Windows of Change in Mature Markets

Koen Pauwels

Tuck School of Business at Dartmouth

Dominique Hanssens

University of California, Los Angeles

Preferred track: Marketing Strategy and Management

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1 Corresponding author: Assistant Professor, Tuck School of Business at Dartmouth, Hanover, NH 03755, Phone: 1603 646 1097, E-fax: 1 502 396 5295, E-mail: koen.h.pauwels@dartmouth.edu. The authors thank Dennis Bender for providing the data used in the empirical analysis.
Abstract
Year after year, managers strive to improve their sales performance in mature markets. Marketing research should therefore provide a dynamic understanding of the conditions for performance growth and of the role marketing actions play in this process. This paper analyzes how strategic windows of performance change alternate with long periods of performance stability. The proposed framework combines consumer learning and punctuated equilibrium theories with the econometric concepts of evolution and long-term marketing effectiveness. Applied to a rich marketing dataset, we show and interpret transitions between stable and changing regimes and marketing’s power to induce performance growth.

Keywords: performance change, turnaround strategy, rolling windows, punctuated equilibrium

1. Introduction
Mature product categories are typically viewed as static-equilibrium markets with mean-reverting company performance (Ehrenberg 1988). This perspective permeates market response and competitive reaction modeling, performance forecasting and budget allocation optimization (Wind and Robertson 1983). By contrast, marketing managers are expected to continually grow their brands’ sales and profits, or at least to reverse any existing stationary or declining brand performance (Bass et al. 1984; Simon 1997). As a result, mature markets are subject to two opposing influences, mean reversion and change. On the one hand, management’s fundamental “quest for more” (Hunt 2000) drives marketing investments which, if effective, create positive performance evolution. On the other hand, demand saturation and competitive reaction pose limits to performance growth (Bass et al. 1984). As a result, we expect sales performance in mature categories to go through successive regimes or windows of stationarity and evolution.

The current state of marketing research typically classifies performance as either stationary or evolving over the full data period. However, such an approach may mask windows of structurally stable, improving and declining performance. The identification of transition points between stable/evolving performance regimes and the causes of these transitions remain areas for future research (Dekimpe and Hanssens 1999). Thus the first objective of this paper is to identify performance windows and the second objective is to relate these windows to marketing actions.

2. Framework and hypotheses
Sales performance regimes can readily be classified by their managerial desirability, based on two dimensions: the direction of change (i.e. growth is better than stagnation, which is better than decline), and the uncertainty around this change (i.e. lower uncertainty is better than high uncertainty for improving conditions, and vice versa). The estimation of deterministic and stochastic trends in sales time series allows us to diagnose these performance regimes. First, the deterministic trend reveals the direction of change. Second, the stochastic trend reveals the uncertainty about the future direction of performance. Absence of a stochastic trend implies that performance is stationary; i.e. all observed fluctuations are temporary deviations from a deterministic component, which may include mean, trend and seasonal cycles. This behavior implies that future performance is relatively predictable, as the expected forecasting error gently increases with the forecast horizon (Hamilton 1994). In contrast, the presence of a stochastic trend (unit root) implies that sales may move widely apart from any previously observed level, with a variance that increases in time. While this feature complicates forecasting, it also allows for truly long-term or trend-setting effects of marketing actions (Dekimpe and Hanssens 1999).
Table 1: Classification of performance regimes, ordered by managerial desirability

<table>
<thead>
<tr>
<th>Deterministic trend</th>
<th>Stochastic trend</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive</td>
<td>Stationary</td>
</tr>
<tr>
<td>Deterministic Growth (#1)</td>
<td>Deterministic Decline (#6)</td>
</tr>
<tr>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Static Equilibrium (#3)</td>
<td>Random Walk (#4)</td>
</tr>
<tr>
<td>Negative</td>
<td>Evolving</td>
</tr>
<tr>
<td>Deterministic Decline (#6)</td>
<td>Stochastic Decline (#5)</td>
</tr>
</tbody>
</table>

Table 1 combines the managerial desirability of a performance regime with observable conditions in the data. Deterministic growth (#1) and decline (#6) are, respectively, the best and worst-case scenarios. Performance evolution adds uncertainty and therefore attenuates the good news and the bad news. Finally, in the case of no deterministic trend, risk-averse managers typically prefer a static equilibrium above a random walk.

This classification offers limited managerial insight when applied to a full data period. First, deterministic trends over long periods are unrealistic as they imply pre-determined patterns that are independent of own and competitive marketing actions (Lambkin and Day 1989). Second, the stationary scenario is unacceptable for managers who are stuck in an unfavorable equilibrium. Their marketing actions aimed at performance improvement have the potential to induce evolution in performance (Salmon 1988). Likewise, evolving performance is unlikely to resist the gravitational forces of competitive reaction (Bass et al. 1984) and consumer habit formation (Ehrenberg 1988) for a long time. Therefore, we hypothesize:

H1: Performance series go through successive regimes of deterministic and stochastic trends.

In the strategic change literature, the most compelling paradigm for regime shifts is offered by the punctuated equilibrium paradigm (Mullins et al. 1995). This paradigm holds that most successful organizations evolve through long periods of relative stability, which is punctuated by occasional periods of upheaval. Punctuated-equilibrium theory argues that these revolutionary change or transition periods are typically short compared to the equilibrium periods. We argue that this principle also holds for market performance. First, buying behavior typically follows stationary patterns and is adequately captured by zero-order stochastic processes (Bass et al. 1984). In mature categories, a strong motivation for consumer learning is needed, such as dramatic price reductions or creative product extensions (Simon 1997). Second, companies rarely undertake strategic reorientations unless deteriorating performance makes the need for dramatic actions obvious (Schendel et al. 1976). Therefore, we hypothesize:

H2: Periods of evolving performance are shorter than periods of stationary performance.

H3: Periods of evolving performance start when performance is negatively trending.

Managers need to know which marketing actions are effective in inducing performance improvement. Recent evidence suggests that price cuts and product introductions (Simon, 1997) are the most likely to yield long-term performance effects. Renewed consumer learning in mature markets apparently necessitates changes in the value proposition. Without such changes, consumer habit formation prevails, resulting in stationary brand performance. Therefore:

H4: Price- and product-related marketing actions induce better performance regimes

3. The Performance Barometer

The distinction between the six performance regimes in Table 1 is captured by the augmented Dickey-Fuller test, including time trend and seasonal dummies (Ghysels et al. 1994):

\[
\Delta y_t = \gamma y_{t-1} + \delta t + \alpha^j + \sum \lambda_j SD_j + \sum \beta_i \Delta y_{t-i} + \epsilon_t. \tag{1}
\]
Least-squares estimation of (1) yields the t statistic on $\gamma = 0$ as the test for a stochastic trend. Likewise, the t-test on $\delta$ reveals the deterministic trend. In each case, the Schwartz Bayesian Criterion guides our choice for the number of lags p to include (Hamilton, 1994). We preserve degrees of freedom by including only seasonal dummies for weeks with exceptionally high and low demand (Franses 1998). We perform this unit-root test for the full data period and for rolling windows of 52 weekly observations. Banerjee et al. (1992) show that such rolling estimation does not affect the asymptotic distribution of the test statistics. They balance the need for sufficient observations with the desire to capture possible breaks by choosing one third of the data as the rolling window size. As one-third of our data (52 weeks) also captures a full seasonal cycle, we maintain this size while performing sensitivity analyses with windows of 40-60 weeks.

The double information in rolling window statistics on the deterministic and the stochastic trend provides a direct test for hypotheses 1-3, but is hard to relate to marketing actions and regimes. We propose the performance barometer as the multiplication of the t-statistics of the stochastic and the deterministic trend in (1). This construct is comparable across settings and preserves the relevant information from Table 1. The best-case scenario combines a significant positive trend ($t\text{-stat} > 1.96$) with the absence of a stochastic trend ($|t\text{-stat}| > 3.5$), and produces a performance barometer exceeding 7. The worst case-scenario combines a significant negative trend ($t\text{-stat} < -2$) with the absence of a stochastic trend. Therefore, performance barometer values under $-7$ reflect conditions of clearly deteriorating performance. As the performance barometer communicates to managers what they can expect under the status quo, it indicates when extraordinary action is needed. Likewise, such actions impact the long-term performance outlook if they succeed in increasing the barometer. Therefore, we test hypothesis 4 by regressing changes in the performance barometer on marketing actions.

4. Empirical analysis

4.1 Data
A rich marketing data set is available for frozen dinners, the largest category within the frozen food market with more than $5.3$ billion in annual supermarket sales. 156 weeks of ACNielsen Sales and Causal data are combined with advertising exposure (GRP) data. Six national brands compete for the lion share of the market: Budget Gourmet (10%), Healthy Choice (11%), Lean Cuisine (10%), Stouffer (15%), Swanson (11%) and Weight Watchers (8%). For the US, we obtain category and brand sales, price, display and feature activity, advertising and product introductions for the period February 1991 to January 1994.

4.2 Results of the rolling-windows analysis
For the full data period, we find that sales performance is stationary, except for Weight Watchers. However, rolling-window analysis shows that category demand displays long periods of deterministic growth and decline, which are interrupted by four brief random-walk periods that coincide with the sign changes in the deterministic trend. Second, Budget Gourmet and Healthy Choice display similar behavior, but stochastic growth and decline periods last longer. In contrast, Lean Cuisine shows very short evolution periods, which occur on a yearly basis whenever its performance gets into decline. Fourth, market leader Stouffer always experiences static equilibrium. Swanson displays similar behavior, but experiences evolution right after a sudden decline near the end of the data period. Finally, Weight Watchers follows similar yearly patterns as Lean Cuisine, with the exception of a long random-walk period in the second half of the data set. In summary, the rolling-window analyses provide support for hypotheses 1-3. First, windows of stationary and evolving performance alternate. The only exception is market leader
Stouffer, whose performance remains in static equilibrium. Second, evolution periods are typically short compared to stationarity periods. Third, deterministic decline periods are followed by evolution periods. In fact, deterministic-trend sign changes are typically preceded by, or occur concurrent with performance evolution. These results are robust to window sizes of 40-60 weeks.

Based on the above discussion, Figures 1-3 shows the brand performance barometers in pairs. Budget Gourmet and Healthy Choice have "evolving equilibrium" barometers that go through longer periods of evolution and prolonged swings in the deterministic trend. Lean Cuisine and Weight Watchers have "punctuated equilibrium" barometers characterized by long periods of stationarity and very short evolutionary periods, which typically occur when the barometer hits a low. Finally, market leaders Stouffer and Swanson have "continuous equilibrium" barometers characterized by stationarity conditions and small fluctuations around zero.

4.3 The impact of marketing actions on the performance barometer

Changes in the performance barometer are regressed on own and competitive marketing actions. First, the evolving equilibrium brands significantly benefit from product introductions and feature activity. Continuous equilibrium brands Stouffer and Swanson benefit from price and feature activity. Punctuated equilibrium brand Lean Cuisine' s performance benefits from product introductions, price cuts and advertising. Finally, Weight Watchers' management improves the performance barometer by price cuts and feature activity. Overall, changes in the performance barometer are mainly caused by price-related marketing actions, such as feature activity and price cuts. Moreover, new-product introductions significantly affect performance for half the brands, whereas display and advertising are important for a minority of the brands. Similarly, category performance changes are largely driven by price cuts. Hypotheses 4 is supported: price- and product related marketing actions induce better performance regimes.

5. Conclusions

Even in mature markets, static equilibrium is not the only business scenario. Moving-window unit-root tests show that windows of growth/decline and of evolution/stationarity alternate for category and brand performance. Similar to the punctuated-equilibrium paradigm in the strategic change literature, evolution periods in market performance are short compared to stationarity periods and mark the transition that turns around a decline phase. The performance barometer summarizes this information for different brands, which are classified as evolving equilibrium, punctuated equilibrium and continuous equilibrium. Price- and product-related marketing efforts are especially effective in improving the performance barometer, which implies that these actions should be the prime drivers of marketing strategy in mature markets.

References


Figure 1: Performance barometer for Budget Gourmet and Healthy Choice Sales (evolving equilibrium)

![Performance barometer for Budget Gourmet and Healthy Choice Sales](image1)

Figure 2: Performance barometer for Lean Cuisine and Weight Watchers Sales (punctuated equilibrium)

![Performance barometer for Lean Cuisine and Weight Watchers Sales](image2)

Figure 3: Performance barometer for Stouffer and Swanson sales (static equilibrium)

![Performance barometer for Stouffer and Swanson sales](image3)