which the purchase takes place or the ambience of the establishment.

To address the issue of price uniformity, or price distribution, the instrument pretest contained a sub-study in which the 13 most frequently purchased drinks for consumption on premise were identified, along with establishing the typical unit of purchase (pitcher, glass, shot, etc.). The most frequently ordered drinks, or the most popular, were constantly re-validated during the course of the data collection phase of the study. A final list of 12 individual drinks plus pitcher draft beer were selected for analysis.

Table 5.2.1 contains mean dollar values, by county, for the selected drinks and includes within-county standard deviations which can also be read as dollar values. The table also has the average of the standard deviations among the seven study sites for each selected drink.

From the table it is clear that, among individual drinks, draught beer is the least expensive. When the pitcher unit is considered, the per-drink price is even less. Also, both bottle and

draught beer are the most uniformly priced among all selected drinks with an average variability of only 15 and 17 cents among the seven study sites.

TABLE 5.2.1

MEAN PRICES OF SELECTED DRINKS, BY COUNTY,
WITH WITHIN-COUNTY STANDARD DEVIATIONS

Drink	County							$\bar{X}\sigma$
	Genesee	Ingham	Kent	Macomb	Oakland	Wayne	Small	
Pitcher of draught Beer	$2.63 $\bar{X}$ (.49) σ	2.63\bar{X}$ (.63)σ	2.65\bar{X}$ (.63)σ	3.26\bar{X}$ (.66)σ	3.37\bar{X}$ (1.09)σ	3.19\bar{X}$ (.57)σ	2.37\bar{X}$ (.29)σ	.62
Glass of draught Beer	.69 (.13)	.72 (.18)	.64 (.17)	.68 (.17)	.81 (.17)	.73 (.27)	.45 (.10)	.17
Bottle of Beer	.93 (.17)	.92 (.24)	.81 (.09)	.92 (.12)	.95 (.19)	.88 (.16)	.75 (.08)	.15
Shot of Bar Whiskey	.96 (.22)	1.12 (.31)	.88 (.22)	1.08 (.30)	1.08 (.40)	.95 (.31)	.71 (.07)	.26
Screwdriver	1.20 (.23)	1.26 (.28)	1.08 (.27)	1.22 (.26)	1.46 (.78)	1.14 (.31)	.85 (.14)	.32
Bloody Mary	1.24 (.25)	1.27 (.27)	1.22 (.28)	1.31 (.36)	1.35 (.27)	1.17 (.31)	.91 (.20)	.28
Seven & Seven	.99 (.24)	1.19 (.32)	1.02 (.31)	1.17 (.35)	1.17 (.36)	1.00 (.36)	.76 (.06)	.29
Black Russian	1.81 (.40)	1.84 (.38)	1.69 (.43)	1.74 (.36)	1.93 (.42)	1.79 (.47)	1.27 (.40)	.41
Shot of Bar Scotch	1.03 (.16)	1.20 (.22)	1.03 (.19)	1.21 (.26)	1.26 (.32)	1.16 (.27)	.90 (.11)	.22
Martini	1.58 (.40)	1.48 (.22)	1.37 (.22)	1.48 (.17)	1.55 (.26)	1.52 (.39)	1.26 (.16)	.26
Gin & Tonic	1.11 (.24)	1.17 (.27)	.97 (.26)	1.12 (.27)	1.23 (.30)	1.07 (.30)	.76 (.10)	.25
Dacquiri	1.56 (.33)	1.48 (.26)	1.45 (.24)	1.48 (.21)	1.54 (.28)	1.59 (.41)	1.30 (.17)	.27
Glass of Wine	1.01 (.26)	.96 (.14)	.90 (.16)	.92 (.16)	1.06 (.26)	.94 (.29)	.73 (.14)	.20
	.27	.24	.22	.23	.39	.34	.16	

Oakland County prices were uniformly higher. Also, the average variability of prices in Oakland County was greater than the other sites. In fact, the 39 cent average variability was approached only by Wayne County, with an average 34-cent variability.

The small counties consistently had lower and more uniform prices than either the three out-state, mid-sized counties (Genesee, Kent, and Ingham) or the Southeastern, "metropolitan" counties

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(Macomb, Oakland, and Wayne). These distinctions reflect certain characteristics of the on-site alcohol market place, local economy, and the influence of increasingly rural or metropolitan environments. It is interesting to note that increasing urbanization, total population size,and price variability are all associated with higher prices for the same, selected drinks.

5.3 DEGREE OF AGREEMENT OF LIQUOR CONTROL COMMISSION DATA WITH SURVEY RESPONSES

The availability of data from the Michigan Liquor Control Commission detailing the status of licenses and permits for individual establishments made it possible to conduct a number of tests to determine whether activities reported by the licensed establishments in the interviews were consistent with the records of existing permits kept by the Commission. Contingency analyses were used to examine the relationship between these records and the responses from the surveyed bars, taverns, and restaurants.

The checks that were made between survey responses and records were confined to four areas.

(1) Age of license, measured by the number of months since either the creation or transfer of ownership of a license;

(2) Sunday operating hours;

(3) Dancing and dancing permits; and

(4) Live music and dancing permits.

The compatibility of operational definitions of these variables between commission and interview data, especially for the first three areas, was the principal criterion used for this variable selection.

Discrepancies between the information supplied by respondents and the Michigan Liquor Control Commission can arise from a number of sources. First is the possibility of an inaccurate answer from the respondent. This would seem more likely when the person answering the interviewer's questions is someone other than the owner or manager, and thus often less knowledgable of the establishment's operations. This is especially the case when respondents were

interviewed in the morning hours and questioned about activities that are usually confined to the evening hours (i.e., music or dancing). A second, related source of error is that of vagueness in the questions asked the respondents. As was discussed above, this problem was addressed in several instances in the construction of the questionnaire. Considerable effort was made to write questions that were precise, and yet understandable to most survey participants. Nevertheless, it is possible that some questions were given different interpretations by those answering, and thus the responses provided by them are not strictly comparable. Finally, there is a potential for error in the Commission records furnished for this study. The status of permits and summaries of licensing activity which were analyzed are current to the end of the calendar year 1977, while the interview data were collected in May/June 1979. This lag of some 16 months gives rise to a small, but unknown inaccuracy when Commission and interview data are directly compared.

The purpose of these comparisons between Commission and interview data should be clarified. If one views the Commission records as essentially accurate (remembering the pitfalls mentioned above), then the comparisons afford an excellent opportunity to assess the accuracy and reliability of the survey instrument. Alternately, if one considers the answers supplied by the respondents to be essentially valid, then the accuracy of the Commission records can be checked. Finally, if data from both sources are presumed to be accurate, then the results of the comparisons can be interpreted as indication of the degree to which Commission regulations (concerning dancing, music, and operating hours) are effectively carried out in the licensed establishments. While such results cannot be considered definitive, they do provide some clue of the extent to which the statistical description (profile) of licensees found in Commission records is accurately reflected in the population of licensees at large.

Table 5.3.1 presents the results of two-way classifications of establishments according to interview responses to a question concerning dancing and to the Commission records of existing Dance

Permits. The dichotomous outcomes to the two variables (existence of Dance Permit, existence of dancing) result in four joint outcomes, as presented in the table. Of these four, three are consistent with the Commission regulations regarding dancing. These are (1) Dance Permit: "Yes," Dancing: "Yes," (2) Dance Permit: "No," Dancing: "No," and (3) Dance Permit: "Yes," Dancing: "No." Only in cases where no Dance Permits exist and yet dancing takes place do the interview responses contradict Commission records. From Table 5.3.1 it can be seen that only a small percentage (9.8%) of those establishments without Dance Permits reported dancing on their premises, and that a highly significant relationship exists between permit status and dancing activity.

TABLE 5.3.1

AGREEMENT OF LIQUOR CONTROL COMMISSION RECORDS AND INTERVIEW
RESPONSES REGARDING DANCING PERMITS AND DANCING (N=237)

Dance Permit: Liquor Control
Commission Records

		YES	NO
Dancing: Interview Response	YES	59.5%	9.8%
	NO	40.5%	90.2%
	Total	100% (N=84)	100% (N=153)

Chi-square = 67.35   Significance <0.001

According to Commission regulations, Dance Permits are all that are required for most forms of musical entertainment - e.g., piano bars, string bands, etc. For various forms of non-musical entertainment, such as comedy acts or movies, as well as elaborate dancing acts that might be accompanied by music, an Entertainment Permit is

required. Therefore we would expect a priori that there would be a relationship between Commission records of Dance Permits and interview responses concerning live music. Table 5.3.2 reports the results of the analysis of this relationship. As before, only the joint outcomes depicted in the upper right cell are inconsistent with Commission records. In this case 15.7% of those establishments with no Dance Permits reported live music in their establishments. It can be observed from the table that Dance Permit status does have some power in predicting the existence of music on premises, and that the expected relationship is statistically significant.

TABLE 5.3.2

AGREEMENT OF LIQUOR CONTROL COMMISSION RECORDS AND INTERVIEW
RESPONSES REGARDING DANCING PERMITS AND MUSIC (N=237)

Dance Permit: Liquor Control
Commission Records

		YES	NO
	YES	42.9%	15.7%
Music: Interview Response	NO	57.1%	84.3%
	Total	100% (N=84)	100% (N=153)

Chi-square = 21.174   Significance <0.001

Each respondent was requested to supply information on the "operating hours" of their establishment. This information was used to create a dichotomous variable indicating whether or not the establishment was open on Sundays. Sunday Sales (SS) permits issued by the Commission allow Class C licenses to sell liquor by the glass on Sundays--sales of beer and wine do not require SS permits. Thus

there are at least two reasons to expect a relationship between SS
permits and Sunday operating hours to be less than exact. First,
establishments were simply asked when they were open for business,
and not specifically when alcoholic beverages were sold on the
premises. Secondly, a number of establishments that serve alcohol
on Sundays and do not have a Sunday Sales permit serve only beer and
wine, and thus do not conflict with Commission regulations. Never-
theless, for many Class C licensees sales of beverage alcohol, dis-
tilled spirits in particular, represent a sizable fraction of
business volume, so that one could expect Sunday Sales permits and
Sunday operating hours to covary, at least to this extent. The
results are presented in Table 5.3.3. It can be seen that a sizable
percentage (42%) of those establishments lacking Sunday Sales permits
are nevertheless open for business on Sundays, possible for those
reasons listed above. The relationship between permit status and
Sunday operations appears to be fairly strong, however, and statis-
tically significant.

TABLE 5.3.3

AGREEMENT OF LIQUOR CONTROL COMMISSION RECORDS AND INTERVIEW
RESPONSES REGARDING SUNDAY SALES PERMITS AND SUNDAY OPERATING HOURS

		Sunday Sales Permit: Liquor Control Commission Records	
		YES	NO
Open on Sundays: Interview Response	YES	82.5%	42.9%
	NO	17.5%	57.1%
	Total	100% (N=171)	100% (N=49)

Chi-square = 30.764   Significance <0.001

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The final congruence check made between Commission records and the data obtained from the interviews concerned the "age" of license. If, according to the Commission records, a license experienced a transfer of ownership at least once within the last 10 years, the records would indicate the date of the most recent transfer. Similarly, if a license was less than ten years old (e.g., it was created within the last ten years) the Commission recorded the date of its creation. Since the data could not distinguish between licenses older than ten years, a dichotomous variable was created as follows. If a particular license had been created or transferred within ten years it was considered "new," if it was neither created nor transferred in that time period it was labelled "old." The question was asked of all respondents: "How long have you been in business under the present ownership?" Answers to this question were dichotomized as "new" and "old" in the same manner as the Commission data. While the results, found in Table 5.3.4, of the comparison between these constructed dichtomous variables are generally as expected and significant, the cells of potential disagreement in the table indicate considerable inconsistencies between Commission records and interview responses. Over half of those establishments that were "old" according to Commission records told interviews that they had been in business less than ten years. A smaller percentage (22.0%) of "new" establishments responded that their establishments were over ten years old.

The agreement between interview responses and Commission records, in the four areas detailed in this section, is fairly close. This is particularly the case for Dance Permits and Sunday Sales, and less so for records on the length of time that licenses have been operating. This gives support to the question of the validity of all survey data in this study and suggests that the Commission enjoys a reasonable large degree of compliance with details of alcohol control regulations and licensing privileges.

TABLE 5.3.4

AGREEMENT OF LIQUOR CONTROL COMMISSION RECORDS AND INTERVIEW
RESPONSES REGARDING AGE OF LICENSE (N=213)

| | | Age of License: Liquor Control Commission Records | |
		LESS THAN 10 YEARS	GREATER THAN 10 YEARS
Age of License: Interview Response	LESS THAN 10 YEARS	78.0%	52.6%
	GREATER THAN 10 YEARS	22.0%	47.4%
	Total	100% (N=59)	100% (N=154)

Chi-square = 11.404   Significance <0.001

5.4 DETERMINANTS OF PRICE AND SALES VOLUMES

This section will present the findings of analyses which specifically addressed the theoretical issues presented in Section 2.0, namely, the factors which are associated with price variability of beverage alcohol. The following analyses are designed to identify correlates of price and sales volumes. The extent to which the correlates are causally related to price or sales volume is only suggested by such analyses as are possible in analyses of survey data such as those of this study. Although certain statistical tests have been used which strengthen the case for causal inferences from the non-experimental data, it remains for more research to substantiate the models which have been suggested here. In addition, there is little guidance from any larger literature in this area. Quite simply, the literature on alcohol availability is not sufficiently developed at the present to identify all of the factors that contribute to variations in availability, specifically in prices and retail sales. Nevertheless, it is our hope that the results of exploratory

studies such as this one can contribute to more refined and exact
specifications of alcohol availability in the future, so that more
informed policy decisions that affect this important phenomenon can
be made.

Thus the relationships reported below, based on multiple
regression and correlation analyses, should be interpreted as sugges-
tive of causality, but not as definitive evidence. In
the cases where reasonable intuitive explanations can be offered
for the observed covariance between any two variables, those explana-
tions will be given; however, there are, as shall be seen, some
relationships that appear to be opposite to those that were predicted
in Section 2.0. While we can suggest some reasons for these deviant
observations, the ad hoc flavor of such reasoning is indicative of
the need for further research in this area.

5.4.1. Description of Variables Used in Regression Analysis

Some of the variables employed in the regression analyses dif-
fer somewhat from those previously described. The most common
modification was to combine a number of interview responses to form
a new, composite variable. This was done in order to reduce the
number of separate analyses, as well as to reduce the number of para-
meters it would be necessary to estimate. For example, the daily
hours of operation of an establishment, coded in question 2 in the
interview, were added for each establishment to form a new variable,
Total Hours. Operations of a similar nature were performed on a num-
ber of variables, as is described below and summarized in Table 5.4.1.

From the prices of drinks elicited from licensed establishments,
the following composite prices were calculated. Average Liquor Price
was calculated as the average price for drinks containing distilled
spirits. Average beer price was the mean price of draught and
bottled beer, excluding the price of pitchers of beer. This exclu-
sion was necessitated by the sizable number of establishments that
did not serve beer by the pitcher; the inclusion of pitcher prices
in the average would have made the average beer prices for these
establishments appear deceptively low.

TABLE 5.4.1

VARIABLES USED IN REGRESSION ANALYSIS

Variable Label	Description
AV.SALES	The average monthly wholesale purchases of distilled spirits by establishments from state liquor stores (Source: Liquor Control Commission)
HOWMANY	The number of people employed by the establishment
SEATCAP	The seating capacity of the establishment
PITCHER	Dummy variable for whether beer is served by the pitcher
TOTHOURS	The total hours an establishment is open for business Monday - Sunday
ENTINDEX	An index of entertainment subsuming a number of responses to questions about a number of entertainment and recreational activities
MILEDUM1, MILEDUM2	Dummy variables indicating whether patrons of an establishment travel 1-5 miles or over 5 miles, respectively
COVDUMMY	Dummy variable indicating whether a cover charge is imposed
COOKDUM	Dummy variable for whether a full-time cook is employed
RANGE	The range of prices charged by an establishment; the maximum price minus the minimum price
AVBEERPR	The average price of bottled beer and draught beer, for each establishment
NUMSPEC	The number of specials, or "happy hours," offered by an establishment in a week
PRCNT1	The percentage discount offered on drinks during happy hours

An Entertainment Index was constructed from the coded responses to questions 9 and 10 as follows. For each establishment, a "score" of 1 was assigned for each affirmative response to questions 10a through 10d, dealing with dancing, games, and other forms of entertainment. A score of 1 was also added for each night an establishment provided live entertainment, so that the Entertainment Index for each

respondent was simply their total score. The decision to afford equal weighting to all the diverse forms of entertainment that establishments offer is obviously arbitrary, but can be defended as a first approximation to the amount of entertainment that establishments actually provide. The index was utilized as an independent variable in the regression analyses.

The remaining variables used in the regression analysis can be seen from Table 5.4.1 to be relatively straightforward adaptations of survey responses. Binary (dummy) variables were created to contain the yes/no responses to questions concerning the distances that customers traveled to reach the establishment, the existence of cover charges, whether or not a full-time cook was employed, and whether beer was sold by the pitcher. The price range variable was calculated as the difference between the highest and lowest priced drinks (excluding pitchers of beer) for each establishment. The percentage discount offered by establishments during "happy hours" was entered as a separate variable (PRCNT1). Establishments that did not run such special discounts were given a score of zero. The remaining variables in Table 5.4.1 are those that were directly transcribed from the completed interviews.

5.4.2 Overview of Regression Methodology

The method of analyzing the variations in alcohol prices and individual establishment sales used here is that of multiple regression. Briefly, this technique can be understood as the estimation of the following linear model:

$$Y = b_0 + b_1 x_1 + b_2 x_2 + \ldots + b_k x_k + error.$$

This equation postulates that Y is a linear function of the underlined independent variables x_1, x_2, . . . x_k; further, the b_0, b_1, . . . b_k are the coefficients that describe this linear relationship. The error term on the right-hand side of the above reflects the belief that the relationship between Y and x's is not exact, but rather is affected

by other factors that are not included in the model and thus are regarded as error. In examining retail price variation in alcoholic beverages, the dependent variable (on the left-hand side of the above equation) would be, say, Average Liquor Price; independent variables might include Average Beer Price, number of employees, seating capacity, and so forth.

The model can be viewed as being composed of two components: one systematic (explained), one random (unexplained). The regression coefficient corresponding to any independent variable represents that variable's independent effect on the dependent variable. The fraction of the total variance in the dependent variable that can be attributed to changes in the independent variable is summarized in the R^2 multiple correlation coefficient statistic; $1 - R^2$ is the proportion of the total variance that is unexplained.

In most cases, a procedure that involved repeated estimation of a selected regression model, known as stepwise regression, was employed (see Douglass, et al., 1979: 107-111). In this procedure, variables are selected from a pool of "candidate" independent variables on the basis of their independent contribution to the variance explained. It is called stepwise because it is carried out in a series of steps, each of which entails selecting a variable, estimating a regression equation including that variable, and checking to see whether further variables merit inclusion into the model, based on their unique contribution to a pre-designated explained variance criterion. The process stops when the addition of further variables fails to bring about a statistically significant reduction in unexplained variance. The variables that are included in the final step thus comprise the model that yields the most explanatory power, in the statistical sense.

In an area of inquiry as poorly understood as that of alcohol availability, where the theoretical underpinnings are too vague and contradictory to permit successful ex ante model specification, the selection of a model of price (and retail sales) variation through a statistical procedure such as stepwise regression may plausibly be defended, as a means of exploring the relationships between

variables when little prior information about them is known. The results that they provide are, for these reasons, of interest. However, considerable effort has been expended in conceptualizing what ought to be important in explaining the variations in price (and retail sales) charged by establishments; therefore the results of these regressions based on theoretical, rather than statistical criteria, will be presented as well.

5.4.3 Regression Results: Models Predicting Price

The results of the first analysis attempted on modelling the Average Liquor Price reported by establishments is presented in Table 5.4.2. A list of the variables was selected from those presented in Table 5.4.1 on the basis of the conceptual criteria developed in Section 3.3. The results are mixed; while most of the estimates of the coefficients are of the "correct" sign (that is, they indicate the direction of the relationship to be consistent with the a priori hypotheses put forth in Section 2.0) the magnitudes of the coefficient estimates are generally quite small, and in most cases not statistically significant. For instance, while the use of cover charges does seem to reduce the prices charged by an establishment, the difference in the average prices charged by those with and without such charges in those establishments sampled is only about 7¢. Seating capacity, number of employees,and the Entertainment Index all covary positively with average liquor price, but again the strength of the relationships is very small. The most important explanatory variable in the model is the response to the question regarding the employment of a full-time cook. This variable affects price in the direction opposite to what was predicted; those establishments that employ a cook (and thus are thought to have a relatively strong commitment towards serving food) actually charge prices that are 11¢ lower than other establishments.

The results from the regression model selected by the stepwise regression procedure are found in Table 5.4.3. As might be expected, since the variables included are selected on the basis of their contribution to the explained variance in price, the model is smaller

TABLE 5.4.2

REGRESSION RESULTS OF SELECTED ESTABLISHMENT CHARACTERISTICS ON AVERAGE LIQUOR PRICE

CONSTANT	HOWMANY	SEATCAP	MILEDUM1	MILEDUM2	COVDUMMY
1.196*	.0229	.0003	-.0639	.0078	-.0690

ENTINDEX	COOKDUM	NUMSPEC	PRCNT1
.0068	-.1190*	-.0217†	.0025

$$R^2 = .2984$$

*Significant at the .01 level.

†Significant at the .05 level.

TABLE 5.4.3

RESULTS OF STEPWISE REGRESSION ON AVERAGE LIQUOR PRICE

CONSTANT	SEATCAP	COOKDUM	RANGE	PITCHER
1.0153	.0005	-.1129	.1533	.0828

$$R^2 = .39681$$

Remaining Candidate Regressors:

HOWMANY	ENTINDEX
MILEDUM1	NUMSPEC
MILEDUM2	PRCNT1
COVDUMMY	CAPACDUM

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and offers more explanatory power than the model described above. As before, the "cook" variable enters with a negative coefficient, and the seating capacity variable has the expected, albeit small, effect on average price. The stepwise model also contains two new variables that are positively related to the prices of the sampled establishments: the range of prices, and whether or not draught beer is served by the pitcher. The percentage of the total variance in average beer prices among establishments that is accounted for by these variables is 39.7%, which is not modest, given the limitations of the data.

Finally, separate stepwise regression procedures were employed on two subsets of the sampled establishments, including those with high average monthly wholesale distilled spirits purchased from state retail liquor stores (Average Sales), and the remaining establishments that had low average sales. It was thought that the sales distinction could be useful as a surrogate for unobserved factors that influence the determination of prices that covary with sales. The results, presented in Table 5.4.4, are interesting since only one variable, the employment of a full-time cook, enters into both the high and low sales regression models. The strength of the relationship between the cook variable and average price is more than twice as pronounced for the high-sales establishments, compared to those with low sales. Further comparison between the high- and low-sales regression models reveals that some of the coefficients in the model predicting prices for those establishments with low-sales are quite large. For instance, within the subset of low sales establishments, those places that levied a cover charge for entertainment had an average price that was 22¢ lower than it is for all establishments as a whole. Finally, the predictive power of the model for low-sales establishments is higher than that of the high-sales model. Sixty percent of the variance in prices is explained for low-sales establishments; the R^2 for the high sales is 43%.

The types of variables that were employed in the models predicting average prices charged by establishments can be loosely

TABLE 5.4.4

RESULTS OF STEPWISE REGRESSION ON AVERAGE LIQUOR PRICE, LOW AND HIGH SALES ESTABLISHMENTS

Low Sales Establishments

CONSTANT	SEATCAP	COVDUMMY	COOKDUM	RANGE
.9676	.0011	-.2247	-.0658*	.3462

R^2 = .6037   S.E.E. = .1925

High Sales Establishments

CONSTANT	MILEDUM2	COOKDUM	PITCHER
1.267	-.0454*	-.1503	.0798

R^2 = .4345

Remaining Candidate Regressors:

HOWMANY   PRCNT1
MILEDUM1   CAPACDUM
ENTINDEX
NUMSPEC

*Significant at the 0.05 level. All other estimated coefficients are significant at the .01 level.

grouped into two categories. One contains those variables, such as seating capacity, number of employees, and cover charges, that can be directly related to the costs and hence the prices charged by individual establishments. Second are those variables that serve as indicators of phenomena that are less easily observed; for instance, the "cook" variable that shows up significant in all the models presented was intended to indicate the amount of establishment services that were devoted to the provision of food. The binary variables indicating the distances that customers travel,

whether beer is served by the pitcher, as well as the entertainment index,all fall into this second category. If there are any patterns to the models illustrated in this section, they are in the unpredict-ability of the direction in which these "indicator" variables affect the prices charged by establishments. This is undoubtedly in large part due to the vagueness of the descriptions of the precise relationships that were thought to exist between these indicators and the underlying phenomena they were intended to measure. The example of the full-time cook variable illustrates this point. The a priori reasoning for the relationship between this variable and price was roughly as follows. While most establishments might serve some sort of food, those places that employed a full-time cook probably serve a larger assortment of meals than those places that do not. If the consumption of food and alcohol are complementary, then we might expect that the demand for alcohol would be higher in establishments that serve a more elaborate menu, so that the price they charge would be higher.

5.4.4 Models Predicting Sales

In weighing the relative importance of the variables collected in this study in providing information about retail availability, the degree to which the variables might covary with the sales of an establishment is an appealing criterion. If any given establishment characteristic, such as advertising, entertainment facilities, or the offering of periodic "happy hours" or discounted prices on alcoholic beverages, was consistently associated with higher sales, then we may be willing to suggest that such a characteristic consti-tutes a significant component of actual availability, and thus we might consider means towards its effective understanding or regula-tion. We might be especially interested in the effects of the retail prices charged by establishments on sales of alcoholic bever-ages as a potentially effective means (through proper taxation or regulatory policies) or governing their use.

Table 5.4.5 presents the results of the multiple regression analysis using Average Monthly Sales, the average wholesale purchases

TABLE 5.4.5

REGRESSION RESULTS OF SELECTED ESTABLISHMENT
CHARACTERISTICS ON AVERAGE MONTHLY SALES

CONSTANT	AVBEERPR	AVLIQPRC	TOTHOURS	SEATCAP	MILEDUM1
-1485.0*	-.755.8	$1800.4^{\dagger}$	5.466	$2.716^{\dagger}$	173.9

MILEDUM2	COVDUMMY	ENTINDEX	COOKDUM	NUMSPEC
101.7	4.670	$117.8^{\dagger}$	-193.6	7.301

$$R^2 = .3521$$

*Significant at the .10 level.

†Significant at the .01 level.

of distilled spirits expressed in terms of dollars, as the dependent variable. While the signs of most of the estimates of the coefficients are consistent with our expectations, the estimate of the coefficient on average liquor price is positive, and significant. On the average, establishments that charged higher prices for their mixed drinks were found to have higher distilled spirits purchases (and thus higher sales). Establishments that charged prices that were, on average, one dollar higher had monthly wholesale purchases that were $1800 higher. This result was precisely opposite to what was expected, and we discuss some of its possible interpretations below.

With the exception of Average Beer Price and the cook variable, all of the variables employed in the regression model predicting sales had estimated coefficients that were positive, although many also had large standard errors and hence were not significant.

Seating capacity and the index of entertainment activities were positively related to the sales (as measured by wholesale purchases) of establishments, and the relationship was statistically significant.

The results of the stepwise regression, displayed in Table 5.4.6, do not change these findings, but indicate that there may be additional variables related to establishment sales as well. Specifically, in the stepwise model, one of the binary variables containing the coded responses to questions concerning the distances customers were thought to travel to reach the establishment was found to be positively related to sales. Recalling that the same variable (MILEDUM2) was found to covary negatively with the Average Liquor Prices charged, this result offers support for the hypothesized positive relationship between availability and the degree of market competitiveness. That is, the larger the capture area of an establishment (as measured by MILEDUM2) the lower is the price that it can successfully charge, and consequently the higher are its sales. That one of the mile dummy variables should turn out to be significant in the stepwise model when neither was significant in the model in Table 5.4.5 is symptomatic of the high degree of correlation that exists among the coded responses to the "miles traveled" questions.

The finding of a strong positive relationship between sales and price is not consistent with other empirical estimates of the demand for alcoholic beverages (see Section 2.0), and consideration of some possible alternative explanations for this perplexing result are necessary. An important difference between this study and other investigations into the relationships between price and sales of alcohol is that these analysis rely on cross-sectional data gathered from a number of establishments at a single point in time. Previous studies (see, for instance, Johnson and Oksanen, 1977) have utilized time series, or pooled cross-sectional and time-series data to produce estimates of the demand for alcoholic beverages. It is well known that the estimation of demand curves from cross-sectional data is relatively more susceptible to

TABLE 5.4.6

RESULTS OF STEPWISE REGRESSION ON AVERAGE MONTHLY SALES

CONSTANT	AVLIQPRC	SEATCAP	MILEDUM2	ENTINDEX	COOKDUM
-872.5*	1192.7	2.513	216.0*	140.9	-222.9*

R^2 = .3533

Remaining Candidate Regressors:

AVBEERPR	NUMSPEC
TOTHOURS	RANGE
MILEDUM1	PITCHER
COVDUMMY	

*Significant at the .05 level. All other estimated coefficients are significant at the .01 level.

errors due to the erroneous exclusion of potentially important demand determinants from the model; the problem is less acute when dealing with time-series data, if the "unobserved" factor affecting demand does not vary significantly over time. It is easy to conceptualize quality of service differences between establishments that escape measurement by the survey instrument. If these undetected differences covary positively with sales, the result could be that price and sales would appear to be positively related.

If one retreats somewhat from attaching a literal causal explanation for these results, an interesting picture of the retail market for alcoholic beverages begins to emerge. The positive estimated coefficient on the price variable should not be interpreted as indicating that any establishment raising its price would actually enjoy an increase in sales (though this is a conceivable result were the quality of service to be simultaneously upgraded), but rather it should be construed simply to mean that those places

that have higher prices also have higher sales. Similarly,
establishments that have larger seating capacities, more entertain-
ment, and a greater market area also have higher sales than
other establishments that scored low on these measures.

Since no establishment-specific data on beer consumption was
available, an estimate of the relationship between beer consumption
and average beer price was not possible. However, the sample does
give some tentative support for a number of hypotheses that might
be put forward regarding the substitution between beer and distilled
spirits as the price of the latter changes. Referring again to
Table 5.4.5, we see that sales of distilled spirits appear to be
inversely related to the average beer price charged by establish-
ments (though the relationship is not significant). This result is
consistent with the view that the consumption of beer and distilled
spirits is complementary. To the extent that sales of beer and
distilled spirits covary, this could mean that an establishment's
beer sales are more responsive to the prices it charges than is the
case for distilled spirits; the unobserved quality differences that
may account for the observed positive relationship between spirits
sales and prices may be insufficient to support higher prices in
the more competitive market for beer and the demographic character-
istics of consumers, most notably their age.

5.5 BETWEEN-COUNTY ANALYSES

Prior analyses have considered the data from a cross-sectional
perspective, utilizing data from each analytic jurisdiction in an
aggregate representation of the state. The analyses in this sec-
tion compare and contrast specific variables between the counties,
with an emphasis on differences in availability, as measured by
both survey variables and the licensing and sales information
provided by the Liquor Control Commission. In utilizing the
counties as the unit of analysis, we are able to examine the rela-
tionships between the dispersion of prices (within each county) as
well as the county averages; we are also able to combine the data

obtained from the telephone interviews with Commission records on licensing activity as well as data on divorce, child abuse, assault, and mortality obtained from the Michigan Department of Public Health, the Michigan State Police, and the Michigan Department of Social Services.

A practical problem encountered in performing county-level analyses is the small number (7) available for comparison. This constraint effectively prevented the employment of the multiple regression methodology utilized in the previous section, as well as most other procedures that introduce extensive controls in making two-variable comparisons (e.g., partial correlation). Under these circumstances, the relationships between variables at the county level were explored using simple correlation coefficients. Two points should be kept in mind when examining the results that are presented below. One is that there are no controls for the influences of intervening variables in examining the two-way relationships (Dixon and Massey, 1969). Thus, there is some danger that observed relationships between variables are in fact spurious results. The second point is that, due to the small number of sample points, large values of the estimated correlation coefficient are required for statistically significant results.

5.5.1 Price and Price Dispersion as an Availability Measure

While it might be argued that retail price is an important component of alcohol availability, the case that has been made for treating the dispersion of prices as such is much less convincing. We might be interested in the degree to which average county prices and price variations covary with the other indicators of availability that were used in Douglass et al. (1979). If the measurements of these characteristics of prices that were constructed from survey responses indicate differences in availability between counties that are consistent with those predicted by other measures, our confidence in the validity of price as an availability measure will be increased.

Table 5.5.1 displays correlations between a set of Commission licensing variables, expressed as population rates, and a set of six county-specific price variables that were constructed from survey responses. The county average for the prices of beer, liquor, and wine were directly calculated from the respective establishment figures, as were the sample variances of beer, liquor, and wine prices for each county. Summary descriptions of these as well as other licensing and social problem rate variables utilized in the analyses that follow can be found in Table 5.5.2; more detailed information and descriptions are in Douglass et al. (1979: 57-73).

TABLE 5.5.1

CORRELATION COEFFICIENTS BETWEEN SURVEY VARIABLES
AND LIQUOR CONTROL COMMISSION LICENSING ACTIVITIES*

	CAVBEER	CAVLIQR	CAVWINE	VARBRPR	VARLIQPR	VARWNPR
New SDD Rate	-.8084	-.8225**	-.7831	-.7379	-.7799	-.5291
New SDM Rate	-.8032	-.8816**	-.7822	-.6048	-.7660	-.4181
New C Rate	-.6749	-.7286	-.6050	-.6143	-.8018	-.3534
Transfer SDD Rate	-.8333**	-.9302†	-.8445	-.5259	-.6143	-.3589
Transfer SDM Rate	-.8517**	-.9144**	-.8116**	-.6050	-.7181	-.3961
Transfer C Rate	-.7854	-.9146**	-.8116**	-.4228	-.5247	-.2599

*Source: Liquor Control Commission.

**Significant at the .05 level.

†Significant at the .01 level.

From Table 5.5.1 it can be seen that while most of the coefficients between average prices and Commission actions are negative in sign, many are not large enough to attain statistical significance, especially for the measures of dispersion. Higher

average prices, especially for drinks containing distilled spirits, are found in counties where the number of retail alcohol outlets per capita is relatively low. While this observation lends credence to the utilization of price as an availability measure, it undoubtedly reflects to some extent the effect of restricted supply on retail price. Markets for retail alcohol may be less competitive in counties with relatively fewer outlets per capita, and prices may be higher as a result. The general pattern of results implies that counties that score high on one availability measure are very likely to score high on others as well.

From the last three columns of Table 5.5.1 it can be noted that the dispersion measures for beer, liquor, and wine prices were negatively correlated with the levels of Commission activity, with none of the relationships achieving statistical significance. In those counties where prices varied widely, availability as measured by outlet density and transfer activity was low. This empirical finding is roughly consistent with the hypothesis that counties with greater amounts of price dispersion have a more uneven spatial distribution of retail alcohol establishments, and correspondingly lower levels of physical availability. Overall, the analyses in Table 5.5.1 suggest that the variety of measures that are related to some of the dimensions of the underlying concept of availability generally correlate in the same direction, and in some instances their interrelationships are significant.

TABLE 5.5.2

DESCRIPTION OF VARIABLES UTILIZED IN CROSS-COUNTY COMPARISONS

Variable	Description
CAVBEER	The average price charged for beer by sampled establishments in a county.
CAVLIQR	The average price charged for drinks containing distilled spirits by the sampled establishments in a county.
CAVWINE	The average price charged for wine by sampled establishments in a county.

TABLE 5.5.2 (Continued)

Variable	Description
VARBRPR	The variance in beer prices charged by sampled establishments in each county.
VARLIQPR	The variance in prices of liquor-based drinks charged by the sampled establishments in each county.
VARWNPR	The variance in wine prices charged by the sampled establishments in each county.
New SDD Rate	The number of new Specially Designated Distributor (S.D.D., package distilled spirits sales) licenses issued in the year 1977, per capita, by county.
New SDM Rate	The number of new Specially Designated Merchants (S.D.M., package beer and wine) licenses issued in the year 1977, per capita, by county.
New C Rate	The number of new Class C (liquor by the glass) licenses issued in the year 1977, per capita, by county.
Transfer SDD, SDM, C Rate	The number of transfers of ownership of SDD, SDM, C licenses in the year 1977, per capita, by county.
BARLIC Rate	The number of Class C, Tavern, A and B hotel and club licenses in existence as of 10/1/77, per capita, by county.
SDMLIC, SDDLIC Rate	The number of SDM, SDD licenses in existence as of 10/1/79 per capita, by county.
SDD Sales Rate	Wholesale purchases of distilled spirits by S.D.D. licenses from state liquor stores, per capita, by county.
Table Top Sales Rate	Wholesale purchases of distilled spirits by Class C licenses from state liquor stores, per capita, by county.
Divorce Rate	Divorces per capita, by county, in 1976.
Child Abuse Rate	The number of reported cases of child abuse, per capita, by county for 1976.
Work Accident Rate	The number of deaths from work-related accidents, per capita, by county, for 1976.
Suicide Rate	The number of deaths from suicide, per capita, by county, for 1976.
Accident Rate	The number of deaths due to all forms of accidents, per capita, by county, in 1976.
Assault Rate	The number of reported assaults, per capita, by county, in 1976.

Table 5.5.3 extends the examination and comparison of survey responses regarding price and price variability and the Commission information on licensed retail outlets pertaining to the number of licensees per capita, by county, and the liquor sales data recorded by the Commission. It can be seen from an inspection of the table that the relationships are strongest between the Commission variables and the measures of average price, while the correlations involving the measures of price dispersion are not statistically significant. As before, the Commission and survey variables covary negatively, with the exception of the SDD (Packaged) sales rate, which exhibits several weakly positive correlations.

TABLE 5.5.3

CORRELATION COEFFICIENTS BETWEEN SURVEY VARIABLES AND
LIQUOR CONTROL COMMISSION LICENSING AND SALES FIGURES*

	CAVBEER	CAVLIQR	CAVWINE	VARBRPR	VARLIQPR	VARWNPR
BARLIC Rate	-.7940	-.9335†	-.8259**	-.3642	-.4707	-.2308
SDDLIC Rate	-.8459**	-.9171**	-.8344**	-.6082	-.7086	-.4235
SDMLIC Rate	-.8396**	-.9303	-.8292**	-.5579	-.6906	-.3808
SDD Sales Rate	.2264	-.0410	.0753	.7095	.6642	.6972
Table Top Sales Rate	-.5910	-.6857	-.6688	-.4034	-.3257	-.2265

*Source: Liquor Control Commission
**Significant at the .05 level.
†Significant at the .01 level.

5.5.2 Alcohol Price and Alcohol-Related Problems

When the relationship between the retail price of alcohol and the prevalence of problems that are thought to be alcohol-related

are considered, it becomes readily apparent that the mechanism through which alcohol pricing policies may have an effect on these problems is complex. As a component of an availability policy, the price of an alcoholic beverage has a role in the determination on the part of individuals of how much and how often to consume alcoholic beverages. The frequency of "drinking occasions," as well as the amounts of alcohol ingested at each occasion, are thought to increase the probability of an individual's alcohol-related involvement in an action with socially deleterious consequences, be it a divorce, work-related or traffic accidents, or alcoholic Laennic's cirrhosis. Thus, one must keep in mind that simple correlational techniques are useful primarily as a preliminary step in an empirical investigation of the relationship between price and alcohol-related problems; a more detailed look must be taken at the specific elements of the causal chain whereby higher prices, for instance, may lead to reduced mortality from alcohol abuse. Unfortunately, measuring the correlation between the two endpoints of this dynamic process exhausts the capabilities of the present dataset. With this rejoinder in mind, we can now turn to the results of these correlational analyses.

Table 5.5.4 summarized the results of the correlations between the survey variables constructed from interview responses and selected problems that are mentioned in the literature as frequently alcohol-related (Douglass et al., 1979). These latter variables are expressed as population rates. Bearing in mind that we have hypothesized the average price and the price dispersions to be inversely related to alcohol availability, we would expect that the survey variables and the problem rates would be negatively related, since availability and problem rates are thought to be positively related. Scanning the table, we note that this is indeed the case for Child Abuse and Work Related Accidents, with some of the estimated coefficients involving the former attaining statistical significance. However, the Divorce Rate and especially the Suicide Rate appear in the sampled counties to be positively related to both average price and price dispersion of all beverage categories.

TABLE 5.5.4

CORRELATION COEFFICIENTS BETWEEN SURVEY VARIABLES AND SELECTED PROBLEM RATES*

	CAVBEER	CAVLIQR	CAVWINE	VARBRPR	VARLIQPR	VARWNPR
Divorce Rate	.5229	.6563	.7260	.3219	.1872	.2906
Child Abuse Rate	-.8125**	-.8333**	-.6213	-.3969	-.6767	-.2318
Work Accident Rate	-.5128	-.5694	-.5775	-.4166	-.2804	-.2239
Suicide Rate	-.9794†	.9280†	.9490†	.8227**	.8046	.7401
Accident Rate	.4409	.1200	.6418	.5069	-.1858	.6808
Assault Rate	.1163	-.3380	.2960	.6218	-.0314	.6498

*Source: Michigan Department of Public Health, Department of Social Services, State Police.

**Significant at the .05 level.

†Significant at the .01 level.

Indeed, the negative correlation between Suicide Rate and the
Average Beer Price is 0.98, a high figure even when one considers
that there were only six data points available for analysis. The
degree to which these associations would be supported with a more
satisfactory data set is a question to be considered in future
research. In the present case it is clear that these analyses are
generically consistent with previous analyses in the State of
Michigan and in other states and countries (Douglass and Freedman,
1979; Douglass et al., 1979; Parker and Wolz, 1979).

6.0 SUMMARY OF FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

The analyses discussed in this report have incorporated descriptive and inferential approaches to an exploratory study of prices of on-site alcohol consumption and the relationships of price variability to alcohol availability, marketing, consumption, and certain health and social problems. The most basic finding is that this aspect of alcohol availability is multi-faceted and complex, and unlikely to be comprehended on the basis of one small investigation. There were, however, several specific findings which are generalizable to most places in Michigan and which will help to formulate more sophisticated research and policy questions in the future. These will be discussed below.

Descriptive Findings - Characteristics of the Sellers. This study included primary data collection from over 200 Class C and Tavern establishments in Michigan. The size of establishments in Michigan, as measured by seating capacity, is widely variable. Establishments in medium-sized counties were larger, on the average, than those in either small-counties or metropolitan Wayne County. Wayne, Genesee, and small county establishments had lower levels of business volume than those in Ingham, Kent, Macomb, or Oakland Counties. Oakland County establishments, with the highest average monthly alcohol sales, surprisingly had the lowest average operating hours and were least likely to use price incentives to increase alcohol sales volumes.

Oakland County, with the highest sales volume per sampled establishment, had the lowest density of establishments. The small counties, which had the lowest alcohol sales volumes, had the highest establishment densities. While it is uncertain if increased establishment density increases total alcohol consumption in a county, it is probably true that the close restriction of numbers of outlets

is in the economic self-interest of individual licensees.

Beer by the glass, and even to a greater extent by the pitcher, is easily the least expensive alcoholic beverage. This supports common knowledge and helps to explain why beer is very popular. Beer is also the most uniformly priced among all selected drinks, with an average variability of only $0.15 to $0.17 among the seven Michigan study sites.

Oakland County prices were uniformly higher and more variable than the other study sites. Again, this County, with higher average incomes, suburban/urban-rural mixture, and proximity to Detroit, became identified as unique among the study sites. By contrast, the small counties had consistently lower and more uniform prices than either the mid-sized counties or the metropolitan counties. Increasing urbanization, total population size, and price variability are all associated with higher prices for the same, selected, alcoholic drinks.

Tests of Primary and Secondary Data Agreement. Three tests of the agreement of Michigan Liquor Control Commission data and interview responses from licensees were conducted. These tests addressed the validity of the interview data, tested the accuracy of Commission records, or identified potential difficulties in the enforcement of the regulations and rules established by the Legislature and the Commission. Of the three tests, the questions regarding dance or entertainment permits and associated actual activities were in agreement. Similarly, the agreement of recorded and reported operating hours were in agreement. The comparison of the age of the licenses, however, was in less agreement. This disagreement was likely to be due to problems in Commission record-keeping or to a lack of knowledge of the question by respondents.

Multivariate Modelling and Prediction. Multiple regression analyses were conducted to build models of price and sales volume determination. An establishment's commitment to food services, as estimated by the maintenance of a cook on the staff, and seating capacity consistently determined increased prices. The existence

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of a cook on the premises was particularly predictive of higher prices in establishments with high alcohol sales volume. The price prediction models were more satisfactory for low-volume establishments than with high-volume establishments.

Establishments with higher prices tend also to have higher alcohol sales volumes. An establishment with a full-time cook, an entertainment permit, and high prices is predicted also to have high sales volumes, according to the responses and records of this study's sample of establishments. Also, places that attract customers from greater distances, indicating larger markets, have greater sales and lower average prices.

Establishments located in counties with low sales outlet density have higher average prices than those in high-outlet-density, or high price competition, counties--a finding which was particularly true for drinks which were entirely or mixed distilled spirits.

The several measures of availability appear to predict the direction of the average characteristics of a county's Class C bars and Taverns. Counties that scored high on one availability measure, such as outlet density, were very likely to score high on others also.

Finally, different counties had unique price variability, and those with a wide range of price variation also had low outlet density and low levels of license transfer activities. These predictive models are limited to measured variables, however, and many others factors remain to be tested, such as the characteristics of customers, the ambience and overhead costs of the establishment, and other unknowns.

The limited numbers of study jurisdictions (7), permitted only a limited analysis of the relationships between health and social problems(mortality and frequency statistics)and the central issues of this study, namely the average price of alcohol beverages for sale and consumption in bars and taverns. Although these specific analyses are very preliminary, it appears that work-related accident mortality and child abuse rates are correlated with (increasing)

average prices of drink for consumption on premise. This statistical correlation should be tested for spuriousness with such intervening variables as urbanism, population density, per capital income, and other factors, including characteristics of the customers of these establishments.

Conclusions. The availability of beverage alcohol in Michigan has been the subject of continuous research projects at HSRI under the sponsorship of the Michigan Office of Substance Abuse Services since 1976. In this series of inquiries the legal, physical, and economic availability of beverage alcohol have been investigated, with economics, or price and availability being the subject of the present study. In many ways this project's topic has proven to be the most complex, conceptually, and difficult, operationally, to investigate. Sources of secondary data in the form of agency records were unavailable for retail prices of alcoholic beverages for consumption in Michigan's bars or taverns. The need to gather valid and representative data from the proprietors and owners of bars and taverns included developing a sampling design and other technical activities.

A sample of seven study sites, at the county level, limited the number of units of analysis and the variety of statistical tasks which could be appropriately used. In addition, economic availability includes factors of the establishment, the product and the consumer, only a fraction of which could be measured, or even conceptualized in this study. Despite these operational limits, some interesting findings did emerge which will begin to illuminate our understanding of economic availability at the local level and provide guidance for future research.

As with other studies of availability, beer was unlike wine or distilled spirits in several respects. Beer in bars and taverns is less expensive and more predictably priced than any other drink. This undoubtedly contributes to beer's popularity and also, we suspect, to its clearly greater quantity of consumption.

Some of the hypotheses raised in the development of this

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project were not supported by the data. Retail specials, happy
hours, and other incentives were not strongly associated with greater
annual distilled spirits sales volumes. Also, increased hours of
operation and increased prices, two factors of availability of
opposite expected economic effects, were both associated with
increased sales volumes. Findings such as those summarized above
and highlighted here lead to the conclusion that further research is
essential. The nature of economic availability of beverage alcohol
and the effects of such availability on consumption, patterns of
drinking, and consequences of alcohol abuse remain to be fully
understood.

Recommendations. This study's findings suggest the following
research and policy recommendations.

Policy Recommendations
1. The monthly retail sales volumes in licensed bars and
taverns of beer and wine, as well as distilled spirits,
should be routinely recorded and monitored by the Michigan
Liquor Control Commission, and these data should be regularly
accessed for policy analysis by the Office of Substance
Abuse Services. This recommendation is fully consistent with
the objectives and legislated mandates of both of these
State agencies.

2. The prices of a set of the most commonly purchased
alcoholic beverages, for sale by the drink, should be moni-
tored for a representative sample of the
state's Class C and Tavern licensees. These data would
permit more satisfactory means of analysis of economic
availability of beverage alcohol than are currently possible.

Research Recommendations
1. Systematic additional research of the factors which
determine choice of alcoholic drink for consumption on
premise, including customer factors, establishment factors,

market effects, and the specific role of price should be undertaken. The associations and elementary models developed in the present study can contribute to the formulation of new and more satisfactory hypotheses.

2. The relative importance of price in relation to legal and physical determinants of alcohol availability should be determined in order to set appropriate priorities in future decisions regarding alcohol control laws and policies. More specifically, the appropriateness of taxation should be weighed objectively if this particular topic is suggested as a tool of public health and intended to reduce mordidity or mortality by way of reduced consumption.

APPENDIX A

SURVEY INSTRUMENT

CALL RECORD

Bar Name _____

Phone # _____ + _____

City _____

Computer Code	
ID #_____	1-5
County _____	6-7
Final Status . . . . (circle)	8
1 = IC	
2 = PIC	
3 = REF	
4 = DISC	
5 = WN	
6 = NA	

DATE	TIME	INTERVIEWER	RESULT	CODE FOR RECALLS

Abbreviations:

NA = No answer   IC = Interview completed

NH = Not home   PIC = Partially completed

WR = Will return call   WN = Wrong number

REF = Refused   DISC = Disconnect

Hello. May I speak to the person in charge?

My name is [interviewer's name] and I'm calling from The University of Michigan in Ann Arbor. We are doing a marketing study of bars and restaurants throughout the state in order to learn about the kinds of drinks that are most popular today. The questions I need to ask you should take about 5 minutes. Is that all right? I would be happy to answer any questions you might have about the study, either now or later. I want to add that the answers you give me will be confidential, and will be used for research purposes only. Also, you may refuse to answer any questions, or stop the interview any time you wish. Okay?

| | Computer Code |
	Deck: Column
First, what is your position? _____	1: 9-10

Now I want to ask you some general questions about your place and your customers.

1. How long have you been in business under the present ownership?

        NUMBER OF YEARS _____   1: 11-12
        DON'T KNOW 99

2. What are the hours and days that you are open for business?

		Number of Hours	
a. Monday	____ to ____	_____	1: 13-20
b. Tuesday	____ to ____	_____	1: 21-28
c. Wesnesday	____ to ____	_____	1: 29-36
d. Thursday	____ to ____	_____	1: 37-44
e. Friday	____ to ____	_____	1: 45-52
f. Saturday	____ to ____	_____	1: 53-60
g. Sunday	____ to ____	_____	1: 61-68

	Computer Code
	Deck: Column

3. How many people do you employ?

NUMBER OF PEOPLE _____
DON'T KNOW 99   1: 69-70

4. Have any of them attended bartending
school?

YES 1   1: 71
NO 2
DON'T KNOW . . 9

  4a. How many?   NUMBER OF PEOPLE _____   1: 72-73

5. About how many people can you seat
and serve at any one time?

NUMBER OF PEOPLE _____   1: 74-76
DON'T KNOW 999

  5a. Does this include any areas
     where alcohol cannot be served?

YES 1   1: 77
NO 2
DON'T KNOW . . 9

  5b. What is the seating capacity
     in the areas where alcohol is
     served?

NUMBER OF PEOPLE _____   2: 1-3
DON'T KNOW 999

6. Would you say that most of the customers you
get travel under a mile, between one and
five miles, or more than five miles to get
to your place?

UNDER 1 MILE 1   2: 4
BETWEEN 1 and 5 MILES 2
OVER 5 MILES 3
DON'T KNOW 9

7. How would you describe, in your own words,
the kind of customers that you get in your
place? [PROBE FOR INFORMATION ON AGE,
OCCUPATIONS, INCOME, AND SEX MIXTURE.]

| | Computer Code |
	Deck: Column

7. Continued.

AGE _____   2: 5-6
OCCUPATION _____
INCOME _____
SEX _____

Next I need to ask you about the kinds
of entertainment and specials you have.

8. Is there a cover charge at your
   place?   YES 1   2: 13
                             NO 2

   8a. How much is the cover charge?
       [PROBE TO SEE IF AMOUNT VARIES]

                 AMOUNT _____   2: 14-16
                 AMOUNT _____   2: 17-19

9. Do you have live music?   YES 1   2: 20
                             NO 2

   9a. How many nights a week?
           NUMBER OF NIGHTS _____   2: 21

10. Do you have: YES   NO

           Dancing?   1   2   2: 22
           Games or Game Rooms 1   2   2: 23
           Recreation (like   1   2   2: 24
             bowling or golf?)
           Any other kind of   1   2   2: 25
             recreation?
             KIND OF RECREATION _____   2: 26

11. Do you serve food?   YES 1   2: 27
                             NO 2

   11a. Do you employ a cook? YES 1   2: 28
                              NO 2

| | Computer Code |
| | Deck: Column |

12. Do you have any specials or happy hours?

YES 1   2: 29

NO 2

12a. How many specials did you have
last week?

NUMBER _____   2: 30-31

12b. What days and times did they occur?

Number of Hours

				Deck: Col
a. Monday	___ to ___	_____		2: 32-33
b. Tuesday	___ to ___	_____		2: 34-35
c. Wednesday	___ to ___	_____		2: 36-37
d. Thursday	___ to ___	_____		2: 38-39
e. Friday	___ to ___	_____		2: 40-41
f. Saturday	___ to ___	_____		2: 42-43
g. Sunday	___ to ___	_____		2: 44-45

12c. How much was the discount?

AMOUNT _____   2: 46-49

AMOUNT _____   2: 50-52

Now I want to ask you some questions about the kinds
of drinks you serve and the prices you charge. We
are trying to find out whether the price charged for
drinks makes any difference in what people drink.

13. What are the three most popular
drinks you serve? [PROBE WITH: DOES
THIS INCLUDE BEER?]

MOST POPULAR _____   2: 53-54

_____   2: 55-56

_____   2: 57-58

14. Do you serve beer by the pitcher?

YES 1   2: 59

NO 2

14a. How much do you charge?

AMOUNT _____   2: 60-62

AMOUNT _____   2: 63-65

Now I need to ask you the price of a dozen drinks.

15. Can you tell me the regular price you charge
    for a:

<table>
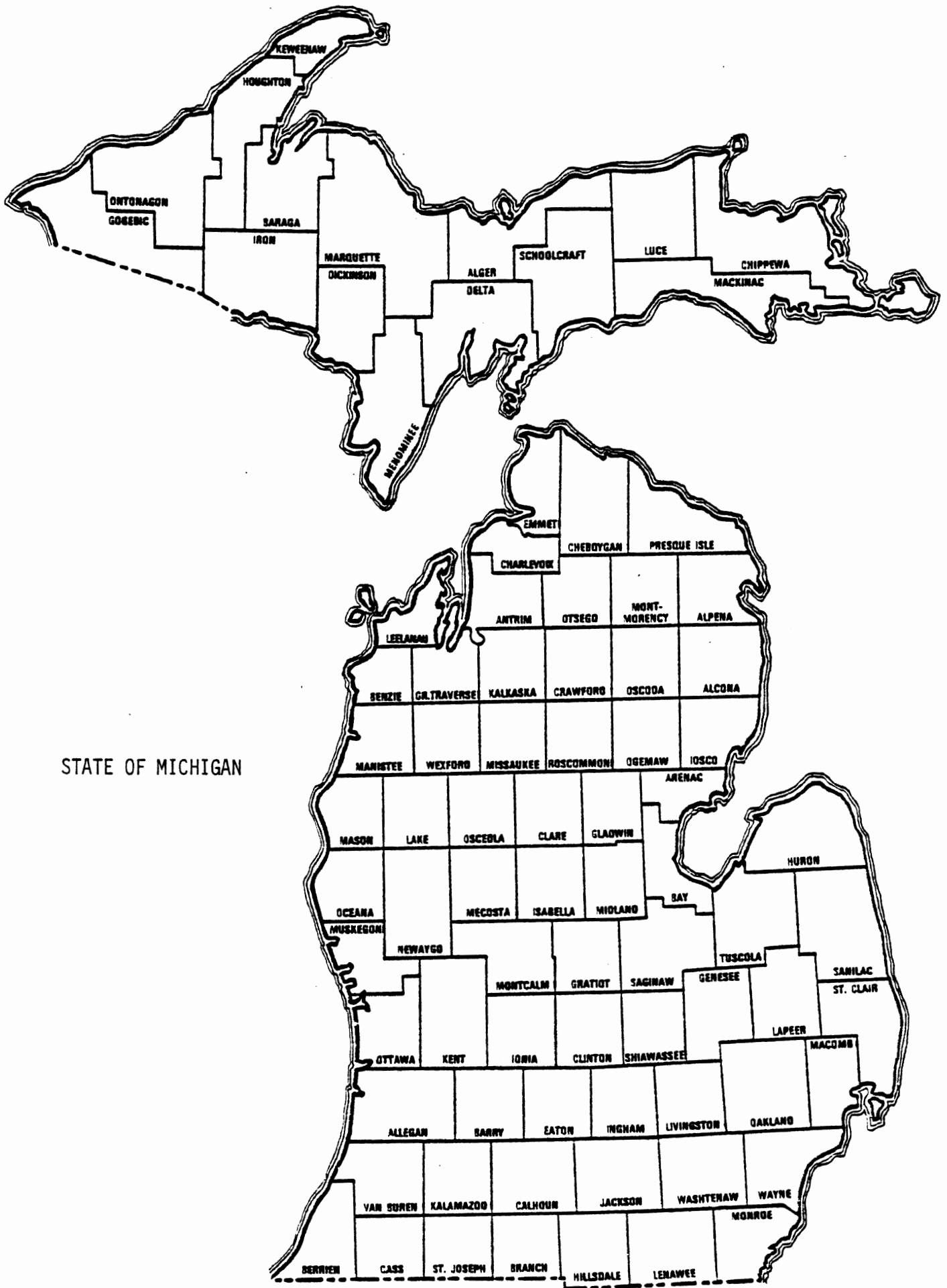<tr><td>a.</td><td>A bottle of beer</td><td>AMOUNT _____</td><td>2:</td><td>66-68</td></tr>
<tr><td>b.</td><td>A glass of draft beer</td><td>AMOUNT _____</td><td>2:</td><td>69-71</td></tr>
<tr><td>c.</td><td>A shot of bar whiskey</td><td>AMOUNT _____</td><td>2:</td><td>72-74</td></tr>
<tr><td>d.</td><td>A Screwdriver</td><td>AMOUNT _____</td><td>2:</td><td>75-77</td></tr>
<tr><td>e.</td><td>A Bloody Mary</td><td>AMOUNT _____</td><td>3:</td><td>1-3</td></tr>
<tr><td>f.</td><td>A Seven and Seven</td><td>AMOUNT _____</td><td>3:</td><td>4-6</td></tr>
<tr><td>g.</td><td>A Black Russian</td><td>AMOUNT _____</td><td>3:</td><td>7-9</td></tr>
<tr><td>h.</td><td>A shot of Scotch</td><td>AMOUNT _____</td><td>3:</td><td>10-12</td></tr>
<tr><td>i.</td><td>A Martini</td><td>AMOUNT _____</td><td>3:</td><td>13-15</td></tr>
<tr><td>j.</td><td>A Gin and Tonic</td><td>AMOUNT _____</td><td>3:</td><td>16-18</td></tr>
<tr><td>k.</td><td>A Dacquiri</td><td>AMOUNT _____</td><td>3:</td><td>19-21</td></tr>
<tr><td>l.</td><td>A glass of Red Wine</td><td>AMOUNT _____</td><td>3:</td><td>22-24</td></tr>
</table>

Computer Code
Deck: Column

These are all the questions I have.

16. Do you have any comments or questions regarding
    this interview?

Thank you very much, you have been very helpful.

APPENDIX B

COUNTY-DESIGNATED MAP
STATE OF MICHIGAN

STATE OF MICHIGAN

KEWEENAW

HOUGHTON

ONTONAGON

GOGEBIC

BARAGA

IRON

MARQUETTE

DICKINSON

ALGER

DELTA

SCHOOLCRAFT

LUCE

CHIPPEWA

MACKINAC

MENOMINEE

EMMET

CHEBOYGAN

PRESQUE ISLE

CHARLEVOIX

ANTRIM

OTSEGO

MONT-MORENCY

ALPENA

LEELANAU

BENZIE

GR. TRAVERSE

KALKASKA

CRAWFORD

OSCODA

ALCONA

MANISTEE

WEXFORD

MISSAUKEE

ROSCOMMON

OGEMAW

IOSCO

ARENAC

MASON

LAKE

OSCEOLA

CLARE

GLADWIN

HURON

OCEANA

MUSKEGON

MECOSTA

ISABELLA

MIDLAND

BAY

NEWAYGO

TUSCOLA

SANILAC

MONTCALM

GRATIOT

SAGINAW

GENESEE

ST. CLAIR

LAPEER

MACOMB

OTTAWA

KENT

IONIA

CLINTON

SHIAWASSEE

ALLEGAN

BARRY

EATON

INGHAM

LIVINGSTON

OAKLAND

VAN BUREN

KALAMAZOO

CALHOUN

JACKSON

WASHTENAW

WAYNE

MONROE

BERRIEN

CASS

ST. JOSEPH

BRANCH

HILLSDALE

LENAWEE

BIBLIOGRAPHY

7.0 BIBLIOGRAPHY

Babor, T. F., Mendenson, J. A., Kuchnle, J. D., Greenberg, I.
"Experimental Analysis of the 'Happy Hour' Effects of Purchase
Price on Drinking Behavior." Paper presented at the 39th
Annual Scientific Meeting of the Committee on Problems of Drug
Dependence, Cambridge, Massachusetts, July, 1977.

Dixon, W. J. and Massey, F. J. Introduction to Statistical Analysis.
New Ypri, McGraw-Hill, 1969.

Douglass, R. L. and Freedman, J. A. Alcohol-Related Casualties and
Alcohol Beverage Market Response to Beverage Alcohol Availa-
bility Policies in Michigan. Volume I. Final Report to the
Michigan Department of Public Health, Office of Substance
Abuse Services. The University of Michigan, Highway Safety
Research Institute, Ann Arbor, August, 1977.

Douglass, R. L., Wagenaar, A. C., and Barkey, P. M. Alcohol
Availability, Consumption, and the Incidence of Alcohol-
Related Social and Health Problems in Michigan. Final Report
to the Michigan Department of Public Health, Office of Sub-
stance Abuse Services. The University of Michigan, Highway
Safety Research Institute, Ann Arbor, May, 1979.

Freedman, J. A. and Douglass, R. L. A Critical Review of Social
Cost Estimation of Alcohol Problems. Volume II of A Study of
Alcohol-Related Casualties and Alcohol Beverage Market Response
to Beverage Alcohol Availability Policies in Michigan. Final
Report to the Michigan Department of Public Health, Office of
Substance Abuse Services. The University of Michigan, Highway
Safety Research Institute, Ann Arbor, September, 1977.

Johnson, J. A. and Oksanen, E. H. "Estimation of Demand for Alco-
holic Beverages in Canada From Pooled Time Series and Cross-
Sections." The Review of Economics and Statistics, Vol. LIX,
No. 1, February, 1977, pp. 113-118.

Moser, C. and Kalton, G. Survey Methods in Social Investigation,
New York: Basic Books, 1972.

Parker, D. A. and Wolz, M. W. "Alcohol Problems and the Availabil-
ity of Alcohol." Alcoholism: Clinical and Experimental
Research, Vol. 3, No. 4, October, 1979, pp. 309-312.

Pratt, J., Wise, D., and Zeckhauser, R. Price Variation in Almost
Competitive Markets. Harvard Discussion Paper Series No.
37-D, December, 1975.

Smart, R. G. "The Relationship of Availability of Alcoholic Beverages to Per Capita Consumption and Alcoholism Rates." Journal of Studies on Alcohol, Vol. 38, No. 5, 1977, pp. 891-896.

_____. "Availability and the Prevention of Alcohol-Related Problems." Paper presented at the NIAAA Seminar on Normative Approaches to the Prevention of Alcohol-Related Problems, San Diego, April, 1977.