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The Impact Of Retail Distribution On Tobacco Consumption: Research Agenda

Suzan Burton, Lindie Clark, Greg Elliott, Frank Siciliano Macquarie University

Abstract

This paper reports the first stage of a joint research project which seeks to explore the relationship between the level of retail distribution and cigarette smoking. Whilst conventional wisdom would suggest that “supply follows demand”, there is evidence from studies on alcohol and fast food, as well as tobacco, that increases in supply, via retail distribution, lead to increased consumption. Whilst consumers will shop from multiple outlets and will switch between outlets, these findings suggest that restricting supply may limit the aggregate level of smoking, the adoption of smoking by the young and/or recidivism among “tobacco quitters”. The paper also outlines a proposal for empirical testing of this relationship.

Background

Cigarette smoking represents the biggest source of preventable disease in developed and developing countries throughout the world and, in recognition of this fact, governments and particularly health authorities have engaged in long-term campaigns to limit tobacco smoking. The principal focus of such campaigns has been to limit *demand* through advertising campaigns designed to highlight the disastrous effects which smoking can have on individuals, particularly the young who might be tempted to take up smoking. While results of such campaigns have been mixed, there has been a measurable decline in the aggregate level of smoking. Such campaigns which seek to limit demand will remain the principal focus of the efforts of health authorities. At the same time, a yet-unanswered question is the impact which *supply*, generally, and retail distribution, specifically, has on tobacco consumption; in particular, the impact of distribution intensity (broadly understood as the number of distribution outlets (largely made up of supermarkets, petrol stations, convenience stores and tobacconists) per head of population or within a given geographical area. An obvious implication of this question is that, if a measurable link between distribution intensity and tobacco consumption can be established, then it follows that restrictions on tobacco retailing might be usefully pursued as a public policy objective.

This is the background to the current study being undertaken by a team at Macquarie University in conjunction with the Cancer Council of New South Wales. The project is being undertaken in stages, the first of which was to review the relevant literature on the link between retail distribution and category consumption of fast-moving consumer goods in general, and tobacco, in particular. This literature review is the focus of this paper. In addition, proposals to measure the statistical relationships between retail distribution and tobacco consumption are discussed.

Retail Tobacco Sales

According to Euromonitor, the value of Australian retail tobacco sales totalled some \$8.5 billion in 2004, or approximately 5% of total retail sales, of which \$7.8 billion (92%) were sales of cigarettes (Euromonitor 2005: 11). ‘Smoking tobacco’ (roll-your-own) accounted for

7.1% of retail tobacco sales, with cigars accounting for the remaining 0.9%. As prices have risen over the past five years, cigarette *volume* sales have decreased by an average of 3% per annum over the 1999-2004 period.

Tobacco distribution is dominated by four channels, supermarkets, petrol stations convenience stores and tobacconists, which in 2004 accounted for 89.5% of cigarette sales. The proportion of sales by the two largest outlets, supermarkets and petrol stations (with a combined 67% of sales in 2004) is also increasing, having risen from 43% in 1997 (Euromonitor 2005).

A comparison of the latest data available on price of cigarettes at different outlets (Scollo et al, 2000).shows that supermarkets were the second cheapest outlets (after tobacconists). A shift of sales to supermarkets is therefore easily explained by consumers shifting purchases to low priced outlets. This explanation is inconsistent, however, with an increase in sales by petrol stations, which in 1998 were found to be the highest priced outlets. It appears that changing patterns in cigarette sales are not solely driven by price. Rather, it appears that the growth in supermarket sales is driven by their low prices and their appeal to committed, regular smokers. In contrast, the appeal of service stations and convenience stores is based on infrequent, unpredictable demand, principally among occasional smokers, “lapsed quitters” and perhaps even young adopters.

The Relationship between Distribution and Sales

Traditional market theory says that distribution affects sales and vice versa, since no consumer can buy a product unless it is available (Farris, et al. 1989). For any product category, the number of distribution outlets will be correlated with the total amount of sales, because sales must necessarily reflect supply; if the product is only available in a few outlets, sales will necessarily be low; if the product is visible everywhere, customers will be exposed to it more often, are more likely to buy it, and sales will be higher (Reibstein and Farris 1995). Beyond these extremes, however, it is not clear to what extent wider distribution causes increased sales, or if instead increased sales cause wider distribution, because retailers are more likely to carry high sales items. It is likely that the direction of causality is to some extent reciprocal; distribution causes increased sales, and increased sales result in wider distribution. However there has been surprisingly little research investigating the primary direction of causality between sales and the number of outlets. A notable result of the literature search was an almost complete lack of research examining any association between aggregate distribution and sales, for cigarettes or for any other product category. The only study found which specifically investigated a link between the number of distribution outlets for cigarettes and consumption was by Andrews and Franke (1996). The study drew on US cigarette consumption data from the 1920s up to the 1970s and found that the number of cigarette outlets has a small but positive effect on consumption, suggesting, at least, that an increase in the number of outlets leads to a modest increase in cigarette consumption.

“Double Jeopardy Effects”

While the summary data show total market share patterns, evidence from other consumer markets is that consumers will typically purchase from a range of outlets, that few consumers will be loyal to one outlet type, and that consumers who purchase from smaller outlets will almost certainly also purchase from other outlets- the “double jeopardy effect”. ‘Double

jeopardy' refers to the consistent finding across a large variety of products that consumers buy a range of brands, and tend to share their purchases between brands, proportional to the market share of the brand in a predictable Dirichlet distribution (Barwise and Ehrenberg 1985; Ehrenberg 1988; Ehrenberg, et al. 1990; Ehrenberg, et al. 2004). Thus a brand that has 40% market share will be bought by much more than 40% of the buyers in the market. The term 'double jeopardy' thus reflects the dual problem for small brands that they have lower market share, and a smaller proportion of loyal buyers. Double jeopardy effects have also been observed in store choice: small stores have fewer customers, who are less loyal to those outlets, tending also to shop at other outlets, proportional to the market share of those outlets (Bhat and Fox 1996; Keng and Ehrenberg 1984; Uncles and Ehrenberg 1988). Specifically for cigarette purchases, the existence of double jeopardy effects implies that most customers will purchase at some time from the largest market share outlets (supermarkets and petrol stations) and that they are likely to switch their purchases from one outlet to another, if supply is interrupted at one distribution channel.

Bhat and Fox (1996) also found what they called 'triple jeopardy' effects in store choice; customers of small stores tended to spend less per visit. For cigarette purchases, triple jeopardy would suggest that a typical smoker will purchase from multiple types of outlets. This pattern of decreased loyalty to smaller brands has been observed in more than 50 different product and service categories (Ehrenberg 1997), so it seems likely to apply also to cigarette sales.

The previous discussion suggests that restriction on sales at any one type of outlet may result in some decrease in impulse purchases, but will also result in a shift of purchases to other available outlets. The available evidence on consumer purchase patterns and on networks suggests that the greatest disruption to tobacco sales would be achieved by removing the largest sales outlets i.e. supermarkets and petrol stations. While removing supermarkets would hit the heavy, committed smokers, eliminating petrol stations and convenience stores would hit the occasional, "social smokers" and "lapsed quitters".

Distribution and Category Demand

There has been surprisingly little work (for cigarettes or for any other consumer product) on the extent to which distribution of a product category is associated with higher demand for the category. Research on the association has generally studied brand share, rather than for category sales (Cadeaux and Tan 2004). There will be some similarities in any association between distribution and sales at both the brand and category level; at higher levels of distribution, it is more convenient for consumers to purchase a product, and so sales will be higher. Similarly, at both the brand and category level, as demand increases, more outlets are likely to stock a product, so sales will be higher. At both the brand and category level, there is therefore evidence of a bi-directional relationship (Reibstein and Farris 1995). There is also a widely observed link between distribution measured by inventories levels and category sales (Baumol and Ide 1962; Hise, et al. 1983; Larson and DeMarais 1990; Urban 1998; Dubelaar, 2002)) One explanation for the strong association between distribution and sales is that widely distributed products enjoy higher levels of what has been called 'psychic stock' (Larson and DeMarais, 1990) i.e. they have higher levels of awareness, consideration, and present more frequent opportunities for purchase. This concept of psychic stock is potentially directly applicable to tobacco, which has been said to be the most widely distributed consumer product in Australia, presenting smokers, lapsed smokers and potential smokers with a constant reminder of cigarettes, and a constant opportunity and temptation to purchase.

There is also some evidence that access to tobacco is associated with the rate of adolescent smoking; (Blewden and Spinola, 1999; Altman, et al. 1991; Bellew and Wayne 1991) Robinson et al (1997) The available studies do suggest, however, that if access to buying cigarettes can be limited, then the rate of teenage uptake of smoking will decrease. (Bishai, et al. 2005; DiFranza, et al. 1992; Jason, et al. 1991)

Fast Food Distribution and Consumption

The link between the scale of distribution and consumption of fast food is implicit in the so-called 'Greenberg's Law', after the former Chairman of McDonalds in the USA, who stated:

Where you have two stores per 100,000 people you might have 16 transactions per capita per year. When you go to three stores, to stay even, you would hope to get to 24 transactions per capita, and when you go to four stores, in order to say you're not causing any saturation or decline, you'd expect 32 transactions. But guess what happened? We went to four stores (per 100,000 population) in some markets and ended up with 33 transactions. (Jack Greenberg, Chairman of McDonalds USA, from

Samuels (1996)). The experience of McDonalds suggests that for fast food, an increased number of outlets, up to a certain point, can result in increased sales. Past that point, however, it appears that growth in the number of outlets results in cannibalisation of sales from other outlets. Jekanowski, Binkley, & Eales (2001), using time lagged data, found that greater availability led to increased convenience and, in turn, increased consumption of fast food. In a strategy similar to McDonalds drive for expansion of sales through increased distribution, the authors quote the National Restaurant Association:

Operators recognise consumers' need for convenience. Unit expansion continues to be a key component of rapid growth in the limited-service segment, and higher unit counts translate into greater consumer convenience, which in turn drives sales (Jekanowski et al, 2001, p.59).

Alcohol Distribution and Consumption

Studies into the relationship between alcohol distribution and consumption have similarly found that increasing the number of outlets for both wine and beer was associated with an increase in the demand for both (Ashe, et al. 2003; Godfrey 1989; Mosher 1985). Similarly, Goldstein and Kalant (1990) have argued that consumption of psychoactive drugs is strongly influenced by the ease of obtaining the drug (1990). Other studies have looked at the impact of limiting alcohol supply. Goldstein & Kalant, (1990) found that limiting adolescent access to alcohol by raising the legal drinking age was followed by an immediate decrease in alcohol related driving accidents. At extreme levels of supply restriction, Goldstein & Kalant cite the prohibition of alcohol in the USA in 1916, which resulted in a prompt fall in the rate of death from liver cirrhosis. The authors argue that the associated fall in cirrhosis following prohibition corresponds to a 50% fall in alcohol use.

In summary, the literature review shows some evidence of a causative link between distribution and tobacco products. This conclusion is supported by strong evidence from other product categories that higher distribution is associated with higher sales. The evidence must be interpreted with caution however, since the direction of causation is unclear, and it is likely that the association between sales and distribution is bi-directional. For under-age smokers, there is strong evidence of both a link between access and consumption, and that limiting access results in a decrease in consumption.

Future Research

The previous discussion suggests *prima facie*, at least, that there may exist a measurable relationship between tobacco smoking and the intensity of retail distribution of tobacco products.

The previous literature review and discussion, leads to the following propositions:

- 1 That there exists a significant correlation between the “aggregate” incidence of tobacco smoking and the intensity of retail distribution.
- 2 That there exists a significant correlation between the “aggregate” incidence of tobacco smoking and the intensity of supermarket and petrol distribution.
- 3 That there exists a significant correlation between the incidence of “heavy” tobacco smoking and the intensity of supermarket distribution.

- 4 That there exists a significant correlation between the incidence of tobacco smoking among “lapsed quitters” and the intensity of “convenience” tobacco distribution.

- 5 That there exists a significant correlation between the incidence of tobacco smoking among adolescents and the intensity of “convenience” tobacco distribution.

As the previous discussion has implied, we can assume that consumer characteristics will at least partly drive both tobacco consumption and retail distribution. What is less obvious is the direction of the link. As discussed previously, we believe the direction is debatable and difficult to prove. The data which are currently available, from commercial and government sources, are largely cross-sectional and this is a foreseeable limitation of the next stage of research. Clearly, it will be extremely difficult to demonstrate causality using this approach. Notwithstanding this perennial and intractable problem, it is argued that with robust and reliable secondary data, it will be possible to test these propositions.

The next stage of the research program will, therefore, involve primary data collection and analysis on each of:

- Consumer characteristics (socioeconomic status, demographics and psychographics);
- Tobacco sales and/or consumption (smoking behaviour); and
- Retail distribution (number, type and intensity). At this stage we anticipate that this analysis will be undertaken at micro and macro levels using a range of techniques including uni-, bi- and multi-variate analyses of aggregate and comparative data based on LGA's and State and Area Health Service boundaries. Analytical tools will include regression-based and structural equations modelling together with geographical spatial analysis.

In conclusion, existing theory and empirical research conducted in related fields suggest, at least, that a *prima facie* relationship exists between retail distribution and tobacco consumption. The proposed research program will examine the empirical relationship and, if established, will provide important justification for public policy interventions designed to limit distribution and consumption of tobacco products.

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