Purchase Loyalty is Polarised into either
Repertoire or *Subscription* Patterns

Byron Sharp, Malcolm Wright & Gerald Goodhardt

Abstract

We have observed that competitive repeat purchase markets are polarised into two radically different structures. The first and best known we call *repertoire* markets; these have few solely loyal buyers as most buyers allocate their category requirements across several brands in a steady fashion. The other we call *subscription* markets; these have many solely loyal buyers as most buyers allocate category requirements entirely to one brand. This is an empirical difference rather than a theoretical distinction, and surprisingly there appear to be no markets which occupy the middle ground between these two extremes. The repertoire-subscription distinction turns out to be an important boundary condition for some well-established generalisations about repeat purchase behavior. Despite this, the NBD-Dirichlet model of purchase incidence and brand choice fits both types of markets, and the differences in loyalty are adequately captured by the Dirichlet's switching parameter, S. This represents an important extension of the generalisability of the Dirichlet, allowing the insights gained from repertoire market analysis to be applied to customer churn analysis in subscription markets.

Keywords: Subscription, Repertoire, Churn, Benchmarking, Empirical Generalisations, NBD-Dirichlet

1. Introduction

In this paper we discuss a dramatic empirical and theoretical difference that we have detected in repeat purchase markets. They are polarised between two types, which we call repertoire and subscription markets. This distinction is based on differences in consumers' repeat purchase patterns, so it may well turn out to be more useful than distinctions based on product characteristics, such as 'product' versus 'service', 'high tech' versus 'low tech' and so on.

As we are discussing repeat purchase markets, our analysis does not extend to markets for durable products, first homes, power stations or funeral parlour services. However, most consumer purchases are repeat purchases in established competitive markets, and each day people buy from product categories and groups of brands that are already very familiar to them. As repeat purchase is the source of most brand revenue, it is also the focus of many currently popular marketing initiatives such as customer loyalty programs, defection analysis and customer relationship management. Thus, understanding differences in repeat purchase behaviour is of great practical and theoretical interest.

We proceed by outlining the well known patterns of repeat purchase found in repertoire markets and described by the famous NBD-Dirichlet model. We contrast this with the very different patterns found in subscription markets. We explain the difference in terms of the switching parameter of the Dirichlet model. We then outline three sub-types of subscription markets (free choice, renewal, and tenure markets) and give guidelines for estimating the switching parameter in each of these markets. We discuss the implications of these results, both for aspects of marketing practice (including defection analysis and benchmarking churn rates), and as a potential boundary condition for marketing theories. Finally, we suggest the areas we think would be most productive for future research.

2. Repertoire Market Patterns

Considerable data on repeat purchase has been gathered in many countries from consumer and business panels. The research companies running these panels have

developed a range of commonly used, time-based, repeat purchase statistics, including:

- penetration - the proportion who buy a brand or category at least once;

- average purchase frequency of those who do buy;

- share of category requirements (total category purchases);

- solely loyal buyers - the proportion of a brands' buyers who buy only that brand; and

- repeat buying rate from period to period.

Marketers and academics track these statistics and use them to compare both brand performance and the characteristics of product categories. They can also be used for diagnostic purposes, to see if a brand is running the way it should be, or was budgeted to, and to assess the impact of marketing interventions. Fundamental research has provided useful empirical generalisations that aid these practices. For example:

1. Differences in market share are largely due to differences in penetration. Higher share brands are bigger largely because they have more customers than lower share brands.

2. The comparatively small differences between brands in average purchase frequency and other loyalty statistics (eg. share of category requirements, proportion of solely loyal buyers) follow the well known double jeopardy pattern - small brands not only have fewer buyers, but these buyers are slightly less loyal.

3. A brand's customers, on average, buy other brands more often. This is because most customers buy from a repertoire of brands. Hence Andrew Ehrenberg's famous line: "your customers are really other people's customers who occasionally buy from you".

4. Solely loyal buying (the proportion of customers who only buy one brand) is relatively rare and declines over time. Also, solely loyal buyers are lighter buyers of the overall category. By contrast, heavier buyers tend to buy more brands and are less likely to be solely loyal.

5. Brands share their customers with other brands in line with each brand's penetration – this is known as the Duplication of Purchase Law.

These generalisations have long been known in the markets typically covered by panel data (Ehrenberg, Goodhardt and Barwise 1990; Fader and Schmittlein 1993; Uncles, Ehrenberg and Hammond 1995;

Battacharya 1997; Ehrenberg 2000; Ehrenberg, Uncles and Goodhardt 2003) and are accurately described by a parsimonious yet comprehensive theory – the NBD-Dirichlet model of purchase incidence and brand choice (Goodhardt, Ehrenberg and Chatfield 1984), commonly known as 'the Dirichlet'.

The Dirichlet model requires only a few inputs; penetration and average purchase frequency for one or more brands and for the overall category, and the market share of any brand to be examined. It theorises that buyers have steady buying propensities, and that these buying propensities vary across the population according to certain statistical distributions. Based on these few inputs and assumptions, the Dirichlet accurately predicts a whole range of commonly used brand performance statistics, such as brand penetration and average purchase frequency, share of category requirements, proportion of solely loyal buyers, repeat buying rate, and purchase duplication across different brands, as well as providing values of these statistics for different time periods. These outputs typically conform to, and model, the generalisations outlined earlier. This makes the model a very useful guide to understanding consumer behaviour, revealing market structure, benchmarking current brand performance, and determining whether brand objectives conform with known patterns of brand behaviour.

The model is highly generalisable; Dirichlet-type patterns have been found to generalize to over 50 varied product or service categories from soap to soup to automobiles, and in different countries and at different points in time. These include probably all fast moving consumer goods markets (Ehrenberg et al. 1990; Uncles et al. 1995; Ehrenberg 2000; Ehrenberg et al 2003), store choice (Keng and Ehrenberg 1984), medical prescriptions (Stern and Hammond 1997), and television channel choice (Goodhardt, Ehrenberg and Collins 1987, Barwise and Ehrenberg 1988).

Such markets have not usually been called repertoire markets (Gordon 1994 is a rare exception), but we have chosen to use this term for two very important reasons. The first is to distinguish repertoire markets from subscription markets. The second is to make the point that in this type of market consumers satisfy their requirements from a repertoire of brands; that is, they are polygamously loyal. Although this last point has been comprehensively demonstrated again and again for nearly 40 years many continue to describe markets as being made up of loyals and their antithesis, switchers

Table 1:
Retail Fuel Purchases (Australia)

Brand	Penetration (%)	Average Purchase Frequency	Share of Requirements (%)	Solely Loyal Buyers (%)
Mobil	50	5.9	40	13
Shell	46	6.3	42	11
BP	43	5.3	35	7.8
Caltex	35	4.6	30	7.5
Ampol	30	4.1	27	6.0
Sth Cross	11	4.0	27	4.7
Average	31	5.0	34	8.3
Any	88	13.5	100	100

Average no. of brands bought (repertoire size) = 2.6

12 weeks data, n = 385

(eg. Totten and Block 1994, pp. 66-67). By using the label 'repertoire markets' we hope to undermine this false belief and promote the idea of polygamous loyalty.

Table 1 provides an illustration of the repeat purchase statistics that characterise a repertoire market, in this case retail fuel brand choice in an Australian city.

We see the typical patterns of double jeopardy, with lower penetration brands suffering twice[i]. Not only do fewer people buy them, but those that do so are less loyal, as measured by average purchase frequency, share of category requirements, and the proportion who are solely loyal buyers. In addition, we can see that no brand satisfied more than 50% of its average buyers' category requirements, and most brands had less than 10% of their customers being solely loyal.

3. Subscription Market Patterns

Despite the wide generalisability of the 'Dirichlet-type patterns', there appears to be a whole class of markets,

which we call subscription markets, that systematically violate three of the five repeat purchase generalisations noted earlier (numbers 2, 3, and 4). At first, we thought this was a boundary condition for the Dirichlet model itself (our suspicion is on public record: Sharp and Wright 2000). However, on further investigation, we found that the Dirichlet model did hold for these different markets, but the values of one of the key parameters was so different from usual that some of the expected generalisations about purchase behaviour could not be observed. This difference in a parameter value is marked and consistent, and appears to be important from both an empirical and a taxonomical point of view.

Unlike repertoire markets, in subscription markets customers do not usually make regular purchases from a repertoire of competing offerings; rather they typically 'subscribe' to a single provider for long periods of time or tend to allocate most or all of their category requirements to one provider (and have very few others). Thus,

for each brand, a large proportion of its buyers are solely loyal. These markets include insurance policies, long distance phone calls, and banking services. They may also include medical and legal services, and utilities such as electricity and gas supply in those instances where the consumer has a choice of provider.

In some of these cases the 'subscription' is literal and involves a contract as a pre-requisite for subsequent transactions; for example, signing up with a long distance telephone supplier, buying a cell-phone, or applying for a credit card. This may preclude purchasing from other providers and thus constrain the polygamous loyalty seen in repertoire markets; for example, most households can use only one supplier of electricity, gas, or household insurance. However, the constraints are by no means total. Some subscription markets still have scope for multi-brand purchasing (ie. multiple contracts). Likewise, polygamous demand in repertoire markets can also be constrained; by the frequency and timing of the main shopping trip, by limited availability due to retailer stocking choices or stockouts, and by pantry "stuffing" from promotional purchases. So there is nothing to stop many consumer goods categories behaving like subscription markets - it just so happens that they do not. Similarly, when there are no constraints on multiple subscriptions, there is nothing to stop multi-brand purchasing in subscription markets. But it just so happens that markets such as insurance and even (we think) hairdressers, doctors, and dentists, show very high (subscription market) levels of loyalty.

Table 2 illustrates the pattern of repeat purchase statistics that characterise subscription markets, in this case use of bank credit cards in New Zealand. To maintain transparency, minor brands have been included, although the

Table 2:
Use of Bank Credit Cards (New Zealand)

Brand	Penetration (%)	Average Usage Frequency	Share of Requirements (%)	Solely Loyal Buyers (%)
BNZ	15	8.1	88	79
ANZ	13	8.1	76	75
Westpac	11	8.5	88	83
Trust Bank	9	8.5	90	81
National Bank	9	7.4	85	81
ASB	4	6.4	77	73
Countrywide	2	4.1	63	83
Average	9	7.3	81	79
Any	57	8.8	100	100

Average size of repertoire = 1.2

10 weeks data, n = 592

Table 3:
Use of Bank Credit and Charge Cards (Australia)

Brand	Penetration (%)	Average Usage Frequency	Share of Requirements (%)	Solely Loyal Buyers (%)
BankSA	13	7.6	86	78
NAB	10	9.6	87	79
ANZ	9	5.9	68	66
CBA	8	5.7	74	73
Adelaide	6	7.8	63	54
Westpac	6	7.3	74	44
Diners	3	7.0	41	9
AmEx	1	10.6	84	60
Average	7	7.7	72	58
Any	52	9.0	100	100

Average size of repertoire = 1.2

12 weeks data, n = 385

smaller a brand the more susceptible it is to random sampling variation (error).

These results are remarkably different from the repertoire market illustration (Table 1) in that here each brand satisfied on average 81% of its customers' category requirements, and on average had 79% of buyers being solely loyal. Also, there appear to be many deviations from the expected double jeopardy pattern. The category average purchase frequency of 8.8 ('Any') demonstrates that these patterns are not merely due to a limited number of usage occasions within the time period.

Table 3 shows a similar market in an Australian city, though this time including charge cards (AMEX and Diners). The patterns are similar; high share of category requirements, high numbers of solely loyal customers,

and a number of deviations from the double jeopardy pattern.

These examples rely on usage frequency rather than purchase occasion. Conceptually, it is not immediately obvious what behaviour is the correct unit of analysis. In repertoire markets, a clear market transaction or store visit is involved. In subscription markets it is not always so clear. For example, what is the corresponding market transaction for credit cards? Is it the annual credit card subscription? The monthly statement? Each use of the credit card, which involves a purchase of an item and also generates credit card interest costs? We have relied on card usage for our credit card analysis as it is associated with a major market transaction. Consumers can have multiple credit cards, or can change their credit

cards during the analysis period, so usage can still be split between brands in the same way that purchases are in a repertoire market. This also allows share of requirements and sole loyalty to be compared more meaningfully between subscription and repertoire markets. However, we outline methods for analysing other types of subscription markets, including the card subscription itself, in Section 5.

Table 4 provides another example from the same panel reported in Table 2. This market, long distance phone calls, was a duopoly at the time of data collection. One brand was overwhelmingly dominant, with almost four times the number of buyers compared to the other brand. As with credit cards the unit of analysis is use of the service. However, in this case, each use of the service directly corresponds to the familiar market transaction (or purchase) seen in repertoire markets.

Despite the drastic difference in market position between the brands, the minor brand still satisfies almost 80% of its customers' category requirements, and still has over 50% of buyers being solely loyal. In fact, the number of solely loyal buyers is lower than usually observed in subscription markets, but this is due to the vast discrepancy in size between the brands and the fact that there were an average of 20 usage occasions by Clear customers during the period of the data collection. Having over 50% of buyers being solely loyal over 20 purchase occasions for such a dominated brand is unheard of in repertoire markets.

4. The Fit of the Dirichlet Model

The examples given in Tables 2, 3 and 4 do not show the well-established patterns of multi-brand purchasing and low levels of solely loyal buying seen in repertoire markets. As mentioned earlier, we initially thought that they might represent a boundary condition for the Dirichlet model. However, on fitting the model to subscription market data, it became apparent that the model's estimates of market statistics were substantially the same as the subscription market observations. By way of example, Tables 5 and 6 demonstrate this for Bank Credit Cards with market observations marked 'Obs' and Dirichlet estimates marked *'Est'*.

Clearly the Dirichlet model reproduces the market statistics for this subscription market very accurately indeed. Although deviations between the observations and estimates are greater for smaller brands, this is to be expected as smaller brands have fewer respondents and thus greater sampling error. Sole loyalty for brands in subscription markets is not just high but is predictably high according to the Dirichlet model. This is the result of the estimate for the S parameter, which is lower than ever seen in repertoire markets; in fact it is lower than any previously reported S parameter.

Table 6 shows that model estimation using the Australian data has also closely reproduced the subscription market statistics, although again the deviations are greater for smaller brands. Interestingly, a major deviation for solely loyal users can be seen for Diners, which concurs with

Table 4:

Long Distance Phone Calls (New Zealand)

Brand	Penetration (%)	Average Usage Frequency	Share of Requirements (%)	Solely Loyal Buyers (%)
Telecom	86	25	93	88
Clear	22	20	76	53
Any	97	26	100	100
Average size of repertoire = 1.2				
10 weeks data, n = 592				

Table 5:
Dirichlet Fit for Bank Credit Cards (New Zealand)

Brand	Penetration (%)		Average Usage Frequency		Share of Requirements (%)		Solely Loyal Buyers (%)	
	Obs	*Est*	Obs	*Est*	Obs	*Est*	Obs	*Est*
BNZ	15	*16*	8.1	*7.9*	88	*84*	79	*80*
ANZ	13	*13*	8.1	*7.9*	76	*83*	75	*79*
Westpac	11	*12*	8.5	*7.8*	88	*82*	83	*78*
Trust Bank	9	*10*	8.5	*7.8*	90	*82*	81	*77*
National Bank	9	*8*	7.4	*7.7*	85	*81*	81	*77*
ASB	4	*4*	6.4	*7.7*	77	*80*	73	*75*
Countrywide	2	*11*	4.1	*7.6*	63	*79*	83	*74*
Average	9	*9*	7.3	*7.8*	81	*82*	79	*77*

"Any" has been omitted as this was used to fit the model. S = .086

its positioning as a card to use for managing business expenses (and thus as an additional rather than a sole card). However, average purchase frequency is still as expected for a card with Diners' level of penetration.

The only issue of concern is the fact that, while a double jeopardy pattern is present in the Dirichlet estimates, it is not very clear in the subscription market observations. For example, the second and third ranked brands have higher observed average usage frequency than the two leading brands in both data sets, and the deviations for smaller brands in the Australian data also undermine the double jeopardy pattern. This problem turns out to be due to sampling error[ii] and the fact that the double jeopardy pattern is very slight at low levels of S – as theoretically low levels of S will result in near-identical measures of loyalty for brands of differing market share (and at S = 0 there should be no differences in loyalty whatsoever and so no double jeopardy pattern). The very slight remaining double jeopardy pattern is then much more easily obscured by random 'wobble'.

4.1 Time and Defection

In repertoire markets sole loyalty is largely due to light buying and short time periods; if the average customer buys the category only twice in the period, then the lowest possible share of category requirements for any

brand is still 50%. The Australian Retail Fuel data provides a good example of this. When a 12-week analysis period is considered (as in Table 1) the average category purchase rate is 13.5 and an average sole loyalty is 8.3%. When a 4-week analysis period is considered, the average category purchase rate falls to about 5, and the average level of sole loyalty is over 30%.

So over very short time periods repertoire markets look more like subscription markets, and over very long time periods subscription markets look more like repertoire markets, due to ongoing churn in the customer base[iii]. Could the differences between the two types of markets just be due to difference in inter-purchase time? Will subscription markets look 'repertoire' in the long term? In fact there are good reasons to discount this.

The first is the likely effect of a brand switch on underlying purchase probabilities. In repertoire markets brand switching happens frequently, generally with no change in underlying purchase propensities. In fact the term 'switching' is inappropriate as buyers are really just shuffling around within their repertoires. By contrast, in a subscription market brand switching generally reflects a defection, where the probability of buying the old brand is likely to be substantially downgraded as a result. Consequently, the set of brands that a consumer buys over a long period of time in a subscription market is

quite different from the repertoire that a consumer buys from in a repertoire market over a short to medium period. The similarities are superficial. Defection does occur in repertoire markets when buyers drop/add or downgrade/upgrade brands in their repertoire, but this means that the lifetime list of brands bought in a subscription market is more appropriately compared to the lifetime list of repertoires (not brands) a buyer has in a repertoire market.

The second reason, explored in detail in the next subsection, is that the differences in loyalty between the two types of markets are explained by the S parameter of the Dirichlet model. This is a time invariant measure of loyalty, and thus is not subject to confusion arising from very short or very long time periods. Thus, we can be assured that the differences in loyalty between repertoire and subscription markets are real.

For practical purposes the issue of time is of little consequence. Managers and researchers do not look at panel data covering only a few purchases, and nor does anyone seem to have subscription panel data covering decades.

4.2 Modeling Loyalty

As noted above, the differences between repertoire and subscription markets can be explained by the different values of the Dirichlet model's S parameter. S ranges from zero to infinity, and can be seen as a measure of heterogeneity in choice probabilities. For any particular level of average choice probability, the greatest heterogeneity between buyers' choice probabilities is found when S is zero; that is when each individual always makes the same choice (although the choices vary between individuals). Heterogeneity in choice probabilities decreases as S increases, as individuals' choice probabilities are spread out more and more evenly amongst the available choices. This also means that consumers' brand repertoires increase as S increases.

Subscription markets have S parameters of less than 0.2, while repertoire markets have S parameters of greater than 0.6, and almost always greater than 0.8. The difference may not seem important, but it actually accounts for most of the possible variation in category specific brand loyalty.

Figure 1 demonstrates this using the data for the highest share brand from Table 1. These results were obtained using the BUYER software (Uncles 1989), which allows users to supply their own S parameter after initial model estimation, but before brand specific outputs are gener-

Table 6:

Dirichlet Fit for Bank Credit Cards & Charge Cards (Australia)

Brand	Penetration (%)		Average Usage Frequency		Share of Requirements (%)		Solely Loyal Buyers (%)	
	Obs	*Est*	Obs	*Est*	Obs	*Est*	Obs	*Est*
BankSA	13	*13*	7.6	*7.2*	86	*71*	78	*63*
NAB	10	*13*	9.6	*7.2*	87	*70*	79	*63*
ANZ	9	*8*	5.9	*7.1*	68	*68*	66	*60*
CBA	8	*6*	5.7	*7.0*	74	*67*	73	*59*
Adelaide	6	*7*	7.8	*7.0*	63	*67*	54	*60*
Westpac	6	*6*	7.3	*7.0*	74	*67*	44	*59*
Diners	3	*3*	7.0	*6.9*	41	*66*	9	*57*
AmEx	1	*2*	10.6	*6.9*	84	*65*	60	*57*
Average	7	*7*	7.7	*7.0*	72	*68*	58	*60*

"Any" has been omitted as this was used to fit the model. S = .18
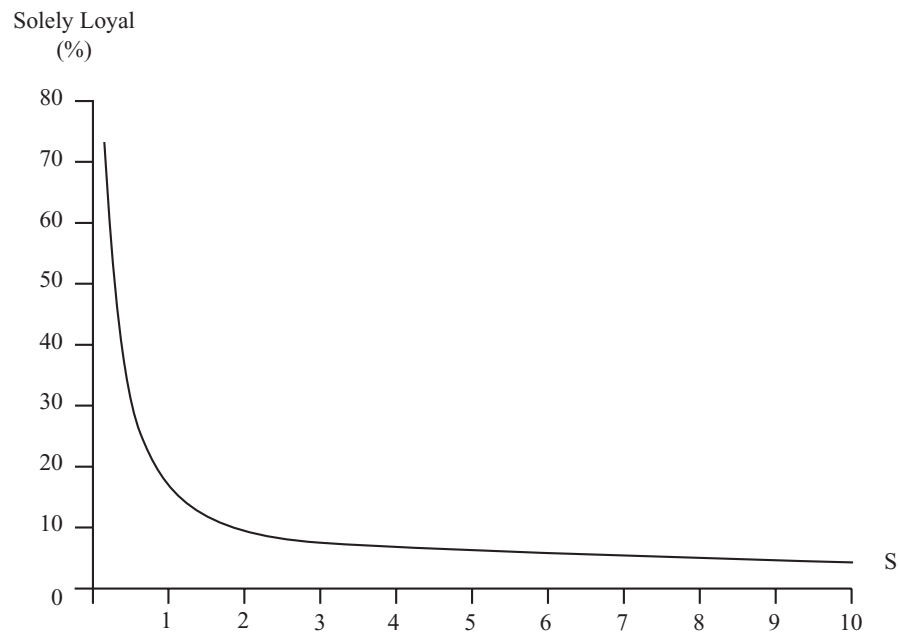
Solely Loyal
(%)

Figure 1: Effect of S on Sole Loyalty Amongst Mobil's Buyers

ated. Figure 1 therefore shows how the Dirichlet esti- mate of sole brand loyalty varies for different values of S, other things being equal.

First, note that the curve is very steep when S < 1, and very flat when S > 2. This shows that most of the varia- tion in loyalty occurs for low values of S, and that large values of S are all more or less the same, from a practi- cal point of view. Second, note that, while sole loyalty noticeably increases as S falls below 2, it really acceler- ates when S falls below about 0.5. Between our claimed lower bound for repertoire markets (0.6) and upper bound for subscription markets (0.2) sole loyalty more than doubles from 25% to 54%. This demonstrates and supports the claim that repertoire and subscription markets show very different patterns of loyalty. It also highlights the dramatic empirical and taxonomical importance of the lack of S values between 0.6 and 0.2.

As a result of this analysis we can see that several famous generalisations about repeat purchase are not inherent to the Dirichlet model, but rather are only mani- fested for the values of S usually seen in repertoire markets. When the value of S is much lower than this, as it is in subscription markets, the model still fits but the pattern of outputs may look rather different. Double

jeopardy patterns become much less obvious, and are easily overwhelmed by random sampling variation (error). However, while this turns out to be a boundary condition for several well-known repeat purchase gener- alisations, the generalisability of the Dirichlet model itself is impressively enhanced. It fits not only the famil- iar repertoire markets, but also the massively different subscription markets.

5. Three Types of Subscription Markets

Subscription markets differ from each other, presumably due to differing structural constraints on multi-brand purchasing. Sometimes there is no obvious constraint on multi-brand purchasing (eg. hairdressers). In other cases, even though a subscription is required, there may be nothing to prevent multiple subscriptions, as with bank credit cards. Sometimes subscription to one provider will preclude the use of other providers, as with household effects insurance, but results in a fixed renewal period that gives an opportunity to switch brands. Finally, a subscription may run indefinitely until the consumer takes action to cancel it, as with many household utilities such as power, gas, and internet connections.

These constraints are important, as they affect not only the ease of switching, but also the type of behaviour that

can be analysed. While purchases or usage can be used to analyse loyalty for bank credit cards or long distance telephone calls, this is clearly nonsensical for household utilities - we do not regard each flip of a light switch as a further demonstration of loyalty. Consequently we also make a distinction between three types of subscription markets, for which data collection and modeling approaches will vary slightly.

- *Free choice.* The ability to use competing brands is largely unconstrained and thus repertoire buying is possible, and yet very high levels of sole loyalty are the norm. If a subscription is required to access a brand or service, multiple subscriptions are possible, but atypical; bank credit cards and savings accounts are examples. Subscription market loyalty is exhibited through high share of category requirements and high levels of solely loyal buying. Predicting, without repeat purchase data, whether such markets are subscription or repertoire is difficult. Doctors and hairdresser visits are probably free choice subscription markets.

- *Renewal.* One and only one subscription is possible for the product or service, but this subscription is subject to renewal at regular, pre-determined, intervals. Home insurance is an example. Loyalty is exhibited through renewal and switching rates, and the pattern of defection - which brands gain/lose from which others - should match the duplication of purchase patterns seen in repertoire markets.

- *Tenure.* The subscription continues until actively terminated. Multiple subscriptions may be possible. The concept of tenure markets may be extended to business-to-business markets (e.g., appointment of advertising agency). Loyalty is exhibited through share of category requirements within a fixed time period or annual churn rates. Practically speaking, most analyses will be identical to those carried out for annual renewal markets.

These distinctions are important because the assumptions and data collection methods will vary for each type of subscription market. In tenure and renewal subscription markets, data is usually not on usage but on renewals, and the brand switches probably include a substantial number of defections (changes in underlying preferences). This creates a problem for estimation of the Dirichlet model which assumes a fixed vector of purchase probabilities; when a consumer switches brand in a renewal or tenure market, these probabilities are likely to be revised. Consequently, the model can only be

applied to the next renewal, or to switching tenure within a fixed time period within which each consumer makes no more than one switch. In effect, this means that analysis of renewal and tenure markets is restricted to brand switching within the next year (or other specified shorter period). As it happens, this is exactly the sort of analysis that managers in these markets are interested in (ie. annual renewal and churn rates).

For the case of 2 purchase brand switching, procedures are available which allow a switching constant, K, to be estimated from data on brand switching and market share (Kalwani and Morrison 1977). S is then simply K/(1-K), and Bass (1974) also previously described an equivalent statistic as a measure of "product class brand loyalty", which is effectively what S measures[iv]. The estimate of K, and thus S, can be obtained at either the brand level, or for the total market (Kalwani and Morrison 1977, Rubinson, Vahonacker, and Bass 1980). The total market method should be used where possible, as this effectively pools the brand estimates as is done with the S parameter in Dirichlet modeling.

By way of example, customer numbers for each company in the New Zealand residential electricity market, a tenure subscription market, were reported in a national newspaper (Robson 2001). Together with knowledge that the churn rate was about 10%, this was sufficient information to allow estimation of S = 0.14. This is well within the expected range for subscription markets. Of course this assumes the market is stationary, which has not been the case as new entrants have sought to establish themselves. Nonetheless, a stationary market benchmark is still useful as it allows managers of non-stationary brands to see if their growth is due to excess acquisition or less defection than expected (and vice-versa for decline). The benchmarks can also be used to make future estimates; once aggressive customer acquisition attempts reduce in the New Zealand market the churn rate may drop to the international residential electricity standard of about 6%. Given the current distribution of market shares this would imply S = 0.08 under stationary market conditions. This is a useful result, as it can be applied to yield benchmarks of the expected rates of ongoing churn for each market participant. For example, the expected churn rate for the market leader (27% share) turns out to be 5.5% of their customer base, while the expected churn rate for the smallest brand (3% share) is 7.3% of their customer base. This also shows the familiar pattern of double jeopardy being reflected in the churn rates for subscription markets.

6. Summary and Implications

Repeat purchase markets come in two radically different types, repertoire and subscription, the latter of which is a boundary condition for some of the well-known generalisations about repeat purchase and brand loyalty. This is the first time (in scores of applications under many diverse conditions) that these empirical generalisations have been found to fail. However, we also found that the underlying model of purchase incidence and brand choice, the Dirichlet model, continued to hold. This indicates that (i) subscription markets could still be treated as zero order markets, at least in the short term, and that (ii) some of the empirical generalisations about consumer markets depend not just on the assumptions about market processes, but also on particular parameter values or particular degrees of loyalty.

6.1 Implications for Marketing Theory

The distinction between repertoire and subscription markets may turn out to be a boundary condition for many marketing theories. This is important; knowing where our theories do not hold is a good solution to the confirmation trap which plagues science (Greenwald et al. 1986, Wright and Kearns 1998). We have already seen that it is a boundary condition for many standard repeat purchase generalisations. Could it also be a boundary condition for other marketing theories? For example, as with repeat purchase modeling, diffusion modeling relies on stochastic elements of consumer behaviour; therefore we should ask, does diffusion modeling apply equally well to both subscription and repertoire markets?

A recent example demonstrates the value of the repertoire/subscription distinction as a boundary condition outside the area of repeat purchase modeling. Chakraborty et al. (2002) examined the ability of ratings and choice conjoint to predict market shares using a Monte Carlo simulation. They found that ratings conjoint performed as well as or better than choice conjoint, except when there was low heterogeneity in consumer preferences and consumers used a probabilistic choice (rather than first choice) decision rule. As explained earlier, consumers in repertoire markets have low heterogeneity in preferences and their polygamous loyalty reflects a probabilistic choice rule; by contrast, consumers in subscription markets have high heterogeneity in preferences, and the preferred brand becomes so dominant in the repertoire that the probabilistic choice rule effectively becomes a first choice rule. Thus, ratings based conjoint should perform poorly in repertoire markets, but perform well in subscription markets. This is worth knowing.

6.2 Implications for Marketing Practice

For managers, one of the most important applications of this new knowledge is in benchmarking rates of sole brand loyalty and share of category requirements. The normal values of these loyalty measures will vary greatly between repertoire and subscription markets, and it is important for managers to understand what type of market they are operating in to determine whether their brand is behaving abnormally well or abnormally badly. For example, managers in subscription markets should realize that it is normal to have about 80% of buyers being solely loyal; if they expect consumer behaviour to follow repertoire market patterns they could be tempted into inappropriate marketing efforts. Likewise, managers in repertoire markets seeking to achieve very high levels of loyalty might be disappointed with all the repeat purchase statistics for their brand; rather than assuming that something is wrong they should appreciate that polygamous loyalty is a natural characteristic of a repertoire market.

The difference between markets also implies different approaches to marketing programs. Repertoire market brands tend to share their customers with other brands, while subscription market brands do not. This implies different objectives for loyalty initiatives; increasing share of category requirements or first brand loyalty in repertoire markets, as opposed to minimising/maximising customer switching loss/gain in subscription markets (eg. see Reichheld and Sasser 1990). Furthermore, repertoire market brands can reach competitors' customers much more easily (because they are also their own customers), while subscription market brands are better able to insulate themselves from competitive offerings. Loss of a customer will also be much easier to measure in subscription markets.

This difference has implications for customer relationship management programs. Working towards goals such as customer retention or zero defections implies the existence of the type of loyalty seen in subscription markets. It does not occur in repertoire markets, and it seems impossible for managers to convert a repertoire market into a subscription market by degrees. The gap between the two types of markets is too dramatic, and the absence of any empirical observations in the middle ground suggests that it is not the type of gap that could be bridged by incremental improvements in retention.

The fit of the Dirichlet model to subscription markets justifies the entailed assumptions of the model, allowing brand switching methodologies to be applied to benchmarking churn rates in subscription markets – just as the Dirichlet model has in the past provided a useful benchmark for evaluating the effect of marketing programs in repertoire markets (Battacharya 1997, Sharp and Sharp 1997). This is of tremendous interest in utilities, financial services and other renewal and tenure markets. It also means that the effectiveness of customer relationship programs in these markets can finally be compared against a theoretically meaningful benchmark.

It is thus very important for managers to know whether their market is a repertoire market or a subscription market. This, we think, is extraordinarily easy (for instance by using summary repeat purchase statistics from panel data such as shown in Tables 1, 2, and 3), although more sophisticated benchmarking procedures will require some modeling using the Dirichlet or other estimators or S.

6.3 Future Research

Much remains to be done in this area. We have provided data from several product categories to illustrate the differences between the two types of markets, but further replication in other markets is required. Indeed, analysis of many more markets is required to determine whether they are subscription or repertoire. For subscription markets, publication of S parameter values will provide a basis for benchmarking in these markets, and industry associations may find it worthwhile to sponsor research to achieve this.

More generally, it would be helpful if S could be estimated using a simple survey methodology. The key requirements are accurate estimates of the market share of all participants, and of the overall rate of churn in the market. The first of these can now be estimated from Juster scale questions (Wright, Sharp and Sharp 2002), but more research is needed to determine how best to estimate total churn rate when this is not available from secondary data or panel data.

Although the Dirichlet assumes market stationarity, it can still provide benchmarks against which non-stationarity can be evaluated. For example, if a brand is growing, is that because acquisition is higher than expected, or is it because defection is lower than expected? This question can be answered on an individual basis by comparison with benchmark churn rates. Future research could investigate the generalisability of such individual

answers, with potentially important implications for the conduct of marketing programmes.

The theoretical arguments for purchase probability revision after a brand switch in a subscription market are strong; however, it would be useful to know more about the effect. Does the prior brand remain in the repertoire at a relatively high probability? Or is it thoroughly rejected with little chance of purchase at the next brand switch? As well as being theoretically interesting, the answer to this question clearly has practical importance for post-switch marketing efforts.

Perhaps the biggest unanswered question about the two types of markets is why are they so different? The difference is marked, and the empirical absence of intervening values of S suggests that there is some strong mechanism that acts to force consumer behaviour to one extreme or the other. What is that polarising mechanism? Basic research is required to address this point.

We hope that our observations of the polarisation of loyalty between repertoire and subscription markets will stimulate the conduct of more work in this area, and especially further thinking and research on the reasons for the differences between these types of markets.

Endnotes

[i]Shell shows up as one deviation from this pattern, having lower penetration than Mobil but higher purchase frequency. This brand had just launched a major loyalty program, and this is the expected 'excess loyalty' pattern (Sharp and Sharp 1997).

[ii]In order to test the significance of the differences between the observed and predicted values of the average usage frequencies (w) we needed to estimate the sampling error of w. We approximated this by the following method.

The average usage frequency w is the mean of the truncated distribution of purchase occasions, excluding the class of zero buyers. The un-truncated distribution is known to closely follow the NBD, which has variance equal to $m(1+a)$ where m is the mean, and a is a parameter which can be estimated from the mean and the proportion of zero buyers. From this it is easy to calculate the uncorrected sum of squares as $m(1+a) + m*m$. Since the zero buyers contribute nothing to the sum of squares, this is the same for the truncated distribution too. Adjusting for the smaller sample size (dividing by the penetration of the brand) and subtracting $w*w$ (to give the corrected sum of squares) provides a good esti-

mate for the variance of the truncated distribution. This allows calculation of t-statistics for the difference between observed and predicted w for each brand. These ranged from .973 to -.899 with one outlier at 2.324 (Countrywide). While one out of 15 t-statistics was significant, we would expect one out of 20 to be significant due to chance alone. This demonstrates that the deviations from theoretical average purchase frequencies are adequately accounted for by sampling error.

[iii]Though as Keynes pointed out in the long run we are all dead.

[iv]Despite these prior theoretical results for brand switching, neither Bass (1974) nor Kalwani and Morrison (1977) reported the non-linear pattern of loyalty seen in Figure 1, or the polarisation of loyalty empirically found between repertoire and subscription markets.

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Biographies

Byron Sharp is Associate Professor of Marketing at the University of South Australia where he is Director of the Marketing Science Centre. He is also Director of the R&D Initiative for Marketing, a multi-million dollar programme of fundamental research sponsored by corporations around the world such as Procter & Gamble, Coca-Cola and General Motors. The R&D Initiative is a joint programme of South Bank University and the University of South Australia. Dr Sharp is Visiting Research Professor to the Doctoral Programme of Thamassat University, Thailand, he is editor of the Journal of Empirical Generalisations in Marketing Science and is on the editorial boards of four other journals.

Malcolm Wright is a Senior Lecturer in the Department of Marketing at Massey University. He has long standing interests in empirical generalisations, research methodology and the Dirichlet model. He is on the editorial boards of the Journal of Empirical Generalisations in Marketing Science and the Marketing Bulletin, and his academic work has appeared in a variety of international journals including the International Journal of Research in Marketing, the European Journal of Marketing and the Journal of the Market Research Society.

Gerald Goodhardt is Adjunct Professor at the University of South Australia and Visiting Professor at South Bank University and Kingston University. Previously he was the Sir John E Cohen Professor of Consumer Studies at City University London. He is a Fellow of the Royal Statistical Society and of the Market Research Society (awarded the gold medal "for an exceptional contribution to market research"). Gerald Goodhardt has published more than 50 articles in journals such Nature, the Journal of Marketing, and the Journal of Marketing Research.

Note: the first two authors have made an equal contribution to this work.

Correspondence Addresses

Dr Byron Sharp, University of South Australia, North Terrace, Adelaide, Australia. Telephone: +61 (8) 8302 0715, Facsimile: +61 (8) 8302 0442, Email: Byron.Sharp@MarketingScienceCentre. com, Dr Malcolm Wright, Department of Marketing, Massey University, Private Bag 11-222, Palmerston North, New Zealand. Telephone: +64 (6) 356 9099 x2868, Facsimile: +64 (6) 350 2260, Email: M.J.Wright@massey.ac.nz, Professor Gerald Goodhardt, University of South Australia, North Terrace, Adelaide, Australia. Telephone: +61 (8) 8302 0111, Facsimile: +61 (8) 8302 0442, Email: prof.goodhardt@ oneteldsl.net