

An Exploratory Analysis with Graphics

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Introduction

I attempted to see how much could be found about the France 1989 data, using graphics.

Data Transformation

The raw data (row totals, column totals, cells) are very asymmetric (skewed to the right). I used a logarithmic transformation of row totals, column totals, cell counts. All plots are log-log.

Row and column totals: Figure 1

- a. The points are reasonably close to the diagonal, which would indicate stable sales. Things change slowly in this market.
- b. Most makes (11 out of 15) markedly gain market share. This is the case of six small makes, four medium makes, one large one: Peugeot. There are no symmetric losses. There are small losses by one small make and one large one (Citroen), while a small make, and Renault, the leader, are roughly constant. Obviously, the non-listed makes must have markedly lost market share (or maybe disappeared).

Repeat purchases: Figure 2

- c. The rate of repeat purchasing is very high and seems rather deterministic: all points (except maybe the smallest make) are aligned very closely on a straight line. This indicates that all makes benefit in the same manner from loyalty purchases. No make has managed to create a "super-loyalty" from its faithfuls. A strategy aimed at increasing a make's loyalty over that of competitors would try to modify a very strong underlying structure. Minute exceptions may occur for three small brands.
- d. Drawing a line by eye indicates that the slope may be slightly larger than 1 (1.12 ?). This would indicate loyalty to be structurally higher for makes with a larger share. Based on the line, one gets a loyalty of about 55% for a large brand and about 40% for a small brand. The loyalty rate, in this market, is anyway very high. But note a double jeopardy for a declining brand X: from year to year there are fewer and fewer buyers coming to the market with brand X as the previous make, and, furthermore, the percentage, among those, of buyers loyal to X will also decline. The flow of loyal buyers has a double cause for decay. Conversely, a rising brand Y sees more and more buyers with Y as the previous make, and more of those will be loyal.

Switching from one make to another: Figures 3, 4

We just said that slightly more than half of the purchases in this market are repeat purchases. This leaves about half of the purchases for switches from one make to another.

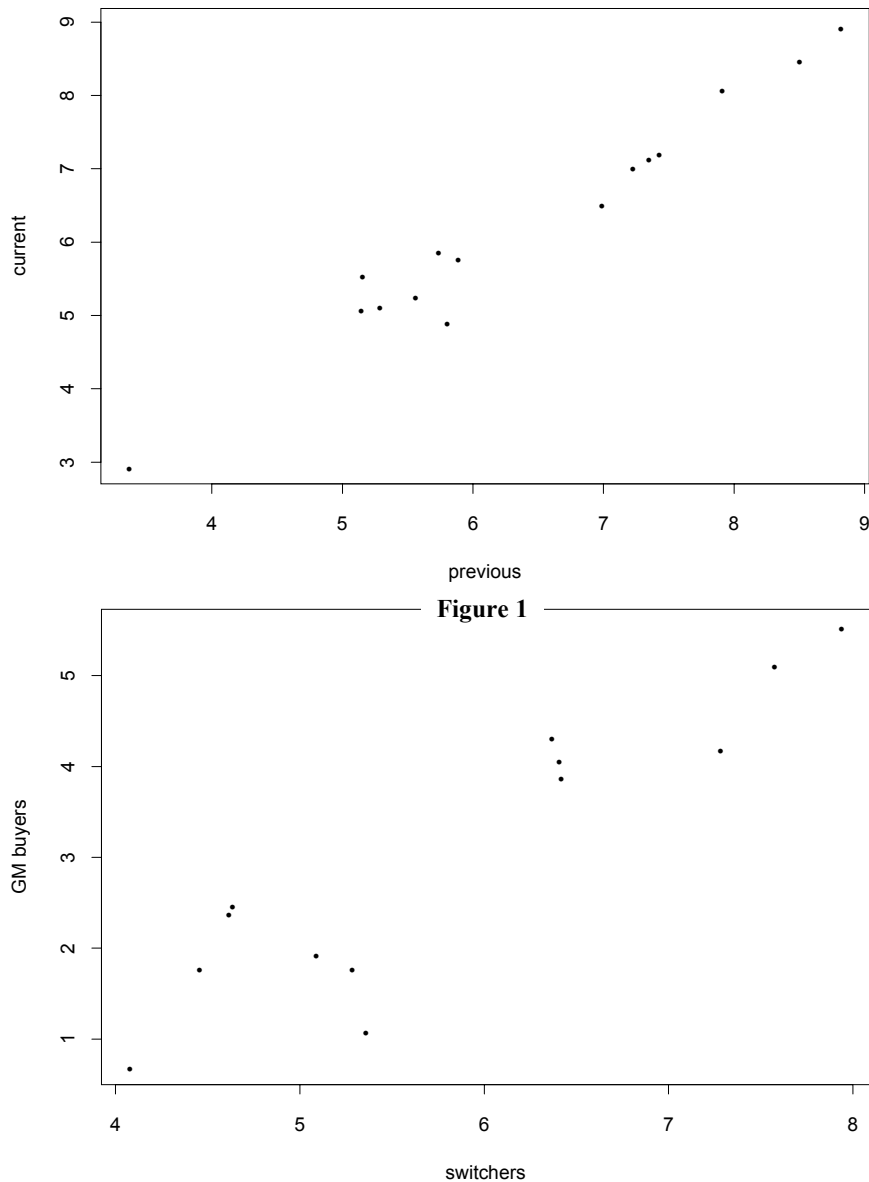
- e. A given make draws from each other make in direct relation to the other make's previous buyers (who don't repurchase it). Figure 3 plots, e.g., the data on GM drawing from every other make. A given make loses to each other make in direct relation to the other make's new buyers (who are not repeat buyers).
- f. The relationship seems to be indeed proportional, as the slope is close to one in log-logs. A

few exceptions occur for small makes, e.g. the points for Volvo are not well aligned and the slope is different from zero.

- g. This suggests a simple general model: the number of switchers from W to X is proportional to the number of people leaving W (excluding repeaters), and to the number of people coming to X (excluding repeaters). Switching is "proportional to share" or, more precisely, to share excluding loyal repeat buyers. This model's fit is reported on Figure 4. Due to logs, variance is bigger for smaller makes.
- h. Finally, two major exceptions are revealed by Figure 4.

The ten rightmost points are above the line drawn by eye. This mostly indicates switching stronger than predicted between the three French makes Renault, Peugeot, Citroen, with Citroen losing somewhat more to Renault and Peugeot; plus excessive losses from Renault to Fiat, Ford, GM, VW.

A close examination of other residuals indicates another clique of high reciprocal switching between BMW, Mercedes, Saab, Volvo and, to some extent, Alfa.



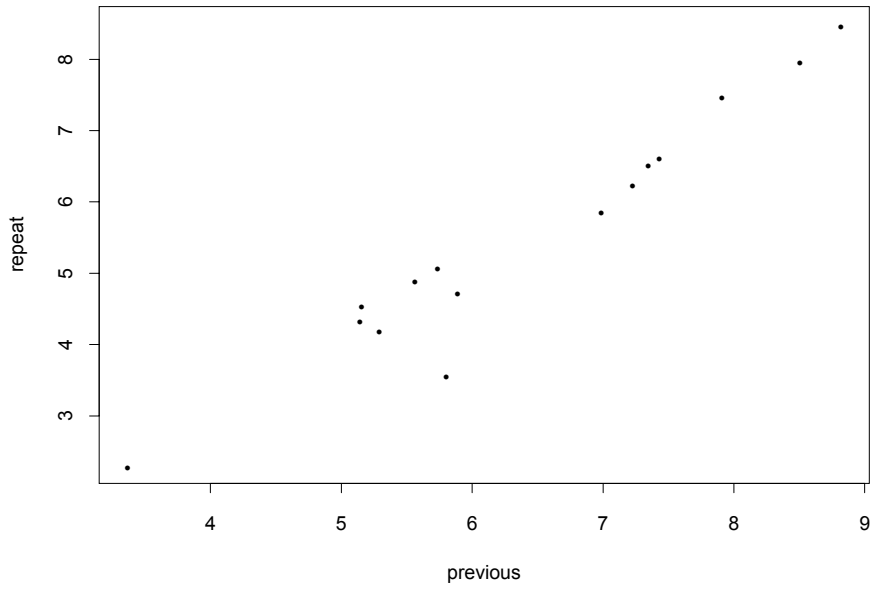


Figure 3

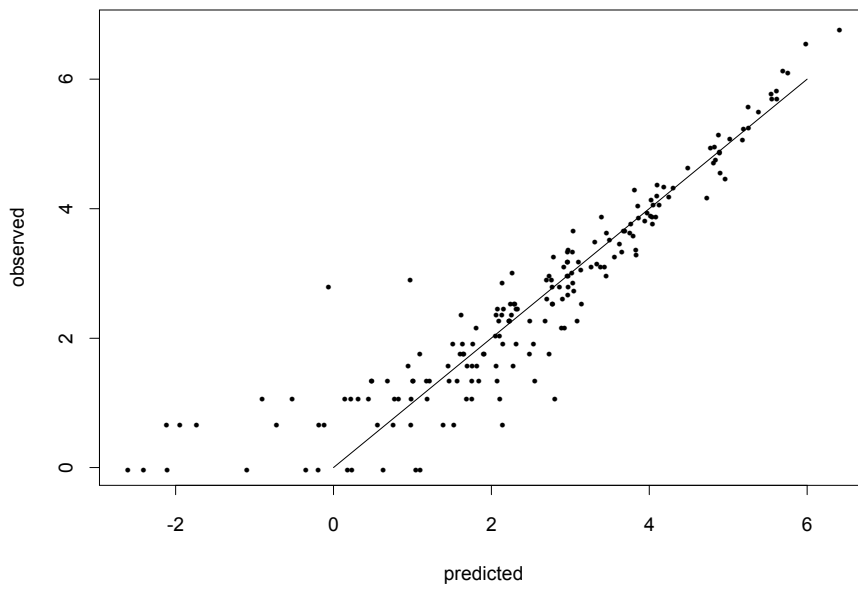


Figure 4