Hockey-stick Phenomenon: Supply Chain Challenge in Emerging Countries

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Abstract

The objective of this study is to investigate a very common phenomenon in an important emerging country, namely the spike in demand at the end of the sales period, known as the hockey stick phenomenon. The analysis will encompass the causes as well as the impacts of this phenomenon, in a way that allows alternative policies to be proposed that are able to provide a better financial result for the agents involved. Data collected from a Brazilian branch of a large multinational in the non-durable consumer goods industry and in semi-structured interviews conducted face-to-face with executives of 26 clients. After internal and external validation of the model, scenarios were generated to identify causes, impacts and alternative policies. The findings showed that the phenomenon negatively impacted the manufacturer's financial performance in the long term and indicated requisite changes able to eliminate it. The study showed that companies should not assume the hockey stick phenomenon to be an exogenous problem; it showed that there are alternative policies; and it provided ideas regarding ways to carry out the change process. This is the first empirical study on the hockey stick phenomenon, a problem that affects diverse companies in emerging countries.

Keywords: hockey stick phenomenon, emerging countries, channel stuffing, temporary price reductions, system dynamics

Introduction

Many global companies plan to expand their operations into emerging countries, attracted by a high potential for market growth and various opportunities for improving business performance (Enderwick, 2009). Meanwhile, these countries have peculiar characteristics that they need to consider if they wish to be successful in their ventures (Bhaumik, 2010). One of these characteristics is the one referred to as the hockey stick sales or hockey stick phenomenon, a sales spike at the end of the sales period.

There are references in the literature to companies in highly diverse industries and countries suffering from the effects of the hockey stick phenomenon (Lee et al., 1997; Oyer, 1998; Bradley and Arntzen, 1999; Chen, 2000; Laban Neto, 2004; Sterman, 2006; Lai et al., 2008; Singer et al., 2009; Sohoni et al., 2010). The Brazilian non-durable consumer goods industry was chosen for this study because it involves, in addition to a relevant segment of an important emerging country, a scenario where hockey stick sales occurs in an extreme and frequent manner (Yin, 2003).

Although this problem is not new, the topic has received little academic study. Theoretical models have been employed that are based on agency theory (Chen, 2000), non-cooperative game theory (Singer et al., 2009) and dynamic stochastic models (Sohoni et al., 2010). The present study makes the contribution of being, to our knowledge, the first empirical study on the topic. Our study expands the scope of previous work and considers in addition to competition between retailers, the actions and reactions of competing suppliers and consumers, and quantifies the impacts of the hockey stick phenomenon on the financial performance of the agents involved. In addition, intra-organizational aspects of the institutional environment of the different departments of the agent are also considered.

The objective of this study is to analyze the spike in demand at the end of the sales period. The study seeks to identify the causes as well as the impacts of the phenomenon, in such a way that it will be possible to propose alternative policies that can provide a better financial result for the agents involved. The system dynamics method (Forrester, 1961; Sterman, 2000) is used for the study.

Background

As a research topic, the sales spike at the end of the sales period is still under-investigated in the literature. Bradley and Arntzen (1999) examined hockey stick sales occurring in an electronics company. The authors developed an optimization algorithm in order to define, based on the demand peak at the end of the trimester, the optimum combination of productive capacity and stocks (Bradley and Arntzen, 1999). Chen (2000) applied agency theory to construct a

theoretical dynamic model in which a company that had no competition sold its products through a single sales force that did not provide discounts. In this model, the cause of the sales spike was the absence of a penalty for postponing sales effort, making the seller vary effort over time (Chen, 2000). The author proposed changes in the length of the period over which sales remuneration is calculated to ensure a lower demand (Chen, 2000).

Along similar lines, Sohoni et al. (2010) created a conceptual model to study the impact of incentives in the area of supplier sales on the sales spike. To do this, a dynamic stochastic model was utilized that consisted initially of one manufacturer and one dealer. The premise that it is not possible to offer discounts was maintained, but the model considered a cost for postponing sales (Sohoni et al., 2010) and the model was extended to the situation where there are two dealers. Despite sales spike effects on production and logistics not being explicitly treated in the mathematical model, these effects were considered in the discussion of the best alternative compensation model. According to the study the main causative factor of the sales spike was demand information asymmetry (Sohoni et al., 2010). In order to eliminate the sales spike, the sales quota was required to perfectly mimic market demand (Sohoni et al., 2010).

Utilizing non-cooperative agency theory, Singer et al. (2009) constructed a theoretical model composed of one supplier and one retailer. In contrast to the abovementioned studies (Chen, 2000; Sohoni et al., 2010), the authors created a model where the sales price was not constant. The primary cause indicated for the end of month sales spike was the fact that the retailer utilized knowledge of future demand and his stock to force the supplier to give a discount to reach the sales target (Singer et al., 2009). One effect of this buying policy is an increase in stock level indicating that, in situations where the cost of maintaining stock is very high, this policy may not benefit the retailer (Singer et al., 2009).

Hockey stick sales is associated with other effects in the accounting and economics literature, such as the end of fiscal year effect, channel stuffing, sales manipulation and forward selling (Cohen et al., 2008; Lai et al., 2008). The importance that executives place on reaching their financial targets causes them to incentivize customers to buy surpluses, generating the fiscal year end effect (Graham et al., 2005). With the implementation of the Sarbanes-Oxley Act in 2002, an incentive was created for executives who need to reach financial targets to adopt real earnings management instead of accrual earnings management (Cohen et al., 2008). Channel stuffing (Cohen et al., 2008) is one of the real earnings management methods. Sales and buying incentives are indicated as causes of channel stuffing (Wang and Zipkin, 2009). Sales manipulation occurs when the executives try to increase sales in order to improve the company's income statement by increasing reported margins through increased sales and decreased fixed costs (Roychowdhury, 2006). Temporary discounts and better credit conditions are utilized to enable forward

selling, which is a common practice among companies in the automobile sector in the final months of the fiscal year (Roychowdhury, 2006). There is some doubt whether this practice makes customers learn and watch for new discounts at the end of the following year (Roychowdhury, 2006). Forward selling is marked by an attempt by sales personnel to anticipate future requests to reach sales period quotas (Dodd and Favaro, 2006).

Description of the market and the company

The non-durable consumer goods retail segment in Brazil has a number of peculiarities when compared to developed countries (Reardon and Berdegué, 2002). In Brazil, by being an emerging country where expenditures on non-durable consumer goods represent a significant portion of the expenses for a large part of the population, one of the fundamental criteria for choosing the place of purchase is the price of the products (Oliveira et al., 2005). Retailers advertise products that are being promoted through common advertising media, which attracts consumers to their stores (Oliveira and Thebaud-Mony, 1998). For retailers that do not have a competitive cost structure, advertising products on sale helps attract consumers (Manning et al., 1998). The importance given to the sale price results in a stimulation of competition based on retail sales prices (Laban Neto, 2004). The competition causes retailers to pass the pressure onto their suppliers, since the relationship between industry and retailers in the Brazilian consumer goods sector is a contentious relationship marked by frequent negotiating, seeking to achieve a more favorable business situations (Laban Neto, 2004).

The company that was utilized as the object of this study is the Brazilian branch of a large multinational in the non-durable consumer goods industry, which will be denoted Consumption Ltd. The company had a diversified, high-quality product line bringing premium prices and sold throughout the country. The company was investing heavily in its brands, making most of their products the leading or second leading products in their segments. Sales were performed through two distribution channels: direct and indirect. A significant part of the logistics tasks were performed by a limited number of shippers and logistics operators. The level of service provided to customers was below that desired internally and the company was facing product expiration problems, internally as well as in its sales channels. The branch was under pressure from the main office to improve financial results in the country. For more than 20 years the company had been suffering from the hockey stick phenomenon. In 2007, 57% of its monthly sales volume on average was sold and invoiced in the last 5 days of the period. This spike occurred in all sales channels and regions of the country.

The executives in the logistics area believed that the spike was causing an increase in logistics and production costs, in addition to increased stocks and

effects on the level of service. However, there was no way to demonstrate or quantify these impacts. The strategy adopted by the company to deal with the sales spike was a combination of increasing stocks and increasing production capacity. When asked whether it would be possible to adopt some other policy to deal with the spike, firm executives asserted that it was not possible to adopt any other policy because the sales spike was an inherent characteristic of the non-durable consumer goods industry and exogenous to the company. It was based on this that it was decided that the study should not only be able to elucidate possible causes of the hockey stick phenomenon but also measure its impacts and propose solutions.

Methodology

Approach of the research study

The methodological steps followed in this study were adapted from the methods of Sterman (2000) and Richardson and Pugh (1981), and followed the good practices recommendations for the method (Martínez and Richardson, 2001). The first step was to identify and define the problem. The next phase was to qualitatively evaluate the model. To do this different data sources were utilized to generate dynamic hypotheses presented in the language of causal loop diagrams (Sterman, 2000) representing causality relationships between the different variables involved (Wolstenholme, 1999). The data collected served, jointly with the theoretical framework, as a basis for the next step, which was the computational model construction (Homer and Oliva, 2001). The simulation model was utilized to identify the causes and evaluated the results of various policies on the performance of the agents involved. These steps were iterative. It was necessary to return to previous steps various times.

Data collection

In accordance with the techniques of system dynamics (Morecroft, 1988; Forrester, 1994; Morecroft and Sterman, 1994; Risch et al., 1995; Towill, 1996) the simulation model was constructed from multiple data sources including numeric data, interviews, direct observations and company documents. Data were collected while working with the company over the course of an 18 month period.

The first data source utilized, the numeric information, was recorded together with company personnel in order to avoid errors related to interpretation or information accuracy. Among these data were the data utilized to determine the size of the impact of the hockey stick phenomenon on the different logistics elements. Data recording was not limited to information collected from the standpoint of a single agent. In order to understand the retailer's point of view, semi-structured interviews were conducted face-to-face with executives of 26 of the company's clients. The questionnaire used was

pretested and the data from these interviews were consolidated and tabulated. In addition to the quantitative data and written data obtained in the interviews with clients, various in-depth interviews and exchanges with executives in different areas of the company were carried out to obtain expert opinion represented by mental models (Senge, 1990; Ford and Sterman, 1998) of the different individuals involved in the problem. To ensure adherence to this final database, the meeting agenda always included a presentation of how previously supplied information had been translated into computational codes, while seeking to understand discrepancies between different data sources. The objective was to increase conformance of the model to the expert opinion of interviewees and to triangulate the data. For this process to be more effective, a company executive who had an interdepartmental perspective of the different aspects involved was trained in the basic concepts of system dynamics and the computer language employed. Various times it was necessary to alter the model to adapt it to the observations made by this executive.

In this study the concept of scientific development through refutation was adopted (Popper, 1975), while keeping in mind the critics made by Quine (Quine, 1961). In this way, the hypothesis testing stage was looked upon as a fundamental step for rejecting or accepting the proposed model. This step was confounded by the different initiatives adopted over the entire course of the study seeking to increase confidence in the model. These tests were divided into two large blocks: internal validation and external validation (Sterman, 2000). Among the various internal validation tests that may be adopted in the system dynamics method (Forrester and Senge, 1980; Barlas, 1996), the following tests were conducted: dimensional consistency, partial estimation of the model, extreme conditions tests and sensitivity analysis. In order to test the model's external or behavioral validity, three tests were performed: the comparison of the model results with the reference mode to verify that it was able to produce the same behavior pattern; the verification of the model results with the expert opinion of a senior company executive with broad knowledge of the problem and the company as a whole, but who did not participate in the model construction effort; comparison of the model with the actual results of companies that had already tried to solve the spike problem.

Parts of the internal validity tests were done in parallel with model construction. Several times it was necessary to reexamine the model and/or collect new data as a result of problems pointed out by the tests. The validation process was done continuously, where the confidence of persons regarding the model gradually increased (Barlas, 1996; Sterman, 2002). After a series of iterations of the different steps of the process, conducting internal and external validity tests as described above did not reject the model and it was possible to make it acceptable to the principal persons involved in the process, which qualified it for the next step of simulating the results.

Data analysis

In order to identify possible causes of the sales spike, a model in dynamic equilibrium was used as the starting point, where exogenous parameters were defined so that there would be no sales spike. This scenario simulated the situation of the company before it was impacted by external policies or conditions that brought about the sales spike. Starting from this model in equilibrium, relevant variables were individually and jointly (when applicable) altered to determine which ones were able to generate the hockey stick effect.

The impacts of the sales spike on the financial result were quantified by comparing the results from the model in equilibrium without the spike with the sales spike scenario. Different policies led to impacts on different components of the financial result of the agents involved at different times: some with an effect in a few weeks and others only in the midterm. In order to eliminate this effect, the procedure adopted was to use the present value of the company's future cash flows.

Results and Discussion

Structure of the model

Figure 1 shows the central structure of the simulation model that was developed. In addition to the manufacturer Consumption Ltd., it was opted to include within the model's boundaries, the activities of the consumer (Households), one manufacturing competitor and two retailers (denoted Main and Competitor retailer). Main retailer's stock increases directly with sales by the manufacturer Consumption to it (sell in) and falls with its sales to Consumers (sell out).

$$Main\ Retailer\ (t) = \int_{t_0}^{t} [sell\ in - sell\ out]ds + Main\ Retailer\ (t_{0)}$$

Households' stocks also can be fed by purchases made from the competing retailer (Competitor) and fall with the effective consumption of products. The sell in flow is influenced by the amount of the retailer's stock and by the flow of sales to consumers (sell out). In addition, it depends on the maximum amount of stock that the retailer is willing to maintain. The company's products were separated into promotional and non-promotional groups of products. The model was run over a 4-year time horizon.

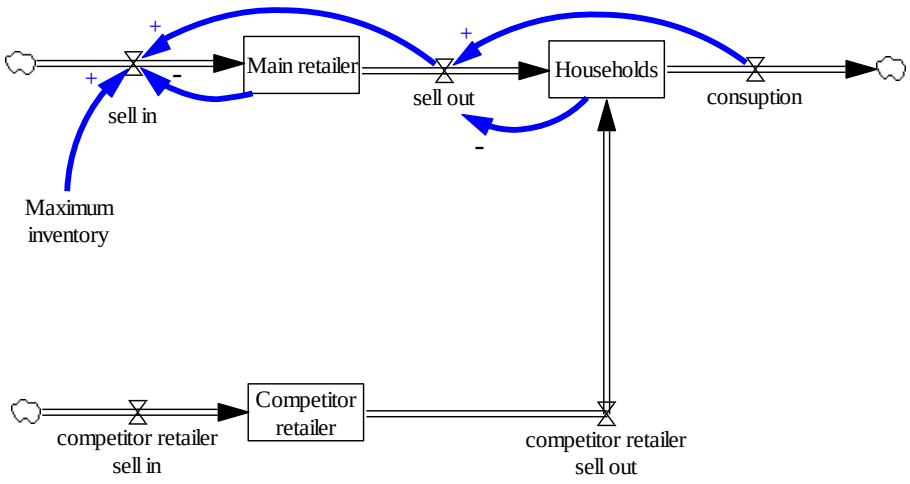

Figure 1—Representation of the central part of the computational model

Causes of the spike

According to the retailers interviewed: "The sales spike has nothing to do with consumer behavior. It only has to do with a practice driven by the need of salesmen to 'reach targets' imposed by the company." Another retailer stated: "At the beginning of the month the supplier charges full prices. At the end of the month he gives discounts to meet targets." Figure 2 shows the objective of the executives of Consumption Ltd. in setting temporary price reductions, better known as discounts. The difference between the desired and actual profits for the manufacturer Consumption Ltd. causes sellers to forward sell (Dodd and Favaro, 2006) offering discounts near the end of the month to reach targets. The Main retailer, whose main incentive was to reduce the purchasing price, accepted the proposal and bought at a volume much higher than needed. Like the sales volume, at the beginning there was rapid growth, receipts were increasing making the actual profit reach the target generating the feedback represented by the balancing feedback loop *Reach the target*. At the beginning of the next month there was no need for the retailer to replace stock, which again created a need to offer discounts. With the passage of time, Main retailer's buyer was learning that if he would wait until the end of the month to

make his purchases, he would be in a more favorable business situation. In the comments of one retailer interviewed:

> End of month syndrome: suppliers make inviting offers to reach targets. The system receives feedback from speculators (retailer buyers) who follow purchases watching out for offers.

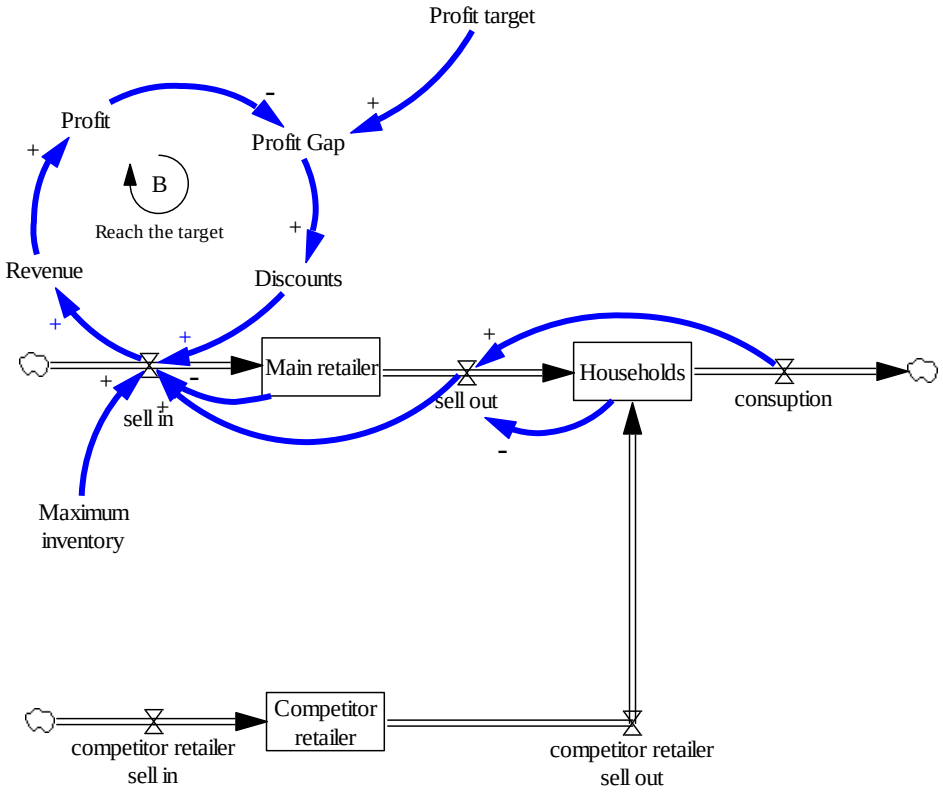

Figure 2—Reach the target balancing feedback loop

In the same way that the manufacturer Consumption Ltd. needed to reach its profit target, Consumption Ltd.'s seller also was charged to reach his sales target and offered discounts whenever the purchasing volume of retailers fell. The retailer's buyer initiated a sort of price war (Figure 3). This practice obliged Consumption Ltd. to further increase the discounts offered if it wanted to reach the sales volume needed, and thereby the sales spike was perpetuated. Figure 4 shows the percentage of sales in the last week of the month generated by the computer model when there was a disparity between the desired and actual profit in the tenth month.

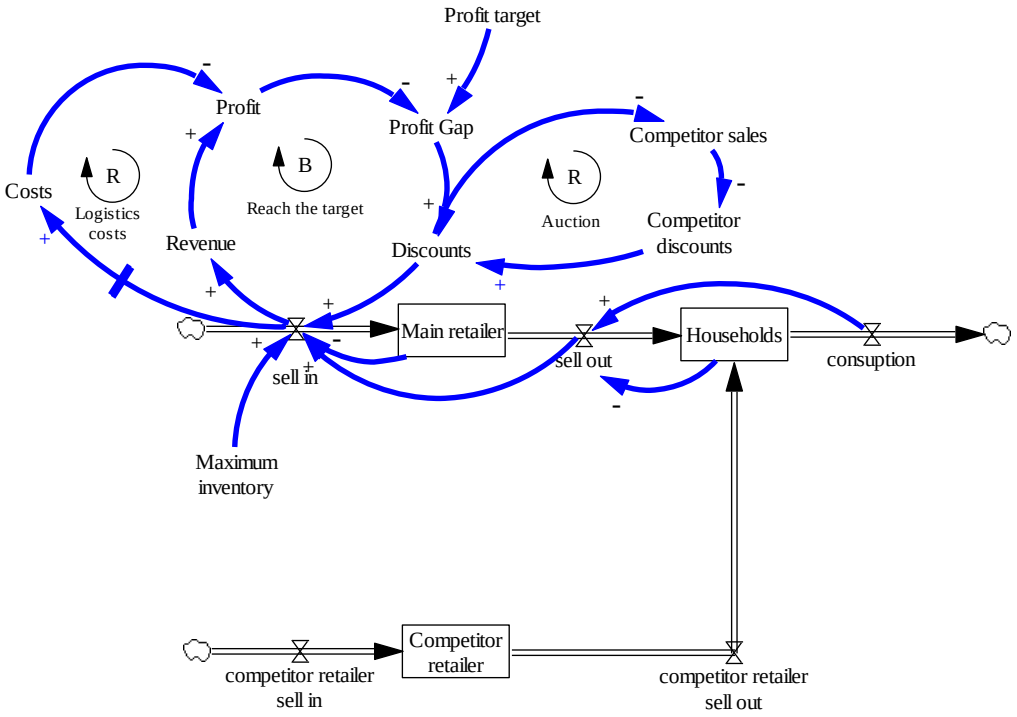

Figure 3—Side effects of discounts

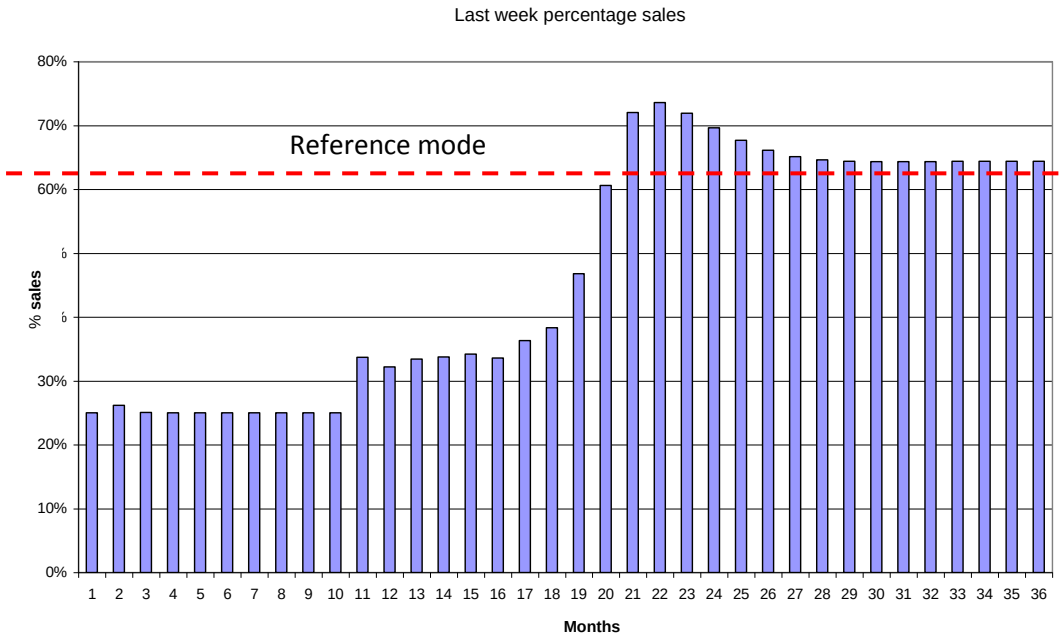

Figure 4—Percentage of sales for the manufacturer Consumption Ltd. in the last week

In addition to the process of defining the inadequate financial objective, the analysis of different scenarios of the computational model indicated other possible causes of the sales spike at the end of the month. Reduced marketing funds, increased sales by competitors or a drop in the market overall would cause a fall in consumer demand, which would reduce the retailer purchase volume, once again obliging the seller to offer a discount. Another possible cause is if the retailer, expecting there to be a price increase at the beginning of the following month, opts to forward buy (Desai et al., 2010) and increases his stocks. This policy of price increases was very common in Brazil in the inflationary period (before 1994). Another scenario that brought about the sales spike was when the retailer decided to reduce his purchase volume as a way to pressure the manufacturer. These actions were common since retailers were constantly monitoring the sales prices of competing retailers and when they found a product with very low prices they were confident that the manufacturer of the product was offering a more favorable business situation.

Impacts of the spike

The reduction in retailer purchases at the beginning of the month makes the variation between the end of the month and the rest of the month increase. These sales and delivery volume fluctuations have a number of impacts on the manufacturer's logistics area and, in particular on its shipping activities. Within the logistics area, the costs of shipping, stocking, warehousing, handling and extra hours were identified to be directly affected by hockey stick sales. This impact was not immediate (or at least it was not immediately recognized), with there being a delay (represented by the crossed lines in the middle of the arrow) between the sales spike increase and the increase in logistics costs. The positive feedback loop *Logistics Costs* in Figure 4 shows that the increase in logistics costs ended up being reflected in the company's actual profit obliging it to increase sales volume to cover the fall in profit margin. The increase in desired sales volume reinforced the need for more discounts at the end of the month.

For retail executives: "The ideal situation would be for there to be no spike whatsoever, because it leads to problems that even include ignoring the consumer." The sales volume at the end of the month, in addition to causing an increase in costs, causes an increase in the variability in demand, which ends up disrupting the availability of products on retailers' shelves. The shortage of products, in turn, makes sell out flow fall. The drop in sales to consumers obliges the retailer buyer to reduce the amount purchased. The reduction in the amount bought causes Consumption Ltd. once again to increase the amount of discounts.

Another effect of increased funds allocated to discounts is a reduction in funds for the marketing and product development departments. These funds were used to maintain and increase the attractiveness of Consumption Ltd.'s products to the Households. The same thing happened with funds intended for

efforts made at the sales point, which helped increase the retailer's sales to the Households. The reduction in these funds had the effect, in the mid and long term, of reinforcing the drop in sell out.

For the industry, the long-term result was a fall in profits for the company caused by the increased costs. The loss of profitability is explained by the fact that in the mid and long term, invoicing was not affected. Consequently, from the standpoint of the sales managers, the spike helped increase the sales volume, but did not contribute to invoicing. However, as can be seen in Figure 5, in the short term, the volume of sales as well as invoicing rose, showing adaptation to the policy of giving discounts. Clients initially were willing to increase their buying volume motivated by the discounts. When the level of stock reached a maximum plateau determined by the product expiration date, the retailers went on to buy maximally or equivalently to what was sold to the consumers (sell out).

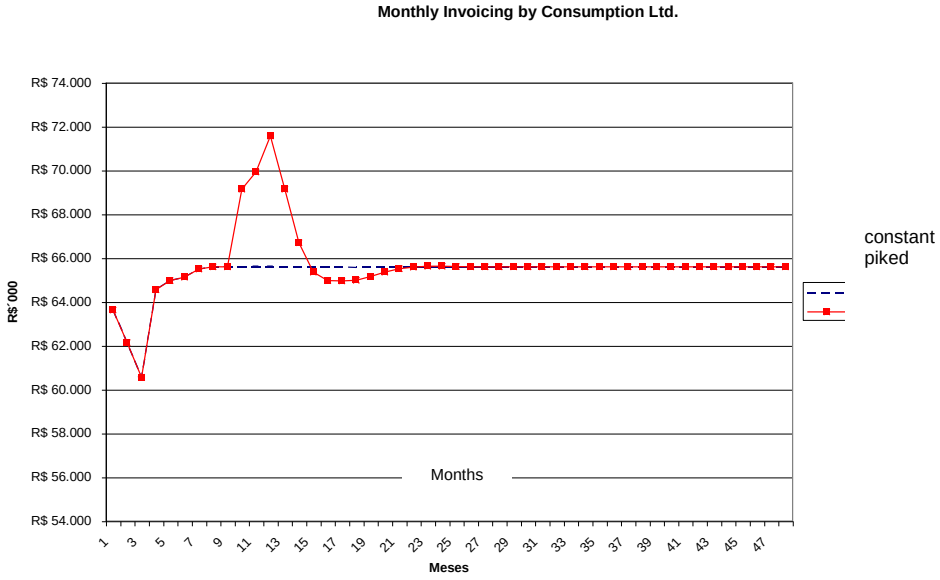

Figure 5—Invoicing by Consumption Ltd. over time

From a cost standpoint, the sales spike caused, initially, a fall in unit cost driven by the fixed unit cost reduction coming from the short-term increase in sales volume. However, in the mid and long term, the sales volume returned to a plateau closer to the initial level making the effect on fixed costs stop being so pronounced. The increase in logistics costs caused the unit cost to return to a value near the initial value. With total invoicing and unit cost similar to the initial levels, the increase in sales volume made the absolute total cost rise causing a drop in total profit.

What can be observed is that, in the short term, the sales spike brought positive effects to managers in the sales area, for those responsible for

manufacturing and for the total profit of the company. Even in the mid to long term, the spike did not harm the invoicing indicators and helped to increase sales volume. The only area of Consumption Ltd. affected was logistics, responsible for the logistics costs and the level of service.

Main retailer profit was not changed, but its invoicing and sales volume increased. In addition, the fall in the sales price of Consumption Ltd.'s products, a well-known leading brand, was able to help attract customers to its stores. From the cost viewpoint, it resulted in a significant increase in discounts obtained, making the purchasing cost of the products fall. But the drop in the value of purchases was cancelled out by the increased logistics costs. Other impacts were the fall in availability of products on store shelves and the increase in capital tied up in inventory.

Quoting a retailer:

> The purchasing spike causes many problems, for example, warehouse resources are not utilized well. It confounds merchandise receiving and warehousing, logistics, retail store displays, cash flow. The stock volume may be reduced, putting it out of phase with sales.

Alternative policies

A number of policies that had been pointed out by company executives over the study period were initiated and their results measured. In order that policies possibly able to eliminate the sales accumulation at the end of the month might be defined, four sources were utilized: ideas suggested by Consumption Ltd. executives, advice from other companies that had tried to do it, models proposed by the theoretical framework, and scenarios that arose while the study was being carried out.

In all, nine different policies were found that were able to eliminate invoicing spikes at the end of the month (see Table 1). In addition to these policies, the results from the policy that was currently being employed by Consumption Ltd., which was to increase logistics flexibility, were also analyzed. To test for the results of policies, a scenario with a sales spike at the end of the month was used as a starting point. At the beginning of the tenth month (week 37) changes were made in selected parameters, so that the scenario created reflected the policy to be evaluated.

The different policies were evaluated in accordance with the objectives of the two principal agents involved in the problem: the manufacturer Consumption Ltd. and the Main retailer. The profits of companies in the different scenarios were converted into current values for comparative purposes. The recommendation of the policy adopted did not just consider the financial result of the agents involved, but also performance relative to other

objectives such as, for example, market share and sales volume. Concern with a range of objectives helped to reduce intra-organizational and external resistance to the new policy.

The evaluation of alternative policies brought up some important observations. The first of these is that the current policy of trying to increase logistics flexibility had a low impact on the financial results of the agents. This policy seeks to minimize the symptoms of the spike, in this case the increased logistics costs, rather than attacking its causes.

The policy recommended, for eliminating the effects of hockey stick sales, was to implement a sales and operations planning process (Grimson and

Policy	Description
Eliminate discounts	Eliminate discounts for retailers and redirect funds to marketing efforts
Constant maximum discount	Always offer retailers the greatest discount possible
Logistic discount	Give greater discounts at the beginning of the month
Negotiate at the end of the month and make scheduled deliveries the following month	Increase the time period for delivering merchandise
Different closing dates for customers/regions	Use different business period calendars for each client/region. For some clients the end of the period will occur in the middle of the month.
Change the way of remunerating salesmen	Stop remunerating salesmen for reaching sales targets
Limit maximum stock	Control retail stock and do not sell unless a maximum limit has been reached
Make feasible financial plans	Set targets feasible with the market and planned sales actions
Increase logistics flexibility	Eliminate or reduce the impact of the spike on logistics by increasing production capacity and inventories
Develop feasible financial plans and shift funds to retail store merchandising	Set targets that are feasible with the market and the actions of planned sales and allocate a greater part of funds to activities directed toward sell-out

Table 1—Policies able to eliminate the hockey stick phenomenon

Pyke, 2007) that would permit the manufacturer to set sales targets that are better aligned with the market. In addition, the manufacture would have to stop conceding additional discounts, and funds not utilized in sales negotiations would have to be directed to in-store practices that would increase retail sales to the final consumer (sell out). It is emphasized that for it to be possible to

implement this policy it was necessary to empower the sales area to carry out in-store practices with the capacity to increase sales volume. Another challenge, perhaps more difficult to overcome, was that even though the policy had a positive impact on Consumption Ltd.'s profit in the mid to long term, in the short term there was a marked fall in the financial result (see Figure 6). The fall occurred, and then with the implementation of the new policy, the retailer's buyer lowered his stock level and consequently continued to buy quite reduced amounts of products for several months.

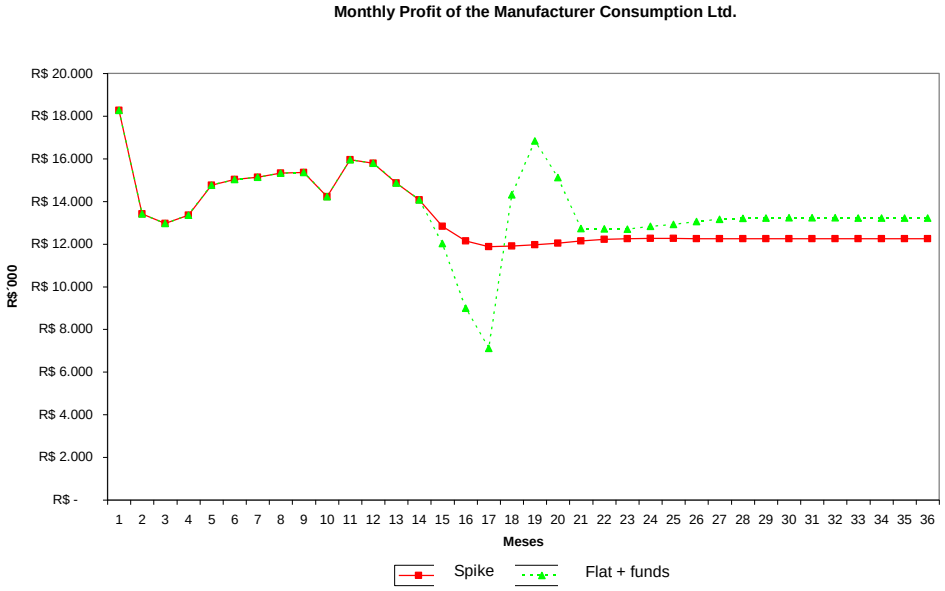

Figure 6 —Financial result of the proposed policy over time

Conclusions

There was a general view among the executives, not just in the company studied but in the Brazilian market, that the sales spike is a problem caused by exogenous variables and that it, therefore, could not be eliminated. This study showed that a number of endogenous variables can generate the sales spike and that it is possible to eliminate it.

The study quantified the impacts of the sales spike on various lines of the company's income statement. This can have two utilities. For companies that are already affected by hockey stick sales, quantification of the impact can be helpful in convincing upper management of the need to implement alternative policies. For companies that are not affected by a sales spike, this study could serve as an alert, primarily in times of depressed sales as is currently occurring in our developed countries.

Unfortunately, the executives of the company studied did not appear to be willing to attack the causes of the spike that were shown by the study. After an upper-level management meeting, where the negative impact of the spike on the company's financial result was presented and it was shown that the primary causes of the spike were endogenous policies within the company, the president of Consumption Ltd. passed the leadership of the initiative to the sales director. The sales director opted to implement the policy of logistic discounts (see Table 1) for three large clients. After a few months of success, in which the phasing of sales for these clients became linear, the sales director opted to not continue the initiative. Despite the protest of the logistics director, the company's president did not want to have a falling out with the sales director because it was to be his last year in the country and he wanted to ensure the financial result for the year.

Two years after conducting the study at Consumption Ltd., a pharmaceutical laboratory implemented the policy proposed by this study of creating feasible financial plans and shifting funds to in-store merchandising with great success. The executives of this laboratory related that the sales behavior and the company's profits continued the pattern simulated in this study and that after an initial fall in sales the company's profit increased.

As can be seen, the sales spike cannot be eliminated just with operational changes in one specific operation. Quite to the contrary, it requires tactical and even strategic changes, in various areas of the firm. It is a risky process whose results only appear in the long term. All this helps explain why so very few companies are inclined to confront this challenge. But for those that are willing, some prescriptions may help.

Since the best alternatives require large changes in various areas of the company, it is necessary for there to be personal commitment by the executives of these areas. The area that needs change the most is the sales area. The big problem is that this area will be the least benefited by the change. This challenge of overcoming executive resistance in this area is one of the main difficulties to be confronted. In order to overcome this resistance, it is necessary to make a number of changes. The first of these is a change in the incentives program (bonuses), so that the executives in the sales area will benefit from investing the effort. The second change is to provide the conditions and support required for them to make the changes. In many cases, the implementation of new sales policies will require a major restructuring of processes, and primarily, of capabilities in the sales area, which will require time and resources in order to train the sales force to carry out, for example, better point-of-sales practices.

The change in incentives for sales executives as well as in the allocation of resources needed to make the change, are in the hands of the firm's president. In addition, he or she is the one ultimately responsible for the firm's financial result. Therefore, the primary person to be engaged in the project is

the president. Normally, these executives do not originate in the logistics division area, and often they do not have a profound knowledge regarding that area. Hence, they cannot be sold the idea by using the area's operational, or "logistics," terminology. It is necessary to evaluate the results of the change from the perspectives of the financial and strategic results of the firm. Consequently, the first objective of the change initiative should be to assess the size of the impact on the firm's results. Should the predicted impacts be significant, there will be greater willingness by upper management to make the change.

Companies whose share of logistics costs is greater will probably have greater gains from eliminating the invoicing spike. Among the outstanding logistics costs are shipping and warehousing. The gains in shipping will be greater in companies that have their own fleet, that have a leasing system, that have shippers with a high level of managerial training or that use suppliers that have different prices over the course of the month. Traditional shippers often charge a constant amount for freight throughout the month. Few shippers have advanced pricing systems such as, for example, activity-based pricing. Since one of the main changes resulting from eliminating the sales spike will be an improvement in vehicle productivity (number of trips made during the month), the shippers will need to be in a position to take advantage of it. The changes needed may involve buying the shipper to capture the gains.

From the standpoint of inventories, the companies that will benefit most will be those that have products with short expiration dates and/or shelf lives, with products with high added value, and high stock maintenance costs (either by having high opportunity costs or by its products having high warehousing costs due to being voluminous and/or requiring special storage). Companies will also be benefitted more if they have policies of buying back products through distribution channels.

Another incentive is for companies whose rate of product replacement due to product shortages on store shelves is high as with essential products such as foods, for example. In this case, the increase in sales arising from the improved level of service could be greater.

In addition to assessing the size of benefits, it is of interest to try to find internal allies who can help out during the process of selling the president. One of the allies can be the executive responsible for auditing and risk management. Pressure from audit mechanisms, such as those created after the passage of the Sarbanes-Oxley Act, can help gain the commitment needed in the firm, since many companies were obliged to report the level of stock in channels and invoice only upon receipt of merchandise by customers (as opposed to when the merchandise is still at company facilities). Another ally can be the sales division, which may be interested in decreasing dependency on the sales policy and, possibly, in increased funding for marketing innovation activities.

Helping the president to convince the stakeholders is also valuable. It is possible the shareholder attorney or, in the case of a multinational, the regional or global courts need to be involved. To achieve this, it is necessary to support the president in the undertaking.

Examining the best time to implement the change can also be helpful. This study showed that in order to implement a policy for eliminating the hockey stick phenomenon it is necessary to sacrifice the short-term financial result due to retailers lowering their stock levels. This can serve to alert executives of the need to develop a plan for gradual transition, where the policy change does apply to all clients at the same time. In addition, it raises a flag regarding the importance of defining the best time to implement the change. The change efforts should begin to be made in a period when the pressure to reach financial objectives is low. Normally, these are periods of growth, when the actual results will exceed the targets. At that time, the firm can afford the luxury of losing sales volume in the short term. Another time is during a crisis period, when there is change in upper management over the year. Often new executives, because they are not held accountable for the short-term result, can be more willing to make major changes to "put the house in order." Another opportunity is in a period of acute crisis, when the firm is forced to change to be able to continue existing. Another time can be right after launching a marketing campaign with greater than expected success, when the operations area is not in a position to supply the demand. In this case, there will be a product shortage.

In addition to choosing the best time to make the change, it is essential to ensure that the firm is prepared for this new way of operating. To do so, resources and time need to be allocated to make the changes. The sales area will be affected the most. It will have to rethink various internal procedures, for example, sales force incentives, the distribution channel strategy used, and its organizational structure and control systems. In addition, the sales force will need to be trained to work with new sales tools such as in-store merchandising, for example.

The logistics area also will have to prepare to capture gains arising from the change. Since part of the logistics operations of many business are in the hands of subcontractors, it will be necessary for contracts to be reviewed so that the gains will not end up going to the subcontractors. Even better would be to select contractors that are better prepared to benefit and develop contracts with clauses that permit capturing the gain. For example, in the case of a logistics operator, instead of paying for warehousing at a fixed rate for space rental, it could be paid by pallet position occupied per day. In this way, if the average stock should drop, the company keeps the gains.

The choice of initial partners for implementing the policy chosen also can be made by considering retailers that are better prepared for change and that will have greater gains. The preparation depends, primarily, on the

retailer's internal integration. Retailers whose purchasing department has solely functional objectives (obtain more discounts and funds) will offer greater resistance when compared to retailers where the purchasing department is responsible for the total profit. Retailers with a more centralized power structure and whose upper management has better business acumen also will be less resistant, since they will be concerned more with the total profit. Retailers with cash problems also can be attracted, because one of the big gains will be stock reduction. Retailers with more advanced cost control systems will be able to more easily quantify the results of the change. Another group that may be more inclined to change is retailers who place greater value on product availability in the store. It is valuable also to select the geographic region where these clients are and to map the operations of competitors. Companies that are in regions with less fierce competition should be prioritized. It is necessary to decide very carefully whether implementation will occur for all clients in an area or not and if not, to think about other ways to mitigate reactions.

Selling the idea to preselected customers should also be done very carefully. A fundamental point, here again, is to estimate the gains and show that the company is taking the initiative seriously (bringing in upper-level executives from various areas to sell the idea). Selling the idea also can be done to the retailers' upper management because, otherwise, lack of functional integration may affect their willingness to accept the idea. Common goals should be designed and the help of the industry should be offered to the client in adapting to the new way of operating. The better the idea is sold, the less will be the chances of unwanted reactions. Simulation models can be used to help in this process.

After initial implementation, it is necessary to calmly analyze the results obtained and learn from them to make adjustments and improvements in the program before expanding it. The results obtained with the initial implementation can be used to help convince other retailers to adopt the initiative. Sequencing and the phasing of the expansion also need to be studied so that they will not have a large impact on the financial result. Many clients will be opposed to the change and will stop buying for a few months. Planning the time of expansion to different clients/regions can allow this negative impact to be diluted across months. After full implementation, control mechanisms need to be implemented so that the company will not yield to the temptation of returning to previous practices.

This study provides a number of options to executives who wish to confront the hockey stick phenomenon. When we consider that this is a widespread problem not just in Brazil, but in other Latin American countries as well, its solution would bring significant gains for companies in the region, increasing their competitiveness and reducing the prices of their products.

The results of this study do not refutate the conclusions made by Gonçalves (2008) in a problem similar to that in this study, in which salesmen of

an agribusiness company forced seeds onto farmers in the final sales period. Gonçalves (2008) shows that one of the main causes for the demand peak were the unrealistic sales target. Anderson et al. (2000) concludes that one of the main leverage points to reduce the bullwhip-effect in capital supply chains is to implement smoother forecasting policies. A reduction in weekly sales variability would contribute to increase the accuracy of the forecasting models suggested by Anderson et al. (2000). Our conclusions agree with Oliva and Gonçalves (2007) findings that decision-makers tend to make decisions that locally optimize the results without considering the impacts in other agents.

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