

UNIVERSITY OF BRASÍLIA
COLLEGE OF ECONOMICS, BUSINESS MANAGEMENT, AND ACCOUNTING
(FACE)
GRADUATE PROGRAM IN BUSINESS MANAGEMENT

MARCOS INÁCIO SEVERO DE ALMEIDA

**MARKETING IMPACT ON B2B SALES AND MARKET SHARE: A DYNAMIC
APPROACH TO GASOLINE RETAILING IN BRAZIL**

Brasília - DF

2016

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Thesis submitted to the Graduate Program in Business Management at University of Brasília as partial fulfillment of the requirements for the degree of PhD in Business Management.

ADVISOR: RAFAEL BARREIROS PORTO

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Brasília/DF, March 18th, 2016.

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APPROACH TO GASOLINE RETAILING IN BRAZIL**

Tese submetida ao Programa de Pós-Graduação em Administração da Universidade de Brasília como requisito parcial à obtenção do título de Doutor em Administração.

Brasília/DF, 18 de Março de 2016.

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The resulting work after four long years of effort is dedicated to the ones who were responsible for shaping my character over the years, João Inácio de Almeida and Margarete Severo de Almeida. It is also dedicated to my beloved grandmother, Olímpia de Castilho Severo, who was an encourager during all my life. There is another person who deserves a great part of the credits. Rosiane Mendes Felipe de Almeida always understood the extent of my effort and the importance of this thesis for my career. She always stood up for me, supporting my beliefs, even without being from the academic field. I also thank Magali de Castilho Severo. Lastly, I must register some final words to my daughter Letícia: it is most likely that you still haven't known me in person, since you have just been born, but your father wants to acknowledge that you gave me the strength to keep moving while I was alone in New Zealand. Your birth symbolizes the end of an era and the beginning of a new one, much, much, better. I love you all...

ACKNOWLEDGMENTS

The conclusion of this work was only possible because there were some people who believed in the result even before I could imagine the theoretical and empirical approach proposed in this space. Firstly, I must thank my advisor and now my newest friend Rafael Barreiros Porto. From the beginning he took the role of a real advisor, indicating paths and alternatives, demonstrating unconditional support in the Doctoral “Sandwich” program. He was always willing to solve the necessary problems of this thesis, during our enduring conversations at Federal University of Goiás or University of Brasília.

I must thank the following Professors: Tomás de Aquino Guimarães, Ivan Ricardo Gartner and Herbert Kimura. The first for being coherent and patient in solving all sort of issues regarding the Interinstitutional Doctoral Program (Dinter). He could project, before anyone, the strategic function of the Dinter to the Business field in Goiás, Brazil. Professor Ivan and Herbert were passionate in teaching Statistics and tolerant enough to answer all sort of questions. I also thank Selma Monteiro Coelho, from PPGA, for the support regarding administrative and operational issues. In the last year of the course, Professor Ricardo Corrêa Gomes was essential to guarantee that my thesis could be written in English. I know professor Ricardo since I was a Masters student in Viçosa, Minas Gerais, and I am aware of how fantastic he is.

Some of my colleagues were important in my development as a researcher. Alethéia, Daiana and Michele: Thanks for the discussions and laughs, specially in the first two years. We had our anguish moments, but also lots of fun and entertainment during the classes. Two other colleagues from Federal University of Goiás were important: Thanks Paulo Roberto Scalco and Sandro Eduardo Monsueto for the support during your classes in the Economics course. Your dedication to Econometrics was responsible to enlighten my path and constantly struggle to the application to Marketing problems. Bear in mind that I will carry this competence in my future research projects.

I should also express my acknowledgment to my friend and coauthor Ricardo Limongi França Coelho. We had various prolific discussions in the ADMKT research group which originated valuable insights to this thesis. The resulting work symbolizes the beginning of a new era for our group, from where we are going to form new marketing researchers in Goiás. Some students were also responsible for giving us the necessary impulse to scientific endeavor. Marina Nery was one of them and deserves a distinct mention for negotiating the data set used in this thesis.

During the last year, Professor Harald van Heerde collaboration was paramount. Even without knowing me in person beforehand he accepted me in New Zealand for the Doctoral “Sandwich” program. Opportunities like this transform and develop scientific research because assure international integration for researchers based in places where Marketing is still in a developmental stage. I cannot express in words the valuable contributions during the five months of my stay, but I am sure that I will carry and disseminate this experience amongst my students during all my professional life.

Finally, I must express my gratitude and recognize the importance of two individuals who I consider the most: to my father and mother, João Inácio de Almeida and Margarete Severo de Almeida. They have been supporting my dreams since 1981. I must also recognize the silent contribution of Rosiane Mendes Felipe de Almeida, my wife. At Saturday mornings, during the night or holidays when this thesis was written, she patiently waited and turned everything more easily. In the last year she was even more brave during the Doctoral “Sandwich” program and I am sure that our daughter Letícia gave her the necessary strength.

The development of this thesis was only possible because The Brazilian Federal Agency for Support and Evaluation of Graduate Education (Capes) financially supported a part of my studies in Brazil and the whole period of my stay in New Zealand.

Thank you very much!

AGRADECIMENTOS

A finalização desse trabalho só foi possível porque alguns indivíduos acreditaram na trajetória e no seu resultado antes mesmo que eu conseguisse imaginar a problematização teórico-empírica proposta neste espaço. Em primeiro lugar, agradeço ao meu orientador, colega de profissão e agora amigo, Rafael Barreiros Porto, que desde o início assumiu o papel de professor/orientador, solucionou minhas dúvidas e indicou caminhos e alternativas; demonstrou apoio incondicional na realização do Doutorado Sanduíche, “comprou” as brigas necessárias e foi sempre paciente e solícito, tanto nas extensas ligações telefônicas quanto nas conversas nos corredores da Universidade Federal de Goiás e da Universidade de Brasília, locais onde essa tese foi concebida.

Agradeço aos professores Tomás de Aquino Guimarães, Ivan Ricardo Gartner e Herbert Kimura. Ao primeiro pela coerência, paciência e ativez na condução dos mais variados assuntos do programa de Doutorado Interinstitucional e por visualizar, antes de todos, a função estratégica do Dinter para a área de Administração em Goiás; aos dois últimos pela paixão e dedicação no ensino da Estatística. Foram muitas as minhas perguntas, sempre respondidas pacientemente. De forma semelhante, agradeço a presteza da funcionária Selma Monteiro Coelho (PPGA) na resolução de problemas de ordem administrativa. No último ano do Doutorado o suporte do professor Ricardo Corrêa Gomes foi fundamental para que essa tese fosse redigida em inglês. Agradeço enormemente a ajuda do professor Ricardo, uma pessoa fantástica que eu conheço desde meus anos de estudante de mestrado em Viçosa, Minas Gerais.

Alguns de meus colegas de Doutorado e de profissão foram importantes para o meu desenvolvimento no curso. Alethéia, Daiana e Michele, muito obrigado pelas discussões frutíferas, risos e conversas, especialmente nos dois primeiros anos. Tivemos muitos momentos de angústia, mas outros tantos de descontração durante as aulas presenciais. Dois outros colegas da Universidade Federal de Goiás foram especialmente importantes: obrigado Paulo Roberto Scalco e Sandro Eduardo Monsueto por me receberem como aluno em suas turmas de graduação. A dedicação dos senhores pela Econometria foi responsável por iluminar o caminho de aplicação desse método aos problemas mercadológicos e será o fio condutor das pesquisas orientadas por mim no futuro, podem ter certeza disso.

Agradeço também ao meu amigo e parceiro de pesquisa Ricardo Limongi França Coelho. Foram várias as discussões no âmbito do grupo de pesquisa ADMKT que deram origem a alguns *insights* valiosos para a Tese. O resultado desse trabalho simboliza o início de uma etapa produtiva de pesquisas que serão conduzidas no âmbito do nosso grupo visando o

desenvolvimento e aperfeiçoamento de pesquisadores na área de *marketing* no Brasil. Os alunos participantes também foram responsáveis por alimentar nosso impulso pela pesquisa científica. Uma aluna em especial, Marina Nery, merece uma menção distinta por ter negociado a cessão dos dados que subsidiaram a modelagem empírica tratada nessa Tese.

No último ano do curso, foi preponderante a contribuição do estimado professor e pesquisador de *marketing* Harald van Heerde. Mesmo sem me conhecer pessoalmente ele aceitou receber um inexperiente e iniciante pesquisador em solo neozelandês. São oportunidades como essas que transformam e desenvolvem a área de pesquisa por meio da globalização e inserção internacional de pesquisadores de outros países. Foram valiosos os ensinamentos nesses (curtos) cinco meses, mas eu tenho certeza que vou carregar e disseminar essa experiência entre meus alunos pelo resto de minha vida.

Finalmente, devo reconhecer a contribuição e manifestar meu agradecimento singelo às pessoas que são o supracumulo da minha vida: aos meus pais, João Inácio de Almeida e Margarete Severo de Almeida, por contribuírem, direta ou indiretamente, desde 1981, para a consumação dos meus sonhos. Esse é mais um realizado. Eu também devo reconhecer a colaboração silenciosa de Rosiane Mendes Felipe de Almeida, minha esposa. Nos sábados pela manhã, nas madrugadas mais difíceis e nos feriados adentro, enquanto essa Tese foi produzida, ela me esperou pacientemente e facilitou o processo de desenvolvimento. No último ano, ela foi ainda mais guerreira ao cuidar da nossa casa no Brasil enquanto eu realizava o Doutorado Sanduíche. Tenho certeza que nossa filha Letícia lhe deu a força necessária.

A produção dessa tese só foi possível graças ao apoio institucional dado pela Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES), que garantiu financeiramente parte da realização do Doutorado em Goiânia e minha estadia na Nova Zelândia por cinco meses.

Muito obrigado!

EPIGRAPH

We should not indulge in high hopes of producing rapidly results of immediate use to economic policy or business practice. Our aims are first and last scientific. We do not stress the numerical aspect just because we think that it leads right up to the core of the burning questions of the day, but rather because we expect, from constant endeavor to cope with the difficulties of numerical work, a wholesome discipline, the suggestion of new points of view, and helps in building up the economic theory of the future. But we believe, of course, that indirectly the quantitative approach will be of great practical consequence. The only way to a position in which our science might give positive advice on a large scale to politicians and business men, leads through quantitative work. For as long as we are unable to put our arguments into figures, the voice of our science, although occasionally it may help to dispel gross errors, will never be heard by practical men. They are, by instinct, econometricians all of them, in their distrust of anything not amenable to exact proof (Schumpeter, 1933, pp. 12).

ABSTRACT

Performance is at the core of marketing practice and is regarded as a critical subject by researchers. The variation of measures such as sales and market share underpins managers decisions and constitutes the basis of response models and this is why the primary objective of this thesis is to explain the impact of marketing strategies on brand and category sales and market share. Research that directly assess the marketing effect reached an overemphasizing condition, especially in industrialized countries, but recent editorials from important journals are stressing the need to shed light on the challenges that emerging economies like Brazil pose to the development of the discipline. The approach detailed in this thesis seeks to fill this gap, anchored in the gasoline retailing context, a competition environment which presents singularities of marketing elements. The starting point is to underscore this particularity in a conceptual chapter dedicated to establish Business-to-Business (B2B) performance in emerging economies as the subject of interest. The theoretical part highlights two established frameworks and incorporates the gasoline market as the foundation for two empirical avenues based on time series analysis. The first empirical study focuses on explaining brand sales in a setting where branded and unbranded competition coexist. The methodology involved the classification of brand sales into six descriptive positions, ranging from what is considered the worst to the best scenario for managers. The second empirical chapter explores the importance of service because this was the most impactful variable of the preceding study. We analyse the positive effect of service differentiation on brand, category sales and market share using a methodology divided into two stages. The issues addressed in this thesis are important for marketing research because outline how performance measures in a B2B setting behave in an emerging economy. This contribution also arouses implications for practice, where managers can understand the processes involved in the variation of brand and category sales and market share.

Keywords: Business-to-Business marketing. Emerging economies. Gasoline retailing. Marketing performance. Market response modeling. Services marketing.

RESUMO

Desempenho é uma temática que se encontra no núcleo da atividade mercadológica, considerado de extrema importância por pesquisadores. Os motivos subjacentes pela variabilidade de medidas como vendas e participação de mercado baseiam decisões de gestores da área e constituem a base de modelos de resposta em *marketing*. Por essas razões, o objetivo principal dessa tese é explicar o impacto de estratégias mercadológicas em vendas de marca, de categoria e na participação de mercado. Pesquisas que avaliam diretamente o efeito do *marketing* são frequentes em países industrializados. Entretanto, editoriais de periódicos respeitados da área destacam a necessidade dos esforços investigativos se concentrarem nos desafios que economias emergentes como o Brasil apresentam para o desenvolvimento da disciplina. A abordagem utilizada nessa tese preenche essa lacuna e fundamenta-se no varejo de gasolina, um ambiente competitivo que apresenta certas particularidades dos elementos mercadológicos. O ponto de partida deste trabalho é delimitar essa singularidade em um capítulo conceitual, que estabelece o desempenho mercadológico no campo *Business-to-Business* (B2B) em economias emergentes como tema de interesse. Essa seção delimita dois quadros teóricos como fundamentação conceitual e incorpora o mercado de gasolina como campo de estudo para duas iniciativas empíricas baseadas em análises de séries temporais. O primeiro estudo empírico se concentra na explicação das vendas de marca em um contexto marcado pela competição entre produtos com e sem marca. A metodologia envolveu a classificação descritiva das vendas em seis posições, que variam entre o pior e o melhor cenário para gestores. O segundo estudo empírico explora a importância do serviço, uma vez que essa foi a variável que mais produziu efeitos positivos na seção anterior. Esse estudo se concentra na análise do impacto da diferenciação de serviço em venda de marca, de categoria e na participação de mercado, com auxílio de uma metodologia dividida em dois estágios. As questões abordadas nessa tese são importantes para a pesquisa de *marketing* pois detalham o comportamento de medidas de desempenho no contexto B2B de uma economia emergente. Essa contribuição provoca implicações para a prática mercadológica, uma vez que os gestores podem compreender os processos envolvidos na variação de medidas de desempenho mercadológico.

Palavras-chave: *Marketing Business-to-Business* (B2B). Economias emergentes. Varejo de gasolina. Desempenho mercadológico. Modelos de resposta em *marketing*. *Marketing* de serviços.

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CHAPTER 1

The compendium of this thesis: Problem, objectives and research context

1.1. Introduction

This thesis concentrates on analysing the behaviour of three measures of marketing performance (brand sales, category sales and market share) in a Business-to-Business (B2B) context, the gasoline retailing in Brazil. The scope of our work is revolved around what Hanssens, Parsons and Schultz (2002, p. 8) classify as modeling marketing systems in a methodological structure where an empirical “response model shows how one variable depends on one or more other variables”. The reasons for this emphasis are twofold. First, sales and market share are rational measures of business success and therefore managers rely on them to evaluate their decisions. Second, they are often related to processes responsible for their variation and these are classified in the literature as decision variables (Hanssens et al., 2002). The attention to a system where firms control their actions in order to produce effects on sales or market share had increased over the last years, especially after a pressure on the accountability of marketing spending (Rust, Ambler, Carpenter, Kumar, & Srivastava, 2004).

The approach used to explain the dependent variables grounds on market response models, where the focus is to use transactional data to identify relationships between marketing mix and performance variables (Hanssens et al., 2002). Model building in the discipline started in the fifties and there is a long list of textbooks and scientific articles dedicated to analyse this evolution. Specifically, this thesis centers on the development of what Leeflang, Wieringa, Bijmolt and Pauwels (2015, p. 4) categorize as “models that advance knowledge”, formalized descriptive structures that describe the effect of marketing efforts.

This methodological approach is important for managerial practice because avoids rules of thumb decisions (Leeflang et al., 2015) and provides answers to “what-if” questions (Franses, 2005). The models developed in this thesis also assess effects on at least two levels of aggregated demand, according to the basic model classification provided by Leeflang et al. (2015): one related to a particular brand (brand sales) and another dedicated to analyse product class and relative performance (category sales and market share).

There are numerous research outputs provided by models that evaluate marketing performance and the more interested reader can refer to comprehensive reviews on results about marketing impact on a wide-range of sectors of the economy within industrialized countries (Ataman, Heerde, Mela, 2010; Dekimpe, Franses, Hanssens, & Naik, 2008; Dekimpe & Hanssens, 1995a; 2000; Leeflang, et al., 2009; Pauwels et al., 2004). The following striking features encompassed by this thesis underscore its importance and show how it contributes to marketing knowledge:

- The developed models are based on an emerging economy setting, often neglected by market response modeling studies, given the paucity of data (Narasimhan, Srinivasan, & Sudhir, 2015).
- The marketing branch addressed is B2B, an area usually dependent on survey methods (Lichtenthal, 2004), where response modeling studies are not common.
- The situation studied (gasoline retailing) is a very specific one, marked by a particular interplay between companies and numerous intermediaries, in a context defined by differences in contractual forms and asset characteristics (Shepard, 1993).
- Products involved are not from non-durable Fast-moving consumer goods (FMCG) categories, the usual source which traditional response models base its results from. Gasoline retailing in an emerging economy involves competition between branded and unbranded products, which can be substitutables or not. Gasoline and ethanol are destined for flexible-fuel passenger cars, while diesel is only authorized for heavier vehicles. This environment presents evident challenges for marketing practices and perspectives (Sheth, 2011).

Research problem and objectives are addressed by a structure divided into three articles. The first is a conceptual piece which outlines the main theoretical gaps found on B2B marketing, the specific marketing branch where our descriptive models are proposed. The second concentrates on empirically explaining brand sales, by presenting a descriptive model time series based, which account for branded and unbranded competition and the impact of a

set of marketing strategies. Finally, we provide further investigation on the impact of service on two levels of demand, using a framework that considers service differentiation.

1.2. Problem and objectives

This section presents the problem and the objectives addressed by this thesis. The specific objectives correspond to questions resolved on the following chapters of the thesis:

- Specific objective one is addressed on Chapter 2, the theoretical piece of our work;
- Specific objectives two, three and four on Chapter 3, the first empirical study;
- Specific objectives five, six and seven on Chapter 5, the second empirical study.

1.2.1. Research problem

What is the dynamic impact of marketing actions on B2B performance of gasoline retailing in Brazil?

1.2.2. Main objective

Describe and explain the dynamic impact of marketing actions on B2B performance of gasoline retailing in Brazil

1.2.3. Specific objectives

1. Conceptualize how marketing modeling can address B2B performance issues in gasoline retailing in Brazil

2. Characterize brand sales positions over time in gasoline retailing in Brazil

3. Analyse the impact of product, price, service and salesperson efforts on brand sales positions over time

4. Identify which marketing actions are associated to proposed brand sales positions

5. Conceptualize service differentiation in gasoline retailing in Brazil

6. Measure the impact of service differentiation on brand and category sales and market share

7. Identify the temporal pattern of the impact of service differentiation on brand and category sales and market share

1.3. Gasoline retailing context and its singularity to marketing research

The theoretical and empirical contributions of this thesis are built from the gasoline retailing context in Brazil. In this environment, multinational integrated energy companies compete against a government-controlled oil company. Each competitor distributes products such as branded and unbranded gasoline, ethanol and diesel to petrol stations under contract. Refiners can own and operate the retail themselves or franchise to a third-party, who can run a petrol station or gain the right to franchise the refinery brand in a limited area (Kleit, 2005). The distribution market in Brazil is mostly marked by independent parties, as the Brazilian government conducted a deregulation process that granted to various retail outlets the function of resale (Ministério de Minas e Energia do Brasil, 1997). Thus, multinational energy companies willing to distribute their products (gasoline, ethanol and diesel) need to formalise contracts with these partners that varies in relation to the number of energy products available offered in stores (petrol stations) and to the levels of service offered in the distribution channels.

When a contract is formalised, it means that a given petrol station can only distribute the products from the contractor and this is often classified in the economic literature as an agent-principal relationship, where the principal is the refiner and the agent is a gasoline station manager (Shepard, 1993). Variation in station characteristics (in the form of various service offerings, such as convenience stores) leads to what Barron, Taylor and Umbeck (2000) classify as horizontal differentiation and this is important because “the role and features of petrol stations have changed enormously” over the last decades (Azimont & Araujo, 2010, p. 1012). There are obvious influences of non-price choice variables (Eckert, 2013) on sales, which deserve attention from the marketing literature (Lin, 2013), specially because empirical research usually overemphasize economic factors, as pointed out by the literature review conducted by Eckert (2013).

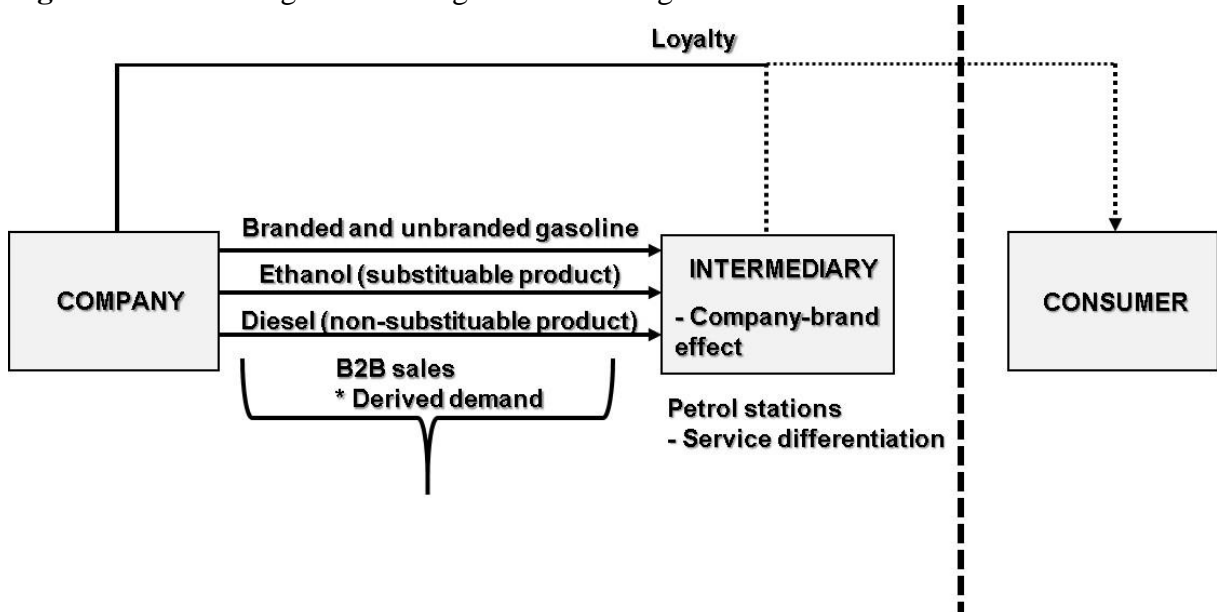
Another particular characteristic of the Brazilian context refers to what Barron et al. (2000) classify as vertical differentiation, attributes properties that differentiate products one from another. Brazilian law ensures, since the 1990s, that passenger cars only use gasoline or ethanol, relegating diesel for Commercial Trucks, Pickup Trucks and Sports Utility Vehicles (SUV) only (Diário Oficial da União, 1989). Since cars are manufactured in Brazil with flexible-fuel technology, ethanol can be considered as a substitute of gasoline. Accordingly, an official resolution published by a Brazilian agency ensured competitors to add exclusive additive components to gasoline (Agência Nacional do Petróleo, Gás Natural e Biocombustíveis, 2014) and market different brands. This alludes to what Chamberlin (1969) defines as heterogeneity among products, which a given petrol station differs in terms of quality

offered (“premium” or regular versions) and brand signalisation of products (branded and unbranded). Some products can serve as substitutables in some occasions, like ethanol and gasoline, leading to what managers of the fuel industry classify as switching behaviour and what marketing researchers specify as products functionally interchangeable and, therefore, imperfect substitutes (Foxall, 1999).

According to David (2014) classification scheme, gasoline retailing is positioned at an objective quality dimension, instead of subjective, including a physical capital evidence, instead of human. This means that products sold at petrol stations are roughly perceived as homogeneous, where differentiation is attributed to two features. Firstly, a product-related objective justification, such as additives in the branded gasoline; second, service physical evidence offered at the retail outlet, in the form of convenience stores (Azimont & Araujo, 2010; Barron et al., 2000), service stations and car wash facilities (Iyer & Seetharaman, 2008). The demand at the refinery level is derived from the consumer level (Kleit, 2005) and the consumer presents a relative inability to reduce gas consumption, which means that increases in gasoline prices could lead to decreases in purchase volume of other goods (Ma, Ailawadi, Gauri, & Grewal, 2011).

Marketing decisions are also used when the refinery invest on loyalty, offering proprietary credit cards and discounting to induce purchases (Barron, Staten, & Umbeck, 1992, p. 90) or place their own brand at petrol stations to signalise reputation (Kleit, 2005). The former strategy exists since the 1920s in industrialized countries such as the United States, where “oil companies pioneered the concept of a national credit card”. The current knowledge on loyalty programmes states that they can be effective and extant research using data from the industry is generally from grocery retailing, electronics, banking and airlines, according to the review conducted by Yoo and Bai (2013). However, in order to advance in this stream, novel research need to consider different markets or conditions (Dorotic, Bijmolt, & Verhoef, 2012), as the one presented by the gasoline retailing in Brazil. Figure 1.1 summarises the features addressed in this thesis.

Figure 1.1. Marketing context for gasoline retailing in Brazil



1.4. How Brazil is portrayed in this thesis? The emerging economy opportunity for marketing research

For the last five years, prominent marketing journals have been emphasizing the need for research to address problems originated at countries like Brazil. This movement had started after Burgess and Steenkamp (2006) stressed the significant environmental conditions of emerging economies to the conceptual and practical advancements of the discipline. It intensified after Sheth's (2011) foundational paper about the five key characteristics of emerging markets. Two of these are clearly observable in gasoline retailing in Brazil: market heterogeneity in the form of owner-managed small enterprises (such as third party owned petrol stations) and the presence of unbranded competition. After this inception, at least three editorials delineated the building blocks from where scientific research should start.

Burgess and Steenkamp (2013, p. 1) argue that multinational companies will need to cope with the reality of emerging economies while scholars must develop models "applicable to the very different contexts found". In a Special Section in Marketing Science dedicated to this phenomenon, Narasimhan et al. (2015) signalise the richness of research within this reality and point out the value of obtaining detailed transactional data from companies. Roberts, Kayande and Srivastava (2015) extend the understanding about emerging economies discussing theoretical and practical implications for nine marketing issues, including branding.

We are not going to examine these questions in detail in the present section, but it is essential to remark the opportunities introduced by Chandy and Narasimhan (2015). According to their research agenda, emerging economies present new ways of linking outcomes to explanatory variables, and empirical models like the ones developed in this thesis can open new avenues for marketing research. These reasons show that gasoline retailing in Brazil is going to be portrayed as an emerging economy phenomenon because it presents some of the characteristics detailed above and because this competition landscape presents singular features which deserve attention from researchers. Regulation structures in the country are more extensive than the observed on the international literature pointed out by Eckert (2013) review, modifying the commercial function of some products, such as diesel.

1.5. Thesis structure

This thesis is organized into five more chapters. Chapter 2 is a conceptual piece that establishes B2B marketing performance in emerging economies as the subject of interest. The theoretical chapter highlights two established frameworks and incorporates the gasoline market as the basis for two empirical avenues, focused on sales and market share. Chapter 3 is the first empirical study and concentrates on explaining brand sales in a particular setting, where branded and unbranded competition coexist. Chapter 4 underscores the importance of service to marketing strategy in an emerging economy and establishes the fundamental basis for the second empirical study, detailed on Chapter 5. This study explores the impact of service on a wider range of performance measures. Service was the most impactful variable on the first empirical chapter and this based the decision to scrutinize the effect of service differentiation on brand and category sales and market share. Chapter 6 provides a summary of the contributions of this thesis to research and practice.

CHAPTER 2

How marketing modeling can manage B2B performance issues in an emerging economy? Conceptual remarks on two established theoretical streams

2.1. Introduction

Amongst *Marketing Science Institute* research priorities from 2014 to 2016 there is a tier component that outlines the importance of marketing models to improve decision making inside organizations (Marketing Science Institute, 2014). The subset of modeling within marketing research has been producing considerable amounts of results in a wide range of areas (Shugan, 2002) and this importance had been reported in textbooks over the last decades (Eliashberg & Lilien, 1993; Franses & Paap, 2001; Lilien, Kotler & Moorthy, 1992; Wierenga, 2008). According to Eliashberg and Lilien (1993), three modeling traditions have emerged from Operations Research and Management Science applications to marketing: measurement models, decision-making models and theoretical models.

While decision-making and theoretical models deal with programming techniques and mathematical assumptions, measurement models relate a dependent variable (such as choice, demand or sales) to a function of various marketing mix-related independent variables (Eliashberg & Lilien, 1993). The supplier disciplines of those are psychology, econometrics and others and the results are provided for “marketing science literature and to the practice of marketing management” (Wierenga, 2008, p. 14).

Measurement models are important because specify independent variables in a sales response function where the researcher can rank effects in a hierarchy system (Eliashberg & Lilien, 1993), identifying which variables are most relevant for the context studied. Besides the significant amount of research produced, opportunities persist for measurement models, especially if we examine the theoretical missing links observed in specific marketing branches, such as Business-to-Business (B2B) marketing, and extract from them possible empirical avenues that frameworks such as the International Marketing and Purchasing (IMP) approach and Resource-advantage theory can pose to these opportunities.

According to Hadjikhani and LaPlaca (2013), B2B research is still in a developmental stage because the late application of scientific methods to its problems. Consequently, research conducted within this field lacked scientific identity throughout the last century. This singularity has been shaping a business field with at least three missing links. Firstly, the only marketing journal exclusively devoted to theory (*Marketing Theory*) did not publish a single conceptual article about B2B realm since its inception, in 2001¹. B2B marketing is frequently portrayed in more high evaluated journals that publish theoretical and empirical papers such as *Journal of Marketing* and *Journal of the Academy of Marketing Science*, but the general perception is that the subfield is underrepresented, as pointed out by the literature review conducted by LaPlaca and Katrichis (2009). These authors argue that “clearly the dominating focus of the mainstream marketing journals on consumer marketing does not reflect the almost mix of consumer and business markets” in some economies, such as the U.S (p. 6).

The second missing link refers to journals specifically devoted to this subfield. One of the most traditional ones (*Journal of Business & Industrial Marketing*) only dedicated a special issue to theory in the 2000s (Kleinaltenkamp & Ehret, 2006). Accordingly, *Journal of Business-to-Business Marketing* initially reviewed its contents in a ten-year celebrating issue only in 2003 (Kabadayi, 2003a; 2003b). A third and final reason is underlined by Hunt (2013) who notes that, despite the existence of frameworks that cover a large variety of topics, “there is no widely accepted, overarching, business marketing framework” (p. 289).

The research methods used also need to be spread to different designs, since empirical work mostly relies on survey methods (Lichtenthal, 2004), creating a state of dependence of descriptive structures (Reid & Plank, 2000), as noted by the theoretical review of Håkansson and Snehota (2002). More recent reviews do not focus on methodological issues and concentrate on content areas (LaPlaca & Katrichis, 2009), metatheoretical (Möller, 2013) and citation and co-citation analysis (Backhaus, Lügger, & Koch, 2011). Håkansson and Snehota (2002, p. 523) suggest a research direction towards the formulation and systematic methodologies inside “quantitatively measurable empirical observations”. Therefore, the modeling directions highlighted by *Marketing Science Institute* research priorities could broaden our knowledge about business marketing function inasmuch as models might describe

¹ We reviewed titles and abstracts of every article published in *Marketing Theory* from 2001 (the year of its first publication) to 2015. We have decided to conduct this review only in *Marketing Theory* because it is exclusively devoted to theory and this is a conceptual article about B2B performance. The more interested reader can refer to other papers that review the whole literature in a systematic fashion and cover not only theoretical journals, but also high evaluated journals that publish theoretical and empirical papers, such as *Journal of Marketing* and *Journal of the Academy of Marketing Science*.

reality and explain the relationship and the behaviour of agents (Chintagunta, Erdem, Rossi, & Wedel, 2006; Shugan, 2002).

The IMP approach and Resource-advantage theory are established theoretical frameworks that can provide additional thoughts on how B2B marketing function and base the managerial use of models. According to Hunt and Morgan (2005) attestation of a firm's objective (superior financial performance) and considering relationship as a central concept like IMP approach stresses (Håkansson, 1982) it is acceptable to conceive the relational resource as capable of contributing to a firm's ability to effectively achieve its objectives. Therefore, IMP approach and Resource-advantage theory could enhance our knowledge on the variation of B2B performance variables such as sales and market share, especially in contexts where research is still scarce, such as emerging economies. Recent articles and editorials from high evaluated journals in this field are encouraging more investigations into these environments (Iacobucci & Onyemah, 2015), highlighting their potential singularities (Lee, Özsoy, & Zhou, 2015).

Considering the state and composition of B2B marketing theory and the opportunities available for alternative research designs, this conceptual chapter attempts to contribute by underscoring three fundamental entities: first, a theoretical structure, based on the IMP approach and Resource-advantage theory. Second, a modeling-oriented assessment that highlights sales and market share as important dependent variables. Third, an examination of a very specific situation in an emerging economy. Altogether, these three entities form a conceptualization dedicated to establish linkages and propose two new empirical avenues for research in B2B marketing, grounded on dynamic-based methodological techniques, such as time series and panel data.

This chapter is organized as follows. Section 2.2 presents the conceptual foundations and structure of Business-to-Business marketing and emphasizes the research opportunities that based this chapter. The next part highlights important features of the International Marketing and Purchasing (IMP) approach and Resource-advantage theory, two traditional frameworks that converge to the important discussion of performance in the following section. Section 2.5 delineates the two empirical avenues for sales and market share in an emerging economy setting, which establishes the succeeding chapters of this thesis. Concluding remarks are presented on Section 2.6.

2.2. A brief view of the origins and the theoretical structure of Business-to-Business marketing

The foray to treat business marketing as a separated discipline was conducted by Frederick (1934) while the first official attempt to define, describe and formalize it appeared in a document organized by a group of professors (Industrial Marketing Committee Review Board, 1954) that delineated 33 differences and five similarities between industrial and consumer marketing. Despite the descriptive nature and the lack of attention to performance variables, the document established the first directions for researchers engaged in industrial marketing issues. The term “industrial” was then replaced by “business” and finally, in the late 1990s, “B2B marketing” was adopted (Hunt, 2013) to discuss questions referring to industrial and “business activities involved in the flow of goods and services” from organizations to organizations (Industrial Marketing Committee Review Board, 1954, p. 152).

Business marketing started gaining special attention thereafter with the publication of *Industrial Marketing Management* journal in 1971 (Peters, Pressey, Vanharanta, & Johnston, 2013) and the establishment of the *Institute for the Study of Business Markets* (ISBM) in 1983 (Hunt, 2013). Since then, the theoretical structure of business marketing resembles the social phenomenon in which occurs the relationship between organizations: it is a complex, multilayered and dynamic process, usually analysed through the lens of within and outside management disciplines, such as anthropology, economics, organisational theory, psychology, sociology and systems analysis (Möller, 2013; Peters et al., 2013). According to Woodside (2004, p. 230), it is a “big umbrella under which scholars representing multiple research areas are sheltered”. There are three important theoretical implications of this fragmented system. It resulted in: (1) a diversified theory construction; (2) a need to enhance consistent theory development; (3) and a necessity for more detailed context-specific theories that base managerial actions in these conditions (Möller, 2013).

Hunt (2013) points out that, despite the inexistence of a widely accepted framework in B2B marketing, two theoretical structures are recognized for providing the key set of assumptions for this subfield: the Value Delivery Framework of the ISBM and the IMP theoretical structure. While ISBM perspective is more managerial in its nature, with a clearly inclination to the use of qualitative, case study and survey methods (Lilien & Grewal, 2012), the IMP theoretical structure had started as an European research endeavour and was founded on the basis of empirical work and in “several minor research projects” (Gadde & Håkansson, 2010, p. 355). There are two core concepts that based the construction of this framework: firstly, companies organize themselves in a network system of interrelated relationships.

Consequently, relationships among them are not singular, but continuous and interconnected (Ford & Håkansson, 2006).

Network and interaction are the starting points for the development of four foundational premises (Håkansson, 1982) in which the IMP Group establishes its research initiative. They provide the elements for an interaction model comprised by four groups of variables that describe: (a) the parties involved; (b) the elements and process of interactions; (c) the environment; (d) and atmosphere (Håkansson, 1982; Hunt, 2013). Whereas the theoretical structure was responsible for changing the research perspective on business marketing from single market exchanges to enduring and interactive relationships (Gadde & Håkansson, 2010), empirical efforts were predominantly of descriptive nature.

Literature reviews support the view of an overdescriptive nature of the research conducted over the years. In 1997, a special issue of *Journal of Business Research* compiled four reviews about B2B marketing published in major journals. Four articles, three written by the editors at that time, detailed the key features and stressed “attention to valuable contributions in the literature” (Woodside, 1997, p. 177). Despite the fact that individual characteristics of the articles deviate from the scope of this chapter, it is possible to outline the gist and the basis of this literature: business marketing was built from research questions managerially focused and delineated with qualitative or correlational quantitative techniques, with a priority on case studies. A more systematic review conducted by Reid and Plank (2000) also confirmed a particular overreliance on nondynamic research designs with cross-sectional data (Woodside, 2004).

The basic consequence of this theoretical structure is a multilayered field established on economic and behavioral general theories (Hadjikhani & LaPlaca, 2013) with clearly defined research themes or subjects (Peters et al., 2013), but also with shortcomings on theoretical refinement and on managerial relevance (Peters et al., 2013; Sheth & Sharma, 2006; Brennan, Tzempelikos, & Wilson, 2014). In 2014, for example, the *Journal of Business & Industrial Marketing* devoted a special issue to B2B research and managerial relevance (Åge & Cederlund, 2014) and its editorial expressed concerns about the existence of a gap between the needs of marketing managers and by what is delivered by researchers. To scrutinize this aspect, Baraldi, La Rocca and Perna (2014) reviewed the 60 most-cited B2B marketing articles published between 2003 and 2012 and discovered that nearly a half of them present implications that are non-normative, generic and abstract while ten lack implications completely.

In order to achieve theoretical consistency and offer practical insights that can actually contribute to managerial reality, the following sections underscore the main features of two

important theoretical frameworks for business marketing: the IMP approach and Resource-advantage theory. The linking concepts responsible for giving managerial relevance are the definition of sales and market share as primary variables in B2B relations, which are going to be discussed afterwards. The structure provided in this chapter tries to connect theory and practice, as recommended by Brennan et al. (2014), who advocate for balance between these two dimensions in an applied business discipline such as marketing.

2.3. Important features of International Marketing and Purchasing approach and Resource-advantage theory to supplier and intermediaries

The publication that marked the IMP approach was Håkansson's book (Håkansson, 1982) that challenged the traditional perspective of examining industrial marketing. The four foundational premises in which this research endeavour established itself were based on four elementary concepts of industrial marketing and purchasing process: relationship, interaction, stability and similarity. Firstly, a long-term and complex relationship between two companies (e.g. supplier and intermediary) is observed, instead single discrete purchases. The second concept refers to interaction between buyers and sellers rather than passive market structures among parties involved. Stability maintains buyers and sellers close in a given relationship, instead of many atomistic, separated elements and, finally, the similarity component implicates that tasks performed are alike and "an understanding of industrial markets can only be achieved by the simultaneous analysis of both the buying and selling sides of relationships" (Håkansson, 1982, p. 1).

The IMP approach was one of the research streams responsible for having "influenced the emergence of relationship marketing and business networks as important schools of business" (Möller, 2013, p. 325). Founded on social exchange theory, transaction cost economics and resource dependence theory (Möller, 2013) it is unrelated to standard microeconomic paradigm (Ford, 2011) and it could not be incorporated into neoclassical economic theory because the assumed heterogeneity nature of business interactions (Hunt, 2013). Conversely, neoclassical paradigm requires homogeneity of firms tangible resources such as capital, labour and land and cannot accommodate an intangible resource like relationship (Hunt, 1997a; 2013).

According to Varey (2010) review about the economics basis of marketing, the orthodox economic framework in which lies the neoclassical thinking presupposes an automatic adjustment between supply and demand. Heterodox economists, on the contrary, relies on complementary dimensions between marketing and markets since the former shapes the later.

The heterodox principles had inspired evolutionary attempts to explain marketing circumstances that were not totally clarified by orthodox rigid assumptions (Alderson & Cox, 1948). Hunt's resource-advantage theory of competition, for example, encompasses nine foundational premises dedicated to explain the process of competition (Hunt, 2000) and advocates for the inclusion of IMP approach as a subordinated framework (Hunt, 2013).

The unrivalled motive for choosing the IMP framework in this chapter is the strength of the four elementary concepts to explain the outcome variables of arrangements between two independent, but interconnected, organizations, such as a supplier and its intermediary. Accordingly, the linking concept in Resource-advantage theory that incorporates IMP theoretical structure into a wider view of competition is the relational resource. Inside Hunt's conceptualization about competition, there are nine premises (Hunt, 2000) and the sixth one corresponds to firm resources. Hunt's theoretical framework is, therefore, the combination of evolutionary-based Austrian economics, heterogeneous demand theory and Resource-based theory of the firm (Hunt, 1995). It is defined by Hunt and Morgan (2005, p. 154) as a "general theory of competition that describes the process of competition" which presupposes heterogeneity of demand, given consumers different tastes and preferences, and products as different marketing offerings to cover market segments. Resources characteristics, such as relationship, are defined as heterogeneous, sometimes unique and responsible for contributing to positions of advantage.

2.3.1. The importance of heterogeneity

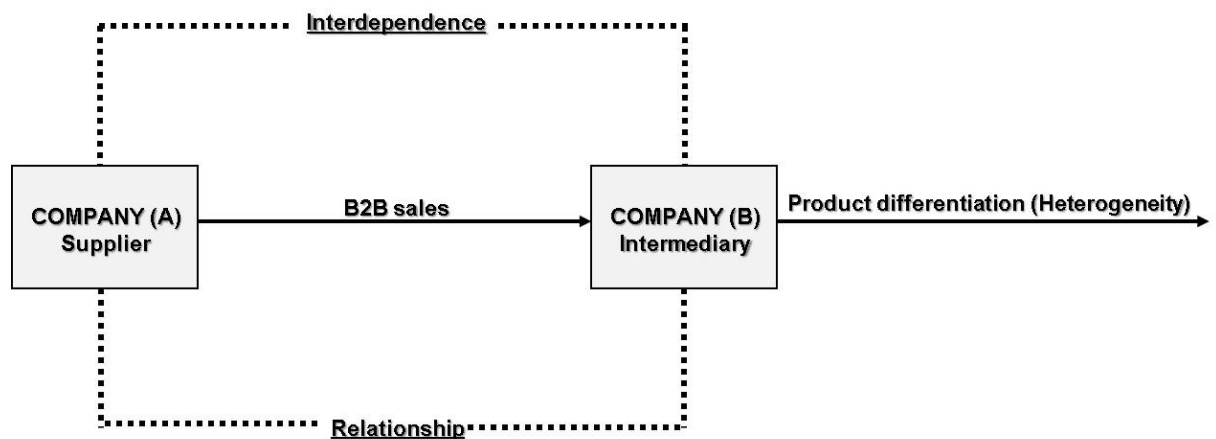
Heterogeneity is a defining concept for B2B marketing that firstly based different theoretical streams in economics and, subsequently, marketing frameworks, and originated what Hunt (1997b) classified as a cornerstone in marketing theory. According to this author, the works by Chamberlin (1969) and Clark (1961) established on economics the principles of heterogeneity of demand. Alderson (1957, 1965) was responsible for the development of these principles in a functionalist theory of marketing processes by specifying the competition between firms for market segments, classified by Alderson (1957) as groups of households. The underlying assumption of heterogeneity is the existence of difference: since the offering (products or services) to markets are different among firms, sales will exhibit variations (Chamberlin, 1969).

Accordingly, product differentiation research has attracted attention of marketing and economics (Vandenbosch & Weinberg, 1995), especially if we highlight the role that heterogeneity assumes inside the evolutionary context. In the perfect competition theory, for

example, demand is static and heterogeneous across industries, but homogeneous within industries (Hunt & Morgan, 2005). These assumptions are consequences of economic principles of monopolistic competition, where differentiation occurs based on characteristics of the product or environmental conditions surrounding its sale (Chamberlin, 1969). According to Chamberlin (1969), differentiation results in preferences for one product over another based on characteristics of: (a) the product itself, like brand name or brand signalisation; (b) singularities in features such as quality, design, color or style; (c) or conditions like convenience, reputation and courtesy.

Figure 2.1 summarises the associations proposed in this conceptual chapter and preserves the main concepts outlined in the preceding sections. There is a hypothetical relationship and stable situation between two companies, A and B, a supplier and an intermediary. These companies are in obviously interaction and exhibit a degree of similarity because operate in the same business sector. Company A relies on company B to distribute its products and usually company B is incorporated into its partner strategy. The primary outcome of this relationship is superior performance, expressed by different products sold to the market.

Figure 2.1. Hypothetical interaction situation between a supplier and an intermediary



2.3.2. The marketing context for a specific situation in an emerging economy

Heterogeneity is also an important concept to understand specific issues of product differentiation, such as branded and unbranded competition, which is a usual outcome in emerging economies. According to Sheth (2011), emerging markets evolve to the core of marketing practice and researchers need to consider at least five particular characteristics that pose major influences to existing practices and perspectives. One of these is the competition between branded and unbranded products, an essential condition in certain sectors. Gasoline

retailing in Brazil, for example, includes multinational integrated energy companies that compete against a government-controlled oil company. Each competitor distribute products such as branded and unbranded gasoline, ethanol and diesel to petrol stations under contract. Products are different from each other where the branded gasoline receives full-marketing support from energy companies, since it generates more profit margin (Barron, Taylor and Umbeck, 2000).

Another characteristic refers to substitutability. Brazilian law ensures, since the 1990s, that passenger cars only use gasoline or ethanol, relegating diesel for Commercial Trucks, Pickup Trucks and Sports Utility Vehicles (SUV) only (Diário Oficial da União, 1989). Since cars in Brazil are developed with flexible-fuel technology, ethanol can be considered as a substitute for gasoline. Accordingly, an official resolution published by a Brazilian agency ensured competitors to add exclusive additive components to gasoline (Agência Nacional do Petróleo, Gás Natural e Biocombustíveis, 2014) and market different brands. This alludes to what Chamberlin (1969) defines as heterogeneity among products, which a given petrol station differs in terms of quality offered (“premium” or regular versions) and brand signalisation of products (branded and unbranded). Some products can serve as substitutables in some occasions, like ethanol and gasoline, leading to what managers of the fuel industry classify as switching behaviour and what marketing researchers specify as products functionally interchangeable and, therefore, imperfect substitutes (Foxall, 1999).

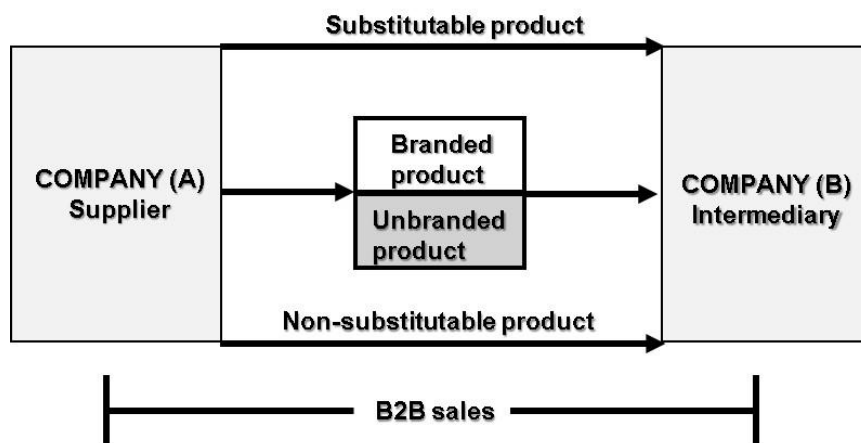
Relationship is an additional key concept because multinational energy companies willing to distribute their products need to formalise contracts with petrol stations that varies in relation to the number of energy products available offered and to the levels of service offered in the distribution channels (the petrol stations). This feature refers to what Sheth (2011, p. 168) describes as market heterogeneity of emerging economies, as “markets are local, fragmented, low scale, and mostly served by owner-managed small enterprises”. When a contract is formalised, it means that a given petrol station can only distribute the products from the contractor and this is often classified in the economic literature as an agent-principal relationship, where the principal is the refiner and the agent is a station manager (Shepard, 1993).

Therefore, the multinational companies must cope with a series of third party owned petrol stations. Variation in station characteristics ranges from the basic function of refuel, to the existence of a store, restaurant or additional service provided by an independent petrol station owner or even up to a licensed branded-convenience store, franchised by the energy company. Authors classify this as horizontal differentiation (Barron et al., 2000), indicating

that “the role and features of petrol stations have changed enormously” over the last decades (Azimont & Araujo, 2010). There are obvious influences of non-price choice variables (Eckert, 2013) on performance outcomes, which deserve attention from the marketing literature (Lin, 2013), specially in emerging economies.

Figure 2.2 presents a hypothetical situation where a company must rely on its partner to reach consumers in an emerging economy setting. B2B sales encompass branded and unbranded products, accompanied by substitute and non-substitute products, resembling the gasoline retailing example just discussed. Sales and market share are widely explored in causal models of B2C form of transaction and are considered financial output measures inside the marketing productivity chain (Gama, 2011; Rust, Ambler, Carpenter, Kumar & Srivastava, 2004). Both are interest variables of marketing phenomenon because the definition of superior financial performance in the Resource-advantage theory (Hunt & Morgan, 1995) and this is the reason why various studies try to explore the sales behaviour of brands, products and services. Hence, to discuss them as variables of interest in B2B relations supports Lichtenthal (2004) claim for understanding business patterns in business marketing practices, Möller (2013) demand for detailed context-specific theories and Håkansson and Snehota (2002) request for the construction of hypothesis that could explore economic and rational arrangements of business relationships.

Figure 2.2. B2B sales in an emerging economy setting



2.4 Defining sales as a variable of interest in B2B relations

The sales of a product or a brand are considered performance measures related to processes like advertising, distribution, price and promotion. The problem related to the variation in sales extends the economic analysis of demand and form marketing’s research

boundaries when controlled variables of the marketing mix are involved (Hanssens, Parsons, & Schultz, 2002). Causal models that seek to explain sales establish a sales response function as a core market mechanism, in which the dependent variable should be a quantity measure of sales for planning and forecasting purposes (Hanssens & Parsons, 1993). Additionally, sales can be observed over time and support data driven time series techniques in order to specify a dynamic relationship (Dekimpe & Hanssens, 2000; Franses & Paap, 2001). Market share is a simple derived measure of sales which includes a competition component, since the dependent variable is expressed in relative form.

Causal modeling has been producing numerous research results, mostly with data from B2C relations. Dekimpe and Hanssens (2000) review on time series models in marketing and Leeflang et al. (2009) review on trends in marketing dynamics show a focus on sales or market share of products sold in retail outlets, where marketing variables express the interference of the intermediate manager/owner on buying or consumption. Research and empirical generalizations are derived from data sets from perishable and storable products sold in supermarkets (Bolton & Rizley, 2010; McAlister, Bolton, & Rizley, 2006) and leave open the possibility for the study of this variable in B2B reality. Another defining feature of sales research with econometric methods is that only a few studies define a considerable amount of marketing mix variables: usually, market response models concentrate on variables related to advertising and pricing because they are more managerially controllable than product and distribution, since the “expenditures on these variables seem the most discretionary” (Tellis, 2006, p. 506).

According to Ataman, Heerde and Mela (2010), as most studies overemphasize advertising and promotion or price, they are unable to provide answers on the real effects of marketing variables and risk suffering omitted variable bias. Marketing actions do not impact performance measures independently of each other (Gatignon, 1993) and this is the primary reason why researchers should incorporate a wide variety of marketing mix instruments into their models. A second reason is related to marketing practice: since managers must decide the allocation of scarce resources and assign budgets to specific marketing instruments, the general understanding of the relative effects of these instruments assists marketers in the coordination of actions and tend to simplify decision rules inside organizations (Gatignon, 1993; Mantrala, 2002). In order to provide a broader perspective on modeling sales, Table 2.1 summarises the research conducted using econometric and time series models that concentrates on explaining sales and their major findings.

Table 2.1

Features and findings of marketing response model studies involving sales as dependent variable

Main features	Marketing instruments used	References	Form of transaction /Products involved	Level /Sales aggregation	Major findings from the studies in each group
Group 01 Univariate time series analysis of sales or examination of the temporal relationship between sales and another marketing variable (e.g. advertising)	Advertising	Aaker, Carman, & Jacobson (1982)	B2C/Cereals	Brands/Monthly	Series of advertising and sales are cointegrated when the study considers data from one company or a given product of various companies; however, no cointegration was identified between soft drinks industry advertising and sales. Little relationship between advertising and sales were found using monthly data from cereal brands.
	Integrated Marketing Communications	Baghestani (1991)	B2C/Pharmaceuticals	Company/Annually	
	Price	Dalrymple (1978)	B2C/Various	Companies/Various	
		Elliot (2001)	B2C/Various	Industry/Quarterly	
		Esteve & Requena (2006)	B2C/Automobiles	Product/Annually	
		Franses (1994)	B2C/Automobiles	Industry/Annually	
		Hanssens (1980)	B2C/Pharmaceuticals	Company/Annually	
Group 02 Multivariate time series analysis involving two or more aggregated marketing variables in forms of dependency.	Advertising	Bass (1969)	B2C/Cigarettes	Industry/Annually	Endogenous relationships between advertising and sales were found. Advertising and sales are mostly related in the current period considering products such as pharmaceuticals. Also, temporary advertising increases can have a permanent effect on sales or on gross margins and a synergistic relationship between different types of advertisements were found. Category sales, brand sales and brand prices generally follow a mean-stationary process while category demand is predominantly stationary. Long-term effects of price
	Competition	Bass & Clarke (1972)	B2C/Dietary product	Product/Monthly	
	Display	Dekimpe & Hanssens (1995b)	B2C/Chain store	Company/Monthly	
	Feature	Dekimpe & Hanssens (1999)	B2C/Various	Companies/Monthly	
	New product	Dekimpe, Hanssens & Silva-Risso (1999)	B2C/Various	Categories/Weekly	
	Perishability	Fok, Horváth, Paap, & Franses (2006)	B2C/Various	Brands/Weekly	
	Price	Hanssens (1998)	B2C/Personal computer	Product/Monthly	
	Product value	Heuts & Bronckers (1988)	B2B/Automobiles	Companies/Annually	
	Promotion	Heyse & Wei (1985)	B2C/Pharmaceuticals	Company/Annually	
		Horváth, Leeftang, Wieringa, & Wittink (2005)	B2C/Various	Various/Weekly	
		Leone (1987)	B2C/Cat food	Brand/Monthly	
		Lim, Currim & Andrews (2005)	B2C/Various	Categories/Weekly	
		Mulhern & Leone (1990)	B2C/Retail chain	Stores/Weekly	
		Naik & Raman (2003)	B2C/Pants	Product/Monthly	
		Nijs, Dekimpe, Steenkamp, & Hanssens (2001)	B2C/Various	Categories/Weekly	

		Okyere, Agyapong, & Nyarku (2011)	B2C/Telecommunications	Company/Monthly	promotions on category demand dissipate after 10 weeks on average, and their long-term impact is essentially zero. Changes in promotion strategy increase sales whereas store traffic levels remain constant.
		Pauwels (2004)	B2C/Frozen dinner	Brands/Weekly	
		Pauwels & Srinivasan (2004)	B2C/Various	Various/	
		Siddhanta & Banerjee (2012)	B2C/Cement	Companies/Quarterly	
		Srinivasan, S., Vanhuele, M., & Pauwels, K. (2010)	B2C/Various	Brands/Monthly	
		Steenkamp, Nijs, Hanssens, & Dekimpe (2005)	B2C/Various	Categories/Weekly	
		Wieringa & Horváth (2005)	B2C/Tuna fish	Brands/Weekly	
Group 03					
Panel data analysis encompassing more than one variable of the marketing mix that seeks to identify potential effects of marketing instruments. These studies use disaggregated data in store, brand or individual level and usually occur at retail settings.	Advertising	Ataman <i>et al.</i> (2010)	B2C/Various	Categories/Weekly	Effects of TV advertising are only significantly different from zero when data are aggregated over either time or individuals. Own and other brands previous promotions are sources of parameter dynamics suggesting modest brand loyalty in food products. Promotions have positive contemporaneous effects and negative future effects on sales. Permanent and cumulative sales effects from promotions are greater for brands with higher equity. Distribution breadth plays the primary role in the success of a new brand. Additionally, elasticities for product and distribution tactics of the marketing mix are superior than advertising and discounting considering 25 different categories of consumer products.
	Brand loyalty	Ataman, Mela, & Heerde (2008)	B2C/Various	Brands/Weekly	
	Coupon	Baidya, Maity, & Ghose (2012)	B2C/Non-durable products	Brands/Quarterly	
	Discounting	Foekens, Leeflang, & Wittink (1999)	B2C/Consumer food product	Brands/Weekly	
	Distribution	Kopalle, Mela, & Marsh (1999)	B2C/Liquid detergent	Brands/Weekly	
	Feature/Display	Pauwels & Hanssens (2007)	B2C/Frozen dinner	Brands/Weekly	
	Line length	Slotegraaf & Pauwels (2008)	B2C/Various	Brands/Weekly	
	Price	Tellis & Weiss (1995)	B2C/Laundry detergent	Brands/Various	
	Product innovation				
	Sales force				
Sales promotion					

Table 2.1 is a comprehensive examination of the different features and possibilities provided by causal modeling in marketing considering sales as dependent variable. The examination does not include studies that derive sales components (category incidence, brand choice and purchase quantity) as dependent variables (e.g. Pauwels, Hanssens, & Siddarth, 2002). The survey presented on Table 2.1 is more substantial than the ones presented on Ataman et al. (2010), Dekimpe, Franses, Hanssens and Naik (2008), Dekimpe and Hanssens (1995a; 2000), Leeflang et al. (2009) and Pauwels et al. (2004) because it organizes the research into three detailed groups. Inside each category is outlined the main characteristics and major findings of analysis involving univariate and multivariate time series and panel data models. Complementary, it shows the emphasis on B2C form of transaction, but suggests opportunities for causal modeling in B2B research implying potential effects of marketing instruments when conducting research in particular contexts, such as when branded and unbranded competition is involved. The next section presents a discussion of empirical avenues for modeling B2B sales and market share in emerging economies, considering IMP approach and Resource-advantage theory as underlying theoretical frameworks.

2.5 How modeling can tackle B2B performance? Empirical avenues for sales and market share in an emerging economy setting

2.5.1. A modeling-oriented research agenda for B2B performance

Industrial Marketing Management published a special section on “Innovation in and from Emerging Economies” grounded on the reason that these contexts present economic, financial and institutional singularities that pressure firms to behave differently (Özsomer & Zhou, 2015). The initiative of this journal resembles a series of efforts from important publications to focus on particularities of emerging economies, as this reality seems to have entered on journals editors priorities. Despite the volume of research produced on this topic in the last five years and the number of editorials, special editions or sections, there are obvious opportunities for researchers dedicated to B2B marketing performance.

The primary reason is the reduced focus on B2B issues. Research is indeed more frequent and evolving, but B2B is still relegated in emerging economies, recreating the underrepresented condition identified by LaPlaca and Katrichis (2009). The second is derived from the foundation of marketing empirical generalizations, since the updated version (Hanssens, 2015) on a series of topics related to B2B performance and to topics addressed in the previous sections of this chapter (sales, market share, branding, distribution and marketing effects) cover mostly non-durable Fast-moving consumer goods (FMCG) in industrialized

countries. Therefore, the following sections outline two modeling-oriented empirical avenues that research should follow, considering the marketing context for gasoline retailing portrayed in the previous sections.

2.5.2. Time series analysis of substitutable products

Empirical research addressing the temporal behaviour of marketing performance variables are normally aligned with marketing science tradition. This stream produced empirical generalizations, mostly with time series of B2C and FMCG data (Dekimpe & Hanssens, 1995a) that outline the importance of observing the stationarity or the evolution of a performance variable. A variable has fixed mean and variance over time when is a stationary process or is classified as a random walk movement when is an evolving series (Hanssens et al., 2002). B2B research lack systematic findings about the dynamics between heterogeneous and substitutable products and there is a continuous concern for specific questions related to heterogeneity, such as branding (McQuiston, 2004; Michell, King, & Reast, 2001).

Considering the situation exposed in Figure 2.2, gasoline commercialization in an emerging economy could ground novel research that consider these issues, because: (1) gasoline is not a traditional non-durable FMCG as the ones used on market response modeling research dedicated to analyse evolution and stationarity. Dekimpe and Hanssens (1995a) empirical generalization lists the usual product description of these studies revealing a focus on supermarket products, like beverages or home or personal care, such as detergents and toothpastes; (2) gasoline is presented in two forms or versions (one branded another unbranded); (3) and competes with an unbranded substitutable product (ethanol).

Research involving industrial products (such as gasoline) remain idle because discuss branding strategies using case studies (Low & Blois, 2002; McQuiston, 2004) or descriptive methods (Michell et al., 2001; Saunders & Watt, 1979; Sinclair & Seward, 1988) and do not advance into complex issues such as the full management of substitutable and non-substitutable products marketed for consumers. Occasionally, marketing managers in emerging economies must decide the allocation of scarce financial resources amongst products and brands inside a product mix and sometimes this involves branded and unbranded products as depicted in Figure 2.2. Therefore, the first empirical avenue is the opportunity to use time series analysis to understand the sales behaviour and position of branded and unbranded products in emerging economies.

The general understanding of brand sales behaviour as stationary or evolving is grounded on the empirical generalizations proposed by Dekimpe and Hanssens (1995a). These

authors conducted a large-scale meta-analysis on all univariate time series models published between 1975 and 1994 in nine marketing top journals and identified conditions for evolution and stationarity. The most important finding to the scope of this conceptual chapter is related to the behaviour of sales series. In the majority of cases analysed in the meta-analysis sales were nonstationary, but further research was stressed necessary “to determine whether the observed sales evolutions are driven by the firms marketing efforts” or whether the result from economic or demographic factors (Dekimpe and Hanssens, 1995a, p. G-114). Using the gasoline context in Brazil as a reference in our discussion, multinational energy companies must establish contracts with petrol stations, distribution partners that can be signalled by the energy company brand. Accordingly, since most of them are independent and under different contracts with energy companies, these must rely on their partners and invest on additional marketing mix strategies to increase sales, such as service (in the form of convenience stores), promotion and loyalty cards to induce frequency purchase patterns. Hence, empirical research using this scenario can assess the impact of these variables on sales behaviours such as stationarity or evolution.

2.5.3. Panel data analysis of sales, category sales and market share

Panel data sets organize individuals repeatedly over points in time (such as weeks, months or years) and this produce several observations (Balestra, 1995), which can be individuals or stores on marketing studies. Baltagi (2005) summarises the primary benefits of using panel data in scientific research and these include controlling individual heterogeneity of the observations and the increase of informations on variables and efficiency of estimates. The primary advantage is to produce a larger number of observations than in cross-section models, enabling the researcher to construct sophisticated models (Balestra, 1995). In marketing, panel data studies that analyse sales as dependent variable normally use disaggregated data in store, brand or individual level in retail contexts (e.g. Table 2.1). The major findings of these studies, therefore, concentrate on B2C reality.

As shown in Figure 2.1, B2B form of transaction encompasses specific arrangements between a supplier and an intermediary, which normally are interdependent. Companies need these parties to deliver its products to their markets and usually attempt to increase relationship with them. According to the IMP theoretical approach and the Resource-advantage theory, complex and different relationships are in the nature of B2B marketing (Håkansson, 1982) and relationship constitutes an important strategy to firms (Hunt, 2013). Inside the B2B marketing domain, where companies (e.g. supplier and intermediaries) interact to deliver products to the

market, different arrangements of these relationships can be found, and therefore could be analysed.

Using as reference the gasoline context in Brazil, energy companies willing to distribute their products (gasoline, ethanol and diesel) need to formalise contracts with independent partners that varies in relation to the number of energy products available offered in stores (petrol stations) and, most important, to the levels of service offered in these distribution channels. The differentiation of services can vary from the basic function of refuel, to an existence of a store, restaurant or additional service provided by this independent petrol station or even up to a licensed branded-convenience store, franchised by a multinational energy company. This situation means that the extent of the relationship between the company and its intermediary will shape the level of service offered to the consumer and produce resulting implications to performance variables such as sales and category sales and market share (the comparative sales from a given petrol station in relation to the whole market). Hence, the focus on service issues and performance constitutes the second empirical avenue in an emerging economy setting.

2.6 Concluding remarks

This conceptual chapter presented a modeling-oriented approach to B2B marketing research using a specific emerging economy situation to fulfill ongoing calls for new research designs into this context, normally limited to descriptive structures. Two main empirical avenues were presented after the discussion of essential concepts based on IMP and Resource-advantage theory. Following investigations resulted from these avenues should consider concepts as heterogeneity and relationship, in order to uncover neglected dynamics in B2B reality. The next chapters of this thesis seek to address these issues, using modeling techniques applied to time series and panel data.

CHAPTER 3

How marketing balance the battle between branded and unbranded products in an emerging economy? A time series analysis of brand sales

3.1. Introduction

A marketing manager working for a multinational company should understand the behaviour of brand sales in time and evaluate its position. The reasons underlying these demands are twofold: first, managers usually interpret performance based on sales trend signs and changes. Second, they are required to assess how marketing actions were responsible for these signs and changes (Pauwels & Hanssens, 2007). Managerial marketing decisions within this background are based on time series processes related to constant or ever-changing means of the performance variable, classified as stationary or evolution (Hanssens, Parsons, Schultz, 2002). However, as Pauwels and Hanssens (2007) point out, market-response research still have not reached a point to provide managers frameworks about brand sales behaviour in time, revealing opportunities for methodologies which encompass forms of classifying and modeling brand sales dynamics.

Another striking feature about decision making is that managers usually rely on subjective judgements and rules of thumb decisions (Leeflang, Wieringa, Bijmolt, & Pauwels, 2015). This is a claim based on models built from developed economies data sets, usually with Business-to-consumer (B2C) brands of non-durable Fast-moving consumer goods (FMCG) sold at retail stores. However, the marketing context in emerging economies seems to resemble and even intensify this characteristic, as they present fragmented markets (Sheth, 2011) and very specific forms of unstructured and unorganized retail competition (Kumar, Sunder, & Sharma, 2015). While in mature markets strategies such as distribution and prices reach a steady state, establishing performance in almost equilibrium (Pauwels & Hanssens, 2007), environment conditions in emerging markets are more diverse (Roberts, Kayande, & Srivastava, 2015). The volume of research about particular characteristics of emerging economies and the resulting implications for performance measures raised in the last years, but editorials from high evaluated journals stress the continuous importance for improving the

understanding about this reality (Burgess & Steenkamp, 2013; Narasimhan, Srinivasan, & Sudhir, 2015).

The purpose of this article is to address these issues by developing a model to explain brand sales dynamics. “Dynamics” in this case is classified by two dimensions: brand sales behaviour in time (stationary or evolution) and brand sales position (negative, neutral or positive). These dimensions determine six possible positions, which range from what is considered the worst (Descending) to the best (Ascending or Promising) scenario for managers. The model account for marketing effects in predicting each position, as associates specific actions to the developed framework. Another contribution provided by our study is the setting where is applied, since most econometric and time series models restrict to FMCG, while our study is based on gasoline retailing in an emerging economy. There is a long list of studies that review marketing effects on brand sales and we restrict to point out the most recent (Ataman, Heerde, & Mela, 2010; Dekimpe, Franses, Hanssens & Naik, 2008) to underscore this emphasis on FMCG traditional retail.

The setting for our empirical approach is the gasoline retailing in Brazil, a specific marketing situation where companies market branded and unbranded gasoline and ethanol for passenger cars and where diesel is only authorized for heavier vehicles. These products are sold in petrol stations, distribution partners that can be signalised by the energy company brand. Accordingly, since most of them are independent and under different contracts with energy companies, they must rely on their partners and invest on additional marketing strategies to increase sales, such as service (in the form of convenience stores), promotion and loyalty cards to induce frequency purchase patterns. Despite the existence of a mix of products, the branded “premium” gasoline is responsible for generating higher profit margins² (Barron, Taylor, & Umbeck, 2000), for both the petrol station and the energy company, and this is the reason why it receives special attention from these parties. This context refer to at least two key characteristics detailed by Sheth’s (2011) foundational paper about emerging markets: market heterogeneity in the form of owner-managed small enterprises (such as third party owned petrol stations) and the presence of unbranded competition.

This article is organized as follows. Section 3.2 presents a brief overview of brand sales studies, followed by our descriptive model. Next, we outline the research context, describing

² Average profit margins of the branded gasoline varies from 16% to 20%, according to internal information from a marketing manager working for a multinational energy company in Brazil. A public information provided by a Brazilian agency responsible for regulating oil production and commercialization indicates an average profit margin of 13.66% for the unbranded version of the product.

gasoline retailing characteristics in a particular emerging economy setting. Section 3.4 portrays the methodology to develop the two dimensions of our model, before the construction of the final multinomial logit model. Results, discussion and managerial implications are provided in sections 3.5 and 3.6 and we finish the chapter with our final remarks and study limitations.

3.2. A proposal of brand sales dynamics

Ever since the publication of the empirical generalizations about sales evolution and stationarity (Dekimpe & Hanssens, 1995a), researchers have been detailing marketing mix effects to identify which elements are most critical in providing success for brand sales (Ataman et al., 2010) and in change for a turnaround strategy on performance (Pauwels & Hanssens, 2007). Dynamic models concentrate on the long-term of marketing strategy, usually resorting to price and advertising (Ataman et al., 2010) and this overemphasizing finds explanation in a management reality: “expenditures on these variables seem the most discretionary, so marketing managers are most concerned about how they manage these variables” (Tellis, 2006, p. 506). The use of price and advertising as a spending measure resulted in the well-known identification of sales response given to spending over time (Dekimpe & Hanssens, 1999), but opened avenues for research dedicated to measure the impact of other variables in different contexts.

The same empirical generalization that provided the basis for what studies recognize as basic conditions for evolution or stationarity also highlighted the need for further research. This request was followed by the assertions that the competitive environment, nature of product category and length of time span could influence sales behaviour classification (Dekimpe & Hanssens, 1995a). One of these issues was addressed by Pauwels and Hanssens (2007) when they divided the sales series of frozen dinners brands in rolling time windows and found unstable brand performance in mature markets. Another question was partially resolved by recent studies with emerging economies data, which advanced into the explanation of marketing mix variables on sales performance of FMCG (Bahadir, Bharadwaj, & Srivastava, 2015; Porto & Lima, 2015).

Our conceptual framework establishes itself on these advancements to develop a descriptive model to identify brand sales behaviour and position in an emerging economy. First, it recognizes different patterns related to the first two moments of statistics, mean and variance. For example: brand sales could be in a mean-reverting position (stationarity) or in a situation where no fixed mean is observed and variance is increasing, defined as evolution (Dekimpe & Hanssens, 1995a). However, this is not the only possible outcome for performance, which can

be unstable (Pauwels & Hanssens, 2007). Comparatively, sales can also be, in the present, in a negative, neutral or positive position, due to its trend significance (or insignificance). Therefore, the descriptive model grounds on two dimensions (sales behaviour in time and sales final position) to define six possible positions to brand sales. Figure 3.1 details the framework developed.

Figure 3.1. Brand sales behaviour and position

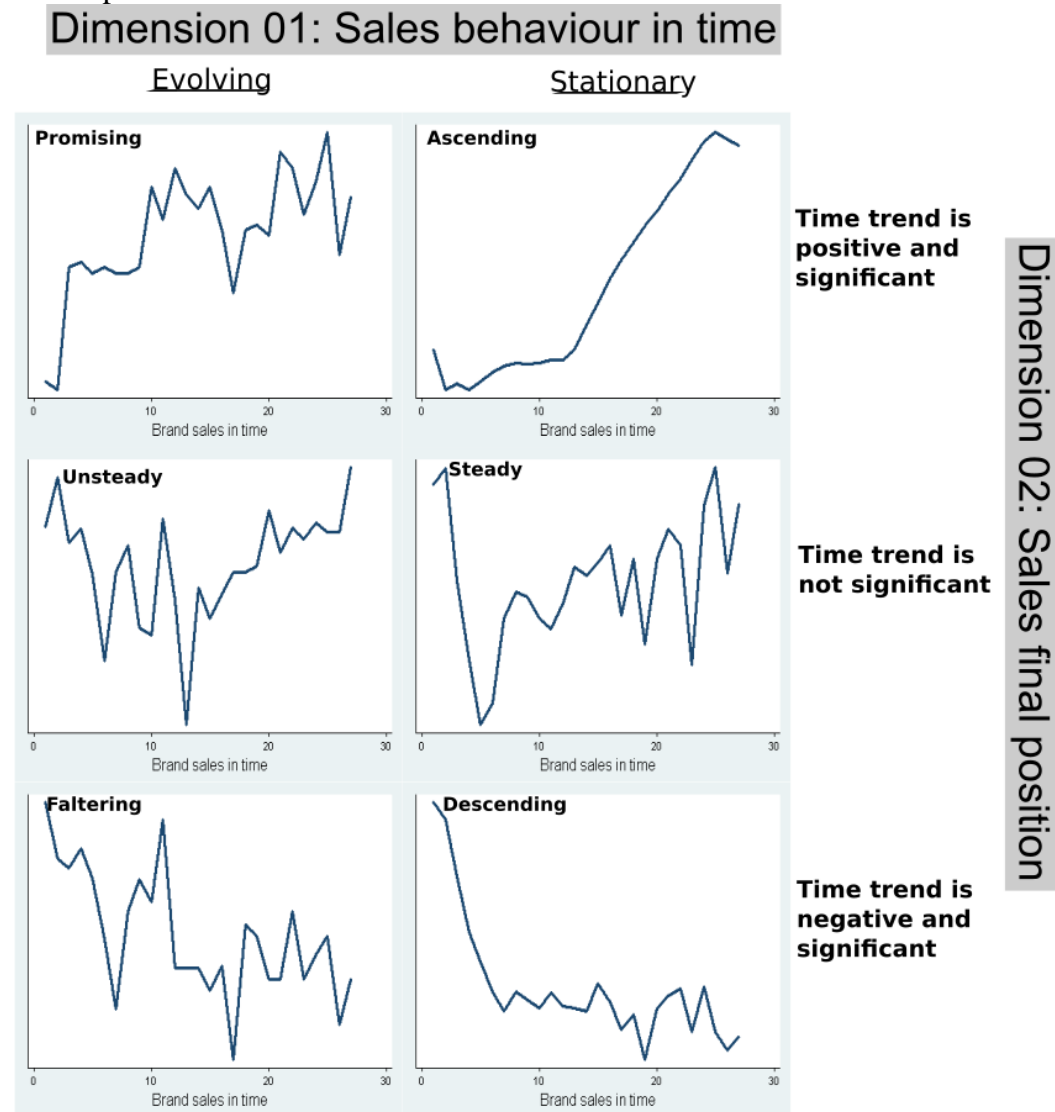


Figure 3.1. Time series of brand sales based on actual data from an emerging economy

In order to classify sales inside the positions it is necessary to analyse the two dimensions concurrently. On the top of Figure 3.1, the behaviour in time plays a role to separate brand sales positions which are stationary (Ascending) from evolving (Promising). These two are identified as the most favourable brand sales scenario for managers, as sales “finished” in positive positions. In the middle, there are scenarios where the time trend is not significant, but one is stationary (Steady) and the other, evolving (Unsteady). In these cases sales mean can wander freely and come back to the original position (when is evolving) or remain with a fixed pattern during all time period (when is stationary). At the bottom, there are the two worst scenarios: sales can be Descending in a free falling stationary situation, difficult to revert, or Faltering in hesitation, due to an evolutionary scenario opened to future changes (Dekimpe & Hanssens, 1995a). This classification can be useful to marketing managers, especially if it includes the effect of marketing on each position.

There are two important contributions to research drawn from the framework depicted in Figure 3.1. First, it is based in an emerging economy setting. Brand sales is a long recognizable marketing performance variable (Hanssens et al., 2002) and studies dedicated to investigate the variation in sales usually resort to data from industrialized countries, as shown by various reviews about marketing effects. Second, the great majority of these studies are limited to regular competition among branded products. Branded and unbranded products issues on retail stores are restricted to private-label implications to what is known as traditional FMCG. These approaches are definitely worthwhile, but open avenues for research on different settings, not fully covered by established research using B2C data. Table 3.1 summarises the outline detailed in our study, identifying the importance for analysing competition between branded and unbranded products in a specific marketing context.

Table 3.1.
Outline of the study compared to extant research

		Developed economies	Emerging economies
Regular competition among branded products		Ataman, Heerde, & Mela (2010) Ataman, Mela, & Heerde (2008) Hanssens (1998) Pauwels & Hanssens (2007) Slotegraaf & Pauwels (2008)	Bahadir et al. (2015) Baidya, Maity, & Ghose (2012) Porto & Lima (2015) Venkatesan, Farris, Guissoni, & Neves (2015)
Competition between branded and unbranded products		Ailawadi, Pauwels, & Steenkamp (2008) Lamey, Deleersnyder, Steenkamp, & Dekimpe (2012) Sethuraman & Gielens (2014)	This empirical study

Note. This limited survey does not intent to be exhaustive. The more interested reader can refer to comprehensive literature reviews about time series models of marketing effects.

3.3. Research context

The framework presented is applied to a gasoline retailing context in Brazil. In this environment, multinational integrated energy companies compete against a Brazilian government-controlled oil corporation. Each competitor distribute products such as branded and unbranded gasoline, ethanol and diesel to petrol stations under contract. The data set considered in this empirical study refers to exclusive distribution partners of a major international energy company and this guarantees that in the period of analysis these partners only bought and sell to consumers the gas-related products from the focal firm. There are two additional characteristics which deserve attention. First, Brazilian law ensures, since the 1990s, that passenger cars only use gasoline or ethanol, relegating diesel for Commercial Trucks, Pickup Trucks and Sports Utility Vehicles (SUV) only (Diário Oficial da União, 1989). Second, an official resolution published by a Brazilian agency ensured competitors to add exclusive additive components to gasoline (Agência Nacional do Petróleo, Gás Natural e Biocombustíveis, 2014) and market different brands.

According to managerial reports published on specialized industry-related websites, the decision regarding the volumes of branded and unbranded versions of gasoline offered inside petrol stations can affect volume and profits (CSP Daily News, 2010), both for the refinery and the retailer. While energy companies and automotive industry exert pressure for demand of premium products, retailers follow consumer switching behaviour for best price, which includes trading down octane levels (The Association for Convenience & Fuel Retailing, 2015). The concept of heterogeneity plays an important role for competition, since there is a presence of horizontal differentiation, when considering the nature of the channels of distribution (the petrol

stations), and vertical differentiation, when accounting for the intrinsic nature of the energy products (Barron et al. Umbeck, 2000).

The differentiation observed in petrol stations varies from the basic function of refuel up to an existence of additional services designed for consumers, classified by Azimont and Araujo (2010) as “people-on-the-move” looking for non-fuel items, such as car washing or drinks and groceries on convenience stores. Moreover, vertical differentiation alludes to what Chamberlin (1969) defines as heterogeneity among products, which in a given petrol station differs in terms of quality (premium or regular versions) and brand signalisation (branded and unbranded products). Some products can serve as substitutes in some occasions, like ethanol and gasoline, leading to what managers of the fuel industry classify as switching behaviour and what marketing researchers specify as products functionally interchangeable and, therefore, imperfect substitutes (Foxall, 1999).

A defining characteristic of emerging markets is the existence of unbranded competition, given the poor infrastructure, which poses difficulties to big brands and companies in doing business. As a result, “much as 50%-65% of the market for jewelry, liquor, luggage, appliance, personal computers, and some consumer electronic products is served by unbranded producers” (Sheth, 2011, p. 169). The gasoline retailing context in Brazil presents an interesting condition, where Petrobras, a Brazilian energy company, is the only one to refine petrol, despite the deregulating process occurred in 1997 (Mesquita, 2010). This means that the unbranded gasoline is the same (produced by Petrobras), wherever the consumer refuels his car. Conversely, the branded gasoline is a product that receives different mixtures of additives from companies and must be registered in a Brazilian agency before commercialization. Consequently, Shell, Petrobras and other companies offer their own brand to the market, according to their additives specification, exclusively distributing in their partners (the petrol stations). Theoretically, these particularities may suggest:

a) an intensity of competition not observed in developed markets, where competition is already consolidated (Roberts et al., 2015);

b) and a superiority of a business model focused on market development and expansion, instead of market orientation (Sheth, 2011).

3.4. Method

3.4.1 Data set and research design

The data set comprises of sales and marketing data on 195 petrol stations during 27 months, from January 2011 to March 2013. Not all stations had the complete set of 27 periods, as some specific observations had started or terminated their distribution contracts after January 2011 or before March 2013. Hence, as one stage of the empirical model involves time series analysis, 21 observations were dropped for having less than 24 periods, the cutoff defined as the limit for inclusion in the sample. Final data set is then concentrated on 174 petrol stations with at least 24 uninterrupted time periods (a total of 4681). These observations are from an entire sales region from the focal company, a sample of 3.7% of the 4700 petrol stations under contract into the company's chain of distribution. The petrol stations are located in 41 cities, distributed in five different states of Brazil, which ensures a variability criteria (Leeftang et al., 2015) of random samples of the population, the total number of petrol stations.

The number of 24 periods may seem unfeasible to conduct traditional time series analysis, as Hanssens et al. (2002) recommend a minimum of 30, but there are studies being published in scientific business journals using original data from companies based in emerging economies containing a number lower than that (Baidya et al., 2012). Neelamegham and Chintagunta (2004) also resolved a similar limitation by applying alternative methodologies and we divided our approach into three parts to overcome this constraint. We detail this structure in Section 3.4.3. Accordingly, one striking characteristic of emerging economies is the shortage of research and data (Narasimhan et al., 2015). Recent publications using large retail data sets in these contexts usually concentrate on consumer packaged goods (Kumar et al., 2015), such as beverages (Venkatesan et al., 2015) or skin-care products (Shah, Kumar, & Zhao, 2015) which outline the importance of using data from different products.

This empirical study focuses on a marketing situation in a singular context (the gasoline retailing), outside from Business-to-Consumer (B2C) and FMCG reality. An additional detail is that in the second year of the observed time series the focal company launched a loyalty program, designed to raise the sales of the branded gasoline in the petrol stations by offering discount as a reward to frequent buyers and this dynamic deserves attention from marketing research. The presented situation involving time series of less than 30 observations corresponds to what Pauwels and Hanssens (2007) identify as periods where performance can be unstable, improving or declining, given to a set of marketing initiatives. This highlights the need to provide evidence for different brand sales positions in a Business-to-Business (B2B) relationship (between energy companies and petrol stations), where empirical research is still

in a developmental stage (Hadjikhani & LaPlaca, 2013), rely on survey methods (Lichtenthal, 2004; Reid & Plank, 2000) and do not focus on modeling performance measures, such as brand sales.

3.4.2 Modeling decision for brand sales

The focal variable of this study is defined as brand sales, measured in the form of a ratio between the branded and the unbranded gasoline in a given month. All product sales information in the data set are at the B2B level and in cubic footage, a volume measure that reflects quantity, the most advisable form to explain sales, given the appropriated form that quantity provide to marketing planning (Hanssens & Parsons, 1993). An additional procedure was necessary, because 48 petrol stations (635 observations of the total data set) had not, at least in one month of their time series, bought from the focal company the branded product, swapping to unbranded only in some periods. This problem was sorted out by adding one small volume number (1) to the branded and unbranded gasoline sales series, a solution commonly employed in marketing response modeling studies (Rao, Wind, & DeSarbo, 1988; Hanssens & Parsons, 1993). Subsequently, the variable underwent a natural logarithm transformation, followed by a difference of logarithms operation, the standard mathematical procedure for treating logarithms in a ratio format. Equation 3.1 summarises the brand sales variable³.

$$\text{Brand sales}_{it} = \text{Ln} \left(\frac{\text{sales of the branded gasoline}+1}{\text{sales of the unbranded gasoline}+1} \right) \quad (3.1)$$

3.4.3 Methodological approach to build the framework

After the construction of brand sales, research methodology was performed using three steps. Firstly, we classified the observations according to “sales behaviour in time” dimension depicted in Figure 3.1. In order to identify if a brand sales was stationary or non-stationary, we conducted formal unit root tests and Zivot and Andrews (1992) test for structural breaks. This was necessary because the purchase pattern of some gas stations for branded and unbranded gasoline was very irregular in some months, creating data dependent breakpoints and, therefore, structural changes in sales series. The use of multiple tests was also necessary to cover the

³ We have also modeled the brand sales variable in the form of percentages of the total volume of gasoline (in Equation 3.1 the denominator would be the total volume of gasoline of a given petrol station). Results yielded roughly the same signs and directions for the independent variables in the final multinomial model. We stucked to the first option because managers in this industry usually base their decisions using the ratio between branded and unbranded gasoline. Hence, our approach tend to use what Neelamegham and Chintagunta (2004) classify as a brand manager point of view.

common problem that time series not being very informative about the presence of a unit root (Kwiatkowski, Phillips, Schmidt & Shin, 1992).

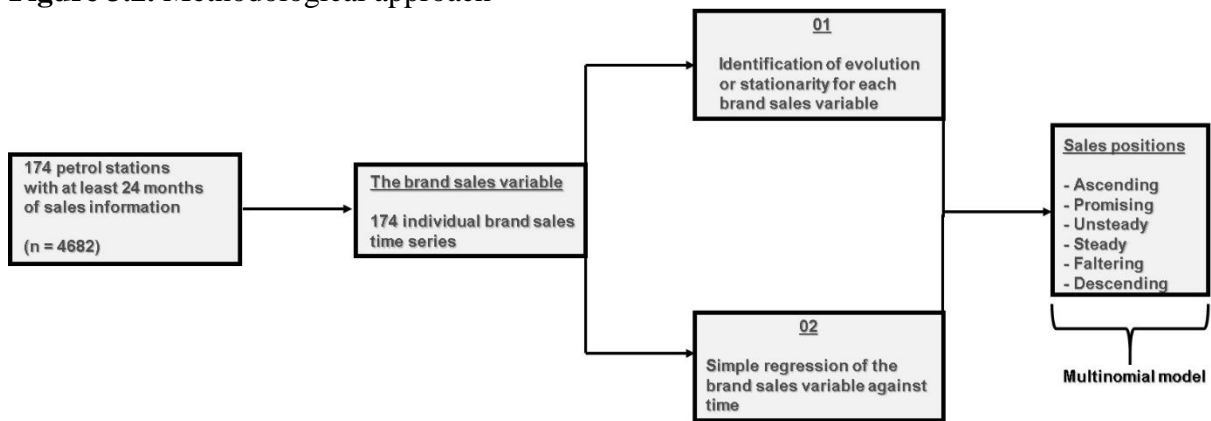
According to Kwiatkowski et al. (1992, p. 159), “it is a well-established empirical fact that standard unit root tests fail to reject the null hypothesis of a unit root” and we resorted to a series of tests to ensure a precise classification. Figure 3.4 in Appendix A details the full procedure for classifying brand sales series as stationary or in evolution and we will not go into the details of differences in the nature of trend-stationary process or difference-stationary process. The more interested reader can refer to DeJong, Nankervis, Savin and Whiteman (1992), while our modeling approach grounds on Dekimpe and Hanssens (1995a) precise classification of two basic time series processes. A process is either stationary, around a fixed component (such as a mean, a set of seasonal means or a deterministic trend), or in evolution, when it does not revert to a deterministic component.

These procedures enabled the classification of a brand sales series of a given petrol station as stationary or in evolution and the second step of the research, designed to classify the brand sales variable according to the second dimension (“sales final position”). For this case, we used the brand sales as dependent variable and the natural logarithm of the time trend (for each petrol station time series) as the only independent variable in a simple double-log regression. The inspiration for this step was Pauwels and Hanssens (2007, p. 297) least-squares estimation of a time trend. This component, expressed in Equation 3.2 as δ , yields a t-statistic which reveals “the sign and significance of the time trend”.

$$\text{Ln} \left(\frac{\text{sales of the branded gasoline}_{t+1}}{\text{sales of the unbranded gasoline}_{t+1}} \right)_{it} = \alpha_{it} + \delta \text{Ln}(\text{time}) + \varepsilon_{it} \quad (3.2)$$

The objective of this step was identify if, compared to the initial period of the time series, sales was not significant (neutral), positive and significant or negative and significant. The comparison was possible after the storage of the t-statistic of the the natural logarithm of the time trend. A complementary procedure involved Skewness/Kurtosis and Shapiro-Wilk tests on the residuals of each regression and performing robust double-log regressions when necessary. At the end, we had two precise classifications for each brand sales series: one referring to dimension one (“sales behaviour in time”) and the other alluding to dimension two (“sales final position”). Figure 3.2 details the full methodological approach of this empirical study.

Figure 3.2. Methodological approach



3.4.4 Detailing the independent variables

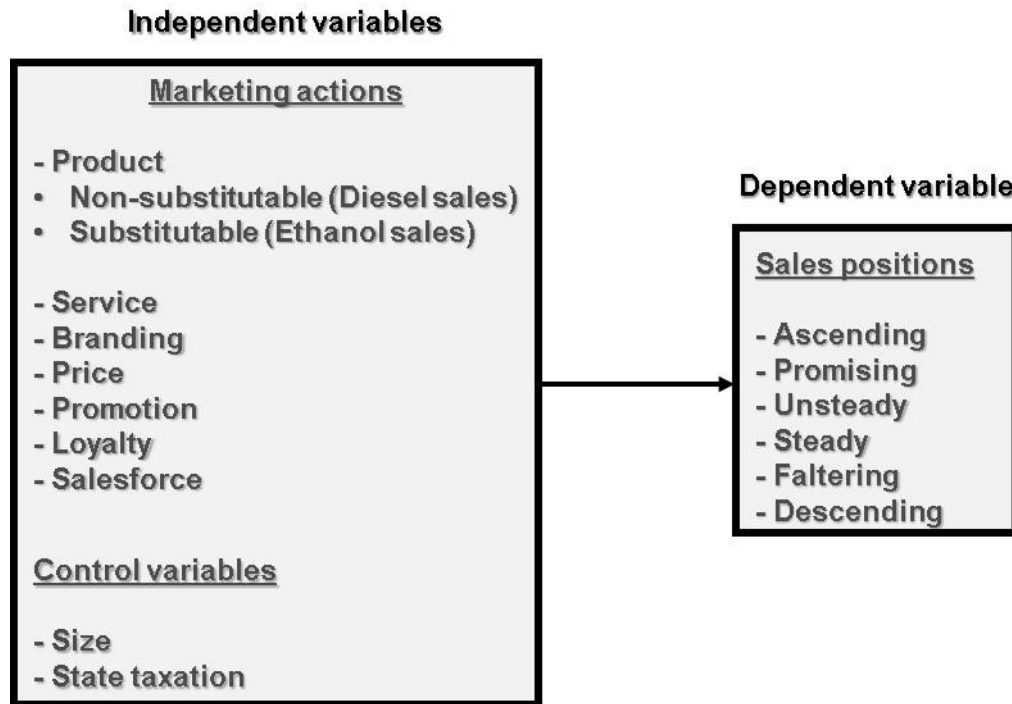
After the definition of sales positions, derived from the construction of brand sales variable, we defined the independent variables of the study. They refer to a group of seven marketing actions which occur in gasoline retailing context, accompanied by two control variables. Specifically, the marketing variables allude to the following managerial decisions:

- (a) Product sales, in the form of substitutable (ethanol) and non-substitutable product (diesel);
- (b) Branding, indicating the presence of the multinational company's brand in the petrol station;
- (c) Service, describing the existence of an increasing level of service in the petrol station (convenience store);
- (d) Price;
- (e) Promotion, for petrol stations that exhibit a stronger relationship with the multinational company and, therefore, are inside the promotional calendar directed to intermediaries;
- (f) Loyalty, indicating the number of loyalty cards issued to the consumers of a given petrol station;
- (g) Salesforce, manifested by the presence of an employee of the petrol station responsible for motivating others to sell more loyalty cards proposals to managers.

Control variables refer to an internal characteristic which can positively affect brand sales, the size of the petrol station, and an external, a state taxation which normally incur on energy products commercialization. The aliquot varies from state to state in Brazil and can

potentially influence the dependent variable. Figure 3.3 illustrates the empirical model developed, including independent and dependent variables.

Figure 3.3. Empirical model



3.4.5 The development of a multinomial logit model

The third and final methodological stage encompassed running a multinomial logit model where we grouped the dependent variable into six mutually exclusive and unordered groups. One assumption of the multinomial logit model is to have $g - 1$ logit functions, where “g” is the number of groups. Assuming the final model with the six groups of the proposed framework, where stationary and fixed Steady sales (when time trend is not significant) is the reference category ($Y = 0$), one intercept and ten independent variables, Equations 3.3-3,7 identify the five logit functions. We used the Hosmer Jr., Lemeshow and Sturdivant (2013) notational system, assuming p covariates and a constant term, all represented by a vector \mathbf{x} , of length $p + 1$. Equations 3.8-3.13 in the Appendix B specifies the probabilities of each outcome category, given the covariate vector.

$$\begin{aligned}
g_1(\mathbf{X}_{\text{Promising}}) &= \ln \left[\frac{\Pr(Y=1|\mathbf{x})}{\Pr(Y=0|\mathbf{x})} \right] \\
&= \beta_{1,0} + \beta_{1,1}x_1 + \beta_{1,2}x_2 + \beta_{1,3}x_3 + \beta_{1,4}x_4 + \beta_{1,5}x_5 + \beta_{1,6}x_6 + \beta_{1,7}x_7 + \beta_{1,8}x_8 + \\
&\beta_{1,9}x_9 + \beta_{1,10}x_{10} \\
&= \mathbf{x}'\boldsymbol{\beta}_1
\end{aligned} \tag{3.3}$$

$$\begin{aligned}
g_2(\mathbf{X}_{\text{Ascending}}) &= \ln \left[\frac{\Pr(Y=2|\mathbf{x})}{\Pr(Y=0|\mathbf{x})} \right] \\
&= \beta_{2,0} + \beta_{2,1}x_1 + \beta_{2,2}x_2 + \beta_{2,3}x_3 + \beta_{2,4}x_4 + \beta_{2,5}x_5 + \beta_{2,6}x_6 + \beta_{2,7}x_7 + \beta_{2,8}x_8 + \\
&\beta_{2,9}x_9 + \beta_{2,10}x_{10} \\
&= \mathbf{x}'\boldsymbol{\beta}_2
\end{aligned} \tag{3.4}$$

$$\begin{aligned}
g_3(\mathbf{X}_{\text{Unsteady}}) &= \ln \left[\frac{\Pr(Y=3|\mathbf{x})}{\Pr(Y=0|\mathbf{x})} \right] \\
&= \beta_{3,0} + \beta_{3,1}x_1 + \beta_{3,2}x_2 + \beta_{3,3}x_3 + \beta_{3,4}x_4 + \beta_{3,5}x_5 + \beta_{3,6}x_6 + \beta_{3,7}x_7 + \beta_{3,8}x_8 + \\
&\beta_{3,9}x_9 + \beta_{3,10}x_{10} \\
&= \mathbf{x}'\boldsymbol{\beta}_3
\end{aligned} \tag{3.5}$$

$$\begin{aligned}
g_4(\mathbf{X}_{\text{Faltering}}) &= \ln \left[\frac{\Pr(Y=4|\mathbf{x})}{\Pr(Y=0|\mathbf{x})} \right] \\
&= \beta_{4,0} + \beta_{4,1}x_1 + \beta_{4,2}x_2 + \beta_{4,3}x_3 + \beta_{4,4}x_4 + \beta_{4,5}x_5 + \beta_{4,6}x_6 + \beta_{4,7}x_7 + \beta_{4,8}x_8 + \\
&\beta_{4,9}x_9 + \beta_{4,10}x_{10} \\
&= \mathbf{x}'\boldsymbol{\beta}_4
\end{aligned} \tag{3.6}$$

$$\begin{aligned}
g_5(\mathbf{X}_{\text{Descending}}) &= \ln \left[\frac{\Pr(Y=5|\mathbf{x})}{\Pr(Y=0|\mathbf{x})} \right] \\
&= \beta_{5,0} + \beta_{5,1}x_1 + \beta_{5,2}x_2 + \beta_{5,3}x_3 + \beta_{5,4}x_4 + \beta_{5,5}x_5 + \beta_{5,6}x_6 + \beta_{5,7}x_7 + \beta_{5,8}x_8 + \\
&\beta_{5,9}x_9 + \beta_{5,10}x_{10} \\
&= \mathbf{x}'\boldsymbol{\beta}_5
\end{aligned} \tag{3.7}$$

3.4.6 Variables descriptions for the final multinomial logistic regression model

The set of ten independent variables for the final model refers to marketing variables, such as product, price service, brand, promotion, loyalty and salesforce, and two control variables that relate to the size of the petrol station and to state taxation. Ataman et al. (2010) pointed out the lack of studies that measure the integrated marketing mix on brand performance and since their publication some studies have tried to enhance this framework using variables

such as product innovation and direct marketing in global (Bahadir et al., 2015) and emerging markets (Porto & Lima, 2015). There are evident opportunities for an empirical research dedicated to understand brand sales splitted inside different qualitative categories, especially if we consider that all these aforementioned studies were conducted using data from FMCG. Table 3.2 provides dependent and independent variables descriptions, along with their means and standard deviations before necessary transformations.

Table 3.2.
Descriptive analysis of model variables

Variable	Mean	SD	Transformation procedure before running the model
Brand sales (Ratio)	5.90	46.64	Natural logarithm of the ratio between branded and unbranded gasoline sales
Diesel sales (Non-substitutable product)	168.30	433.64	Geometric mean of sales of a non-substitutable product (diesel) inside the time period ^a
Ethanol sales (Substitutable product)	39.68	44.67	Geometric mean of sales of a substitutable product (ethanol) inside the time period
Service	.17	.38	Dummy variable indicating the existence of a convenience store in the petrol station
Branding	.76	.42	Dummy variable indicating the presence of a company brand effect in the petrol station ^b
Price (Branded gasoline)	2.96	.11	To build the price variable, we used the following steps: (a) calculated a geometric mean for actual price of branded gasoline and unbranded gasoline; (b) Calculated a natural logarithm for both price informations; (c) Took the difference in logs operation, reproducing the same structure for brand sales variable (Equation 3.1)
Price (Unbranded gasoline)	2.83	.12	
Promotion	.57	.49	Dummy variable indicating if a petrol station was inside the two annual promotional calendars (offered from the company to its intermediaries)
Loyalty	6.31	4.94	Natural logarithm of the number of months that a petrol station participated in a loyalty card schema designed to enhance brand sales ^c
Salesforce	.50	.50	Dummy variable indicating if a petrol station had a special salesforce effect for the loyalty card schema ^d
Size	102.09	42.24	Natural logarithm of size, measured as the total capacity (in cubic footage) of the fuel tanks inside the petrol station ^e
State taxation	.21	.19	Specific and variable per state tribute (Circulation of Goods and Services Tribute), which incur on energy products. Aliquot is different for diesel, ethanol and gasoline and we calculated a geometric means per state to capture the dynamic effect of this variable.

Note. Variables are in raw values for descriptive statistics

^a Geometric means were used for product sales series to capture dynamic fluctuations of the values inside the time periods.

^b Petrol station brand changes inside the time period was considered zero (no company brand effect) in the data set. This means that only petrol stations which remained the total time period signalised by the energy company brand were attributed the value of one (company brand effect).

^c The construction of this variable also involved adding a unity, because some petrol stations presented zero values. To count and consider a month “valid”, we resorted to the following criteria: petrol stations should have issued at least five proposals inside a month and stayed inside the loyalty card schema for at least three consecutive months.

^d This marketing action was performed only in the second year of the data set. An employee of the gas station was responsible for motivating the other employees to sell loyalty cards to petrol station consumers. This employee could receive monthly prizes from the energy company if the team achieved some predetermined sales goals.

^e Retrieved information from an official Brazilian agency responsible for regulating the energy sector in the country. For missing data on six observations, we resorted to the average size for all petrol stations inside the city where the information for size was missing.

3.5. Results

3.5.1 Descriptive results

Table 3.3 identifies the frequency of observations classified as stationary or evolution according to the procedures detailed on Figure 3.4. The data reveal an insignificant prevalence

of stationary sales series (54.6%), with the proportion of evolving being statistically the same (45.4%). Dekimpe and Hanssens (1995a) found a dominant pattern for evolution in sales in their empirical generalizations with industrialized countries data (68% against 32%), but their work classified performance variables using series in level, while our approach resorts to a ratio format between the branded and the unbranded product. Albeit being only descriptive, these results address at least two remarks given by their seminal article: (1) the need for investigation into the circumstances where evolution or stationarity are observed; and (2) the apparent singularity of the context, as distinctions in evolution and stationarity “may be caused by differences in legal and competitive structure” (Dekimpe and Hanssens 1995a, p. G118).

Table 3.3.

Identification of stationarity and evolution of brand sales series

Brand sales behaviour in time	Frequency	Percent
Stationary	95	54.6
Evolving	79	45.4

Note: Hypothesis of equality of proportions cannot be rejected at $p < 0.05$, as evolution and stationarity occur with equal probabilities inside the sample, with a $\chi^2(1.47)$, p value = 0.22.

Accordingly, data interval in this empirical study is short (between 24 and 27 time periods), from an emerging economy and from a particular retailing context, where probably brand performance regimes presented will not last for long time periods, due to possible managerial interventions (Pauwels & Hanssens, 2007). Table 3.4 reveals a cross tabulation to describe means and standard deviations of the t-statistic retrieved by regressing the brand sales variable against the time trend (dimension 02). Results show that the evolving time series exhibit slightly higher (and positive) values for the t-statistic than stationary time series, indicating that, on average, evolution lead to positive sales in the final period. A test for equality of means was conducted revealing a statistical difference in means.

Table 3.4.

Descriptive statistics for brand sales behaviour and t-statistics for stationarity and evolution

Brand sales behaviour in time	Mean of t-statistic ^a	SD of t-statistic
Stationary	-.59	3.40
Evolving	.95	3.07

^a Means of t-statistic for the two groups are statistically different, according to equality of means test, with equal variances assumed: F(.16) and p value = .00.

Table 3.5 details descriptive statistics for the six brand sales positions. Only 28.7% of the sales series are in a positive position (Ascending or Promising groups), revealing that brand sales behavior is normally in a neutral or in a negative position compared to the initial period. Another interesting question regards the noteworthy values of the t-statistic for the Ascending

and Promising positions. They exhibit values close to four standard deviations away from the mean. These descriptive results uncover the need to assess the marketing conditions responsible for driving sales to positive positions and preventing from neutral or negative ones. For this case, the one sample chi-square test rejected the null hypotheses for equal probabilities, with a $\chi^2 = 1.47$ and a p value = .00. A significant proportion of brand sales series is neutral (47.7%), while 23.5% is inside negative positions, such as Descending or Faltering.

Table 3.5.

Descriptive statistics for brand sales groups and their respective t-statistics

Brand sales groups	Frequency	Percent	Mean of t-statistic ^a	SD of t-statistic
Steady	48	27.6	-.06	1.01
Unsteady	35	20.1	.24	1.10
Promising	30	17.2	3.98	1.59
Descending	27	15.5	-4.75	2.34
Ascending	20	11.5	3.74	1.51
Faltering	14	8	-3.76	1.18

^a We resorted to Tukey honest significance tests (HSD) to assess difference in means. With equal of variances not assumed, we have not found difference in means between Ascending and Promising, Descending and Faltering and Steady and Unsteady. For all other combinations, difference in means was statistically different.

Variance Inflation Factors were accessed before running the final model. An exploratory linear regression containing all predictors against the t-statistic (“sales final position compared to the past” dimension) retrieved an average VIF of 1.28, with the highest value being 1.78 for the Loyalty variable. The concern underlying this test before running the multinomial model regards what Leeflang et al. (2015) state about the perils of multicollinearity providing unreliable parameter estimates. Hopefully, this was not the case, since all predictors exhibited values lower than five, the cutoff that signals a potential problem for estimation according to the aforementioned authors.

3.5.2 Model results and coefficients interpretations

Table 3.6 reports the estimated parameters of the multinomial model and the first noteworthy result regards to significance levels of some marketing mix variables effects on positive (stationary or evolution) brand sales positions. Price is negatively associated to Ascending position, which means that increases on price reduce the probability for brand sales to remain on a positive (and stationary) position. Conversely, the existence of high levels of service (in the form of convenience stores) increases the probability for brand sales to stay Ascending or Promising, revealing an important effect of this strategy. Salesforce is also positively associated to Promising position, indicating that employees motivating petrol stations coworkers could raise brand sales.

Product variables are significant and may explain how to avoid negative positions in order to stay neutral. It is important to note the positive coefficient for a substitutable product and the negative coefficient for a non-substitutable product on Descending and Faltering. The signals and significance of these variables reveal that increases on diesel sales, the non-substitutable product, can sustain brand sales on a neutral and stationary position (given the negative signal for Descending and Faltering). Otherwise, increases on ethanol sales, a substitutable product, can pressure brand sales to the worst scenario (Descending). Control variables results indicate a relationship between size and evolution pattern, as increases on petrol station size can avoid brand sales to go from Promising and Faltering to Steady. Using Steady as reference category, the state taxation was not statistically significant.

We had also run the model using Descending as reference category to check for consistency and found similar patterns for coefficients. Appendix C details the estimated parameters and shows that service is indeed fundamental to managers wishing that petrol stations sell more the branded gasoline. Product variables and salesforce effects reproduce similar signs and significances as the model portrayed on Table 3.6. Important remarks are related to control variables, as size can prevent sales going from Faltering to Descending. Increases on state tribute also raise the probability that sales stay in an evolution and negative context (Faltering), compared to Descending sales. It seems that negative positions in evolutionary sales (Faltering) are more difficult to be associated to marketing effects, as decision variables can potentially affect sales in a positive way (Hanssens et al., 2002).

Table 3.6.
Parameter estimates for the multinomial model

Group ^a	Variable	Beta	SE	Sig.	Exp(B) ^b
Ascending	Intercept	-23.17	13.66	.09*	
	Diesel	13.41	11.86	.25	672383.07
	Ethanol	1.73	4.12	.67	5.67
	Service	1.33	.61	.03**	3.80
	Branding	.57	.67	.39	1.77
	Lnprice	-922.16	529.35	.08*	.00
	Promotion	1.18	.98	.22	3.28
	Lnloyalty	-.13	.33	.69	.87
	Salesforce	.24	.75	.74	1.28
	Lnsize	.44	.85	.60	1.55
Statetaxation	14.76	15.58	.34	2590696.09	
Promising	Intercept	-20.84	15.61	.18	
	Diesel	-11.61	10.24	.25	9.01E-00
	Ethanol	21.27	13.78	.12	1730896287
	Service	1.24	.56	.02**	3.45
	Branding	-.07	.56	.89	.93
	Lnprice	-535.52	436.94	.22	1.00E-01
	Promotion	-.11	.82	.89	.89
	Lnloyalty	.14	.31	.64	1.15
	Salesforce	1.13	.66	.08*	3.12
	Lnsize	1.49	.80	.06*	4.45
Statetaxation	15.30	13.75	.26	4412099.46	
Descending	Intercept	-12.20	14.01	.38	
	Diesel	-15.33	8.60	.07*	2184E-00
	Ethanol	29.12	11.95	.01**	4.54E+12
	Service	-.85	.73	.24	.42
	Branding	.26	.56	.64	1.3
	Lnprice	-641.96	388.76	.09*	1.00E-01
	Promotion	-.17	.67	.79	.83
	Lnloyalty	.01	.29	.95	1.01
	Salesforce	-.86	.94	.36	.42
	Lnsize	.09	.82	.90	1.10
Statetaxation	-9.76	14.57	.50	5.73E-00	
Faltering	Intercept	-16.19	19.32	.40	
	Diesel	-17.88	8.62	.03**	1.70E-00
	Ethanol	16.93	17.62	.33	22711671.26
	Service	.63	.78	.41	1.89
	Branding	-.92	.71	.19	.39
	Lnprice	-201.23	434.54	.64	1.00E-01
	Promotion	-.86	.91	.34	.42
	Lnloyalty	-.11	.40	.77	.89
	Salesforce	.96	.97	.32	2.61
	Lnsize	2.37	1.02	.02	10.76
Statetaxation	27.84	17.27	.10	1.23E+12	
Unsteady	Intercept	10.19	10.41	.32	
	Diesel	-15.86	8.52	.06*	1.28E-00
	Ethanol	3.84	5.77	.50	46.85
	Service	-.06	.52	.90	.93
	Branding	.43	.52	.40	1.54
	Lnprice	-288.81	355.67	.41	1.00E-01
	Promotion	-.19	.70	.78	.82
	Lnloyalty	.30	.28	.29	1.35
Salesforce	.93	.62	.13	2.55	

Lnsizes	.33	.79	.67	1.39
Statetaxation	-2.76	12.93	.83	.06
R ² Nagelkerke			40%	
-2 Log Likelihood (Null model = 595.31)			510.47**	

Note. * $\leq .10$ is significant; ** $\leq .05$ is highly significant.

^a Reference category for group is neutral and stationary (Steady sales).

^b According to Hosmer Jr. et al. (2013), taking the exponential from betas ensures an interpretation in terms of odds ratio for *dummy* independent variables.

Interpretations of the coefficients must taken into account the nature of the independent variables. The most advisable procedure to interpret *dummy* variables is using odds ratio, after taken the exponential of beta coefficients. As shown in column six of Table 3.6, the presence of service (in the form of convenience stores) in petrol stations multiplies the odds of brand sales to remain in an Ascending position by 3.80 and by 3.45 to stay in a Promising position. Accordingly, the presence of an employee motivating others to increase the offers of loyalty cards to consumers (Salesforce) multiplies the odds for brands sales to be in a Promising position by 3.12. Contrarily, for quantitative variables which we calculated geometric means (such as diesel and ethanol sales and state taxation), the interpretation should restrict only to the signals and significance due to a wider range of the numerical value when compared to qualitative variables. This range resulted in large and misleading odds ratio values after taken the exponential of beta coefficients.

3.6. Discussion and managerial implications

Eckert (2013) conducted an economic-based review about empirical studies of gasoline retailing and what draws attention is the reduced amount of research on what the author classifies as non-price variables. Our empirical study concentrates on this stream and identifies the effect of marketing variables on brand sales positions based on short periods, specifically the ones related to product, price, service and salesforce. The results provided can assist the relationship among energy companies and numerous and heterogeneous intermediaries because signalise which marketing variables increase the probabilities of positive brand sales positions. This is important for the context studied, marked by a diverse set of retail outlets and where marketing mix real effects still need to be uncovered (Kumar et al., 2015; Venkatesan et al., 2015). Service-related research stress the positive effects of service on firm performance (Aas & Pedersen, 2011) and our investigation expands this general understanding by presenting the effect of service on positive brand sales positions in an industry where there is a tangible integration between products and services, in the form of convenience stores.

Results also identify the interplay between substitutable products and consequences for brand sales positions. According to Foxall (1999, p. 241), consumers exchange between brands “because the benefits gained from one are directly substitutable with those provided by others within the repertoire”. However, in the context studied there is only one brand (the branded gasoline) which normally receives the full marketing support by the energy company, which obviously expects no switching behaviour. Hence, energy companies want to treat branded gasoline and ethanol as vertically (Barron et al., 2000) and, therefore, qualitative (Foxall, 1999) differentiated products when practice brand-marketing support to distribution channels (Venkatesan et al., 2015), despite the fact that they possess characteristics of being functionally interchangeable. Our research shows the conditions where a non-substitutable product (diesel) can cooperate to maintain certain brand sales positions, while cases where a substitutable product (ethanol) pressure brand sales to a negative position.

Salesforce effect (in the form of incentives) increases the probability to brand sales stay in evolution positions, such as Unsteady and Promising. Outcome-based salesforce control systems are widely recognized in marketing literature (Cravens, Ingram, LaForge, & Young, 1993) and firms use commissions to motivate and manage activities of salespeople (Zoltners, Sinha, & Lorimer, 2012). The empirical model indicates that this commission structure can also be related to two brand sales positions and the main managerial recommendation is to provide, for both the company and petrol station, a combined strategy to alter sales state, as the employee responsible for motivating others to sell loyalty cards to consumers is hired by petrol stations, but receives bonuses from the energy company.

3.7. Final remarks and limitations

Dekimpe and Hanssens (1995a) provided empirical generalizations presenting some basic conditions where sales evolve or stay in a long-run equilibrium. Their study stressed the need for further research, especially regarding additional circumstances for evolution and stationarity, and was followed by the performance regimes approach, evaluated by the assessment of trend signs and changes (Pauwels & Hanssens, 2007). Our empirical work grounds on both studies and provides a multinomial logit model to explain brand sales series according to two dimensions: behaviour in time (stationary or evolution) and final position compared to the past (negative, neutral or positive). Further research should advance into the development of models to understand conditions for evolution and stationarity and fill this important gap of dynamic marketing models, uncovered by Dekimpe and Hanssens (1995a)

Our framework resulted in six brand sales positions applied to a particular marketing retail setting, providing two important outputs: (1) evidence of marketing role to these positions; (2) and a simple and rational framework to managers involved with decisions regarding brand sales based on short time series analysis. Two important limitations must be outlined and regard to the use of a unique transactional data set from a multinational company. Despite the similarity of the strategies used by energy companies and the number of observations of the initial data set (representative of five different states of Brazil), they do not cover singularities of petrol stations under contract with other companies. Additionally, there is a natural limitation of the number of observations, since the final multinomial model encompassed 174 petrol stations, a reduced sample of the total number of stations inside the company chain of distribution.

CHAPTER 4

Service distinctiveness and importance to gasoline retailing in an emerging economy: a prologue to Chapter 05

The previous chapter concentrated on a set of actions to identify the effect of marketing on brand sales positions. Our descriptive model defined six scenarios and two of them were related to desirable outcomes for managers: Promising and Ascending. Results and managerial implications accomplished are appropriated to address the presence of unbranded competition in emerging economies and how it affects brand sales. A complementary contribution is the consequences of substitutable (ethanol) and non-substitutable (diesel) products sales for brand sales positions which address theoretical issues discussed on Chapter 1.

Additionally, service was the only variable which was common to both positive positions. When Steady sales is the reference category, the presence of a convenience store multiplies the odds of brand sales to remain in Ascending by 3.80 and in Promising by 3.45. Using as reference the worst scenario (Descending), the result seems even more prominent, as the odds are multiplied by 8.95 to brand sales stay in Ascending and by 8.12 in Promising.

Therefore, it is appropriate to remark that service is one aspect of gasoline retailing which deserves a careful examination from researchers dedicated to study marketing in emerging economies. This is related to how petrol is commercialized in these contexts and refer to what Sheth (2011) classifies as market heterogeneity, which in Brazil takes the form of owner-managed small enterprises, such as third party owned petrol stations.

According to Eckert (2013) comprehensive review about gasoline retailing, the literature provides at least four major streams and none encompasses what he classifies as non-price choice variables. The distribution is marked by different contractual arrangements between distributors and suppliers resulting in diverse forms of how products are sold. Sometimes, gasoline is marketed along with services such as convenience stores. Most importantly, in emerging markets these stores can vary from restaurants or small shops independently managed by the petrol station owner to a fully licensed convenience store, franchised by a multinational energy company.

The presence of small business is a characteristic disseminated to different industries. Díaz, Lacayo and Salcedo (2007, p. 71) estimate the existence of a million “ubiquitous retailers that range from street stands and kiosks peddling soft drinks and snacks to corner selling groceries”. This characteristic is defined by Shah, Kumar and Zhao (2015) as fragmented retail environment, which obviously reproduces to a series of business areas, including gasoline retailing. The research opportunity presented by this context was not completely highlighted by the review exclusively devoted to marketing research on gasoline industry, conducted by Lin (2013). He developed a framework of the 4p’s, but neglected a possibility to investigate service distinctiveness in an emerging economy like Brazil.

Hence, Chapter 5 focuses on service differentiation in emerging economies and the implications on a wider set of marketing performance measures, namely brand sales, category sales and market share. This objective encompasses the importance of superior performance as stressed by the Resource-advantage theory. Correspondingly, the problem addressed also highlights relationship issues between a supplier (the energy company) and its intermediaries (petrol stations) discussed by the International Marketing and Purchasing (IMP) approach. The framework used on Chapter 5 resorts to utilitarian levels to classify service in low, moderated and high differentiation. There is one additional appealing characteristic from the dynamic described, as gasoline retailing in Brazil presents an interesting interplay among different products and service offered in petrol stations.

CHAPTER 5

How service differentiation in the gasoline retail context impacts B2B performance? Product-service interplay implications for sales and market share

5.1. Introduction

Services marketing is an important academic field and a research stream that has been producing considerable outputs since the publication of Shostack (1977) seminal conceptual proposal based on a molecular model of products and services. Since then, researchers are struggling to measure the impact of service on marketing performance. The management of services is distinctively different than products, but in various cases product and services are marketed together and empirical research must address the effects of these particular dimensions (Rust & Chung, 2006) of services on well-known measures such as market share, brand and category sales (Hanssens, Parsons, & Schultz, 2002).

Some industries naturally offer integration between products and services and literature usually classifies their combination in a single package as bundling strategies (Gultinan, 1987), as these two elements of the marketing mix are interdependent. A more service emphasized branch defines this combination as an augmented service offering (ASO), where managers must tackle the totality of service available to consumers (Storey & Easingwood, 1998). One concrete example of this dynamic is the gasoline retailing environment, where clear and tangible energy products are commercialized along with a set of services, that “may include car washes, automotive services and grocery convenience store items” (Eckert, 2013, p. 142).

The variations in petrol stations characteristics are defined as horizontal differentiation in the economic literature (Barron, Taylor, & Umbeck, 2000), while service innovation authors refer to internal and external extensions when analysing services output (Djellal & Gallouj, 2005). This specific literature relates innovation to economic performance and an important empirical result is that differentiation can lead to better economic productivity levels and growth (Cainelli, Evangelista, & Savona, 2004). Despite the aforementioned heterogeneous and important theoretical concerns about the integration between products and services, marketing focused empirical research still need to measure the effects of particular product-service

systems on marketing performance and bridge the gap between theory and practice (Kauppinen-Räsänen & Grönroos, 2015).

Some attempts have been made by researchers using emerging economies transactional data which are addressing questions related to specific service characteristics observed in retail contexts. Kumar, Sunder and Sharma (2015) stress that firms developing multichannel distribution strategies must consider the critical role assumed by distribution, as in these markets unstructured retail can enhance the complexity of marketing mix efforts. This particularity is well documented on Venkatesan, Farris, Guisconi and Neves (2015, p.644) empirical study using data from the beverage category. The authors defined channel intermediaries as full and self-service formats and found “that structural differences in these channels cause differences in the response to some of the manufactures’ marketing mix elements”. There are evident implications and opportunities from service differentiation at the retail level, built exclusively on Fast-moving consumer goods data (FMCG), for other industries.

But which industries are that and how they express what we define as product-service interplay and its implications to marketing performance? This empirical study covers these issues by measuring the impact of service differentiation on three marketing performance variables (market share, brand and category sales) in a particular environment, the gasoline retailing context in Brazil. Petrol-related products (such as ethanol, diesel and gasoline) commercialization have changed over the last decades as petrol stations developed from sites where vehicles were only refueled to organized points of sale of confectionary, drinks and other products (Azimont & Araujo, 2010). In emerging economies, petrol stations present fragmented retail characteristics (Shah, Kumar & Zhao, 2015) and resemble the market heterogeneity pointed out by Sheth (2011), as competition is marked by various independent retailers. Therefore, petrol stations are places where exist a clear integration between energy products and services (convenience stores) and where differentiation can affect marketing performance measures, indicating managers how to invest on service level.

Therefore, research objectives are defined as measure the impact of service differentiation on brand and category sales and market share and identify the temporal pattern of the impact of this differentiation. Our categorization of service differentiation resorts to utilitarian levels in the Behavioural Perspective Model of brand choice (BPM), a framework developed to individual consumer behaviour. According to this literature, non-price elements of the marketing mix (e.g. service) can influence particular instances of behaviour (Foxall, 2005). Our approach used the same criteria and basis of this literature for the classification of

services offered in a petrol station. The primary reason for this categorization is the identification that services marketing research entails the same limitation observed by Foxall, Oliveira-Castro and Schrezenmaier (2004) with Fast-moving consumer goods (FMCG): there are no established units to measure differentiation in services and our empirical study followed their strategy to adopt a forced system.

This chapter is organized as follows. Section 5.2 presents an outline of product-service interplay and marketing performance, followed by the operationalization of service differentiation in the gasoline retailing context in Brazil. Next, we describe the data and our methodological approach. Results are shown in Section 5.5, followed by discussion on Section 5.6. We conclude the chapter by outlining its contributions and limitations.

5.2. A brief outline of product-service interplay and marketing performance

Levitt (1980) was one of the first marketing scholars to advance into a product classification schema proposing that product levels incorporate augmented features to achieve differentiation. This mainly conceptual approach used a simple managerial terminology to exemplify the research effort conducted by Ehrenberg and others (Goodhardt, Ehrenberg, & Chatfield, 1984), where the main concern was to find patterns in brand choice preferences. This framework was enhanced by the inclusion of brand characteristics, in the form of differentiation, “that are associated to the formation of consumers’ brand repertoires and brand preferences” (Oliveira-Castro, Cavalcanti, & Foxall, in press). Despite observing a clear evolution in product-research theory, services marketing still need to encompass operational definitions to what differentiation means and how it affects performance.

Correspondingly, literature on marketing performance is widely explored by authors who concentrate on econometric and time series models. A representative part of empirical studies are focused on explaining brand performance and results often detail the impact of marketing mix actions such as advertising, price and promotion on sales and market share of retail brands (Dekimpe, Franses, Hanssens, & Naik, 2008; Dekimpe & Hanssens, 2000). The updated empirical generalizations about marketing impact (Hanssens, 2015) show this biased inclination, as there does not exist a section in this publication exclusively devoted to service effects. Systematic findings of marketing impact entail consumer-packaged goods brands across numerous different categories or household response to marketing.

Results about the impact of service on response measures are scarce and extant findings are peripheral when considering a wider view of the marketing discipline. Eggert, Högrevé, Ulaga and Muenkhoff (2014) identified positive relationships between industrial service

strategies and revenue, but their study followed the same structure as others from this stream: it is based on latent variables, rather than observable, to measure performance. Fang, Palmatier and Steenkamp (2008) used transactional data, but concentrated their analysis on the strategic level, finding positive effects of a firm's transition to services on firm value, only after an identified point of service sales (between 20% and 30%). Aas and Pedersen (2011) also used secondary data to compare potential effects of service innovation among manufacturing and service Norwegian firms. Their approach involved a series of performance measures, mostly relative and aggregated-firm sales, reinforcing the opportunity to investigate product-service interplay effects on marketing-level performance measures.

5.3. Formalising product-service interplay and service differentiation: the gasoline retailing context in Brazil

5.3.1 Peculiarities of the gasoline retailing context in Brazil

The marketing context of gasoline retailing in Brazil is a concrete example of this interplay in an emerging economy. In the 1990s, the government conducted a deregulation process that granted to various independent retail outlets the function of resale (Ministério de Minas e Energia do Brasil, 1997). Thus, multinational energy companies willing to distribute their products (gasoline, ethanol and diesel) need to formalise contracts with independent partners that varies in relation to the number of energy products available offered in stores (petrol stations) and to the levels of service offered in the distribution channels.

The differentiation of services can vary from the basic function of refuel to an existence of a store, restaurant or additional service provided by this independent petrol station or even up to a licensed-branded convenience store, franchised by the multinational energy company. The decision to invest in petrol stations as areas where people-on-the-move can access non-fuel items is not new, and conceptual research have been conducted to understand this phenomenon in Europe (Azimont & Araujo, 2010). However, there are two striking differences in emerging economies embraced by our approach that deserve attention.

The first is an attempt to formalise and quantitatively measure the effect of service differentiation on marketing performance in a clear context of product-service interplay: gasoline retailing. Usually, companies own and operate the retail themselves or franchise to an independent dealer the function of distribution (Kleit, 2005; Shepard, 1993), whereas in emerging economies third party owned small outlets also play a significant role in the distribution system. According to Díaz, Lacayo and Salcedo (2007), an unique characteristic of

an emerging market like Brazil is the presence of numerous and ubiquitous retailers, offering a range of diverse services to reach consumers.

The second singularity is that in Brazil passenger cars do not use diesel, which is a fuel only authorized for Commercial Trucks, Pickup Trucks and Sports Utility Vehicles (SUV) (Diário Oficial da União, 1989). Brazilian law authorizes energy companies to add chemical additive components to gasoline (Agência Nacional do Petróleo, Gás Natural e Biocombustíveis, 2014) and market different brands to their consumers. These singularities create a marketing research context where there is a presence of branded and unbranded products in petrol stations and the level of service differentiation provided can influence performance measures such as brand and category sales and market share in distinct forms.

5.3.2 Service differentiation operationalization

These aspects highlight the need for empirical research to understand the effects of service differentiation. The peculiarities of emerging economies are actually at the core of the marketing phenomenon, being constantly emphasized by editorials of important marketing journals (Burgees & Steenkamp, 2013; Narasimhan, Srinivasan, & Sudhir, 2015; Roberts, Kayande, & Srivastava, 2015) or papers which stress the “millions of opportunities” posed (Chandy & Narasimhan, 2015). Services marketing issues within these contexts turn the research opportunity even more interesting, as recent publications about service raise questions about the improvement of theory (Russell-Bennett & Baron, 2015), development of practice-oriented models (Kauppinen-Räsänen & Grönroos, 2015) and measurement of performance as a priority (Ostrom, Parasuraman, Bowen, Patrício & Voss, 2015). Despite the sudden attention dedicated to emerging economies, service issues as the one presented by the gasoline retailing environment in Brazil can enrich this discussion.

Our approach grounds on the Behavioural Perspective Model of brand choice (BPM) to operationalize the definition of service differentiation. The BPM is a model based on a behaviourist perspective of consumer choice of retail brands, where choices are outcomes of utilitarian and symbolic rewards (Foxall, 1999). We will not detail the entire model and the contributions provided to marketing research, as our framework concentrates exclusively on utilitarian characteristics to define levels of service differentiation in gasoline retailing in Brazil. In this market, firms compete not only for price, but also for other dimensions, like service (Iyer & Seetharaman, 2008). Petrol stations are normally under exclusive distribution contracts and on certain occasions they are required to exhibit the refinery brand when the contract demands,

in a context defined by differences in contractual forms and asset characteristics (Shepard, 1993).

Petrol stations under contract exclusively buy the product from a given refinery and compete offering service characteristics that can vary (Iyer & Seetharaman, 2008). Therefore, the approach outlined in our study considers these variations as service differentiation, where differences are related to attributes that acquire utilitarian functions, as the BPM stresses (Oliveira-Castro et al., in press). The reason to resort to this framework to define service differentiation is that services marketing literature exhibit the same limitation observed in FMCG, where there are no general units to measure differentiation levels (Foxall et al., 2004). To overcome this constraint, we defined three levels: low, moderated and high service differentiation. The classification detailed on Table 5.1, specifically the high differentiation, also finds grounds on economic literature under a different theoretical approach, where a licensed convenience store can be operated under strong effort incentives from a principal-agent perspective, where the refinery plays the role of the principal (Shepard, 1993).

Table 5.1.

Service differentiation in the gasoline retailing context in Brazil

Definition	Description
Low service differentiation	When petrol stations offer only the basic refuel service
Moderated service differentiation	Where there is a presence of an additional service, such as a restaurant or a convenience store, independently managed by the petrol station owner
High service differentiation	Where the petrol station offers the basic refuel service and there is also a licensed-branded convenience store, franchised by the multinational energy company. Management in this case is also relegated to the petrol station owner, but the energy company acts like a partner in business, including the store in promotional or discounting strategies

5.4. Method

5.4.1 Research design and data description

The research design comprised of two objectives and procedures. First, to identify the impact of service differentiation on performance, three Generalized Linear Models (GLM) were developed using three dependent variables. Data set was in a balanced panel format at the store level (the petrol stations), where the primary independent variable (service differentiation) was analysed and internal and external informations were used as control variables. Sales information of the data set consisted of 195 petrol stations in 27 months, from January 2011 to March 2013. Twenty-five observations, however, had less than 27 periods: they had started or terminated their distribution contracts after January 2011 or before March 2013, but were maintained in the analysis, resulting in a total of 5010 observations.

The 195 petrol stations are distributed along five states and 47 cities in Brazil. There are observations located at capitals and minor cities and this characteristic guided the construction of control variables related to internal and external factors, once the non-inclusion of exogenous variables could produce bias in empirical models of sales (Venkatesan, Farris, & Wilcox, 2015). Accordingly, the data set meets the variability criteria established by Leeftang, Wieringa, Bijmolt and Pauwels (2015), presenting multiple sources of variation, considering the heterogeneity among the observations. The number of 195 is higher than the normal interval of 10 and 20 stores normally selected for auditing (Malhotra, 2009) and represents an entire sales region from the company, and a sample of 4.1% of the 4700 petrol stations under contract into the company's chain of distribution. Since the petrol stations were all under contract with the multinational gas company inside the time window (2011-2013) this guarantees that in the period of analysis they only bought gas-related products (such as unbranded ethanol, diesel, gasoline and branded gasoline) from the company.

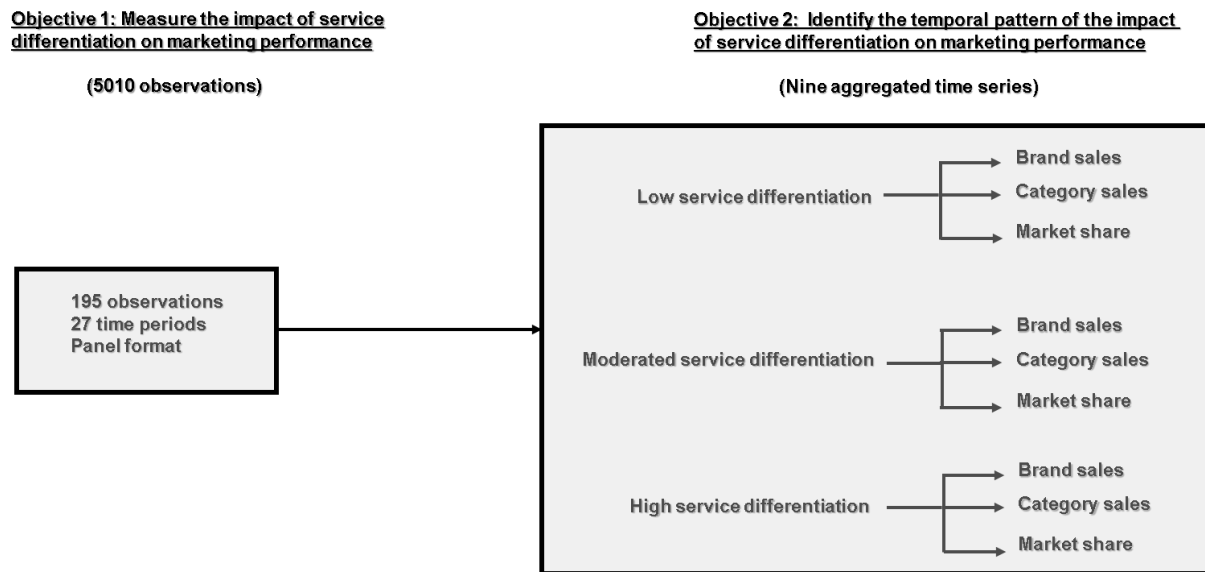
GLMs were used because basic assumptions from a simple linear model were violated for all dependent variables (McCulloch & Searle, 2001). The results of Skewness/Kurtosis and Shapiro-Wilk tests on all three dependent variables guided the selection for this design, since all tests rejected the null hypothesis of normality. Preliminary tests using Ordinary Least Squares (OLS) estimation models also produced non-normal residuals, clearly indicating the use of GLM (Olsson, 2002). Another reason was the identification of an obvious independent marketing variable (service differentiation) in a context of between-group and repeated-measures variables with more than one independent variable (Field, 2009) and one of the features of the GLM is to produce estimated marginal means for a factor independent variable.

The second step of the empirical research included a simple time series analysis on the 27 month period for each combination of group (service differentiation) and the dependent variables. In this case, however, marketing performance measures were aggregated and adjusted by the number of petrol stations inside each group, generating three individual time series for each dependent variable. The full procedure is detailed on Section 5.5.2. The objective of this stage was identify temporal patterns of the response variables, considering the presence of the effect of the main independent variable (service).

In this stage the KPSS test for stationarity (Kwiatkowski, Phillips, Schmidt, & Schin, 1992) was used to analyse the temporal behaviour and the prevalence of the impact of service differentiation over time. This identification is important because managerial marketing decisions using time series processes are based on constant or ever-changing means of performance variables, classified as stationary or evolution. The evolution pattern, for example,

grants a stochastic behaviour of the performance variable and a susceptibility to marketing efforts, in contrast to stationarity, which shows only temporary deviations from a fixed mean (Hanssens et al., 2002). Further information about the implications of these concepts to marketing is fully detailed on the empirical generalizations published by Dekimpe and Hanssens (1995a). Also for this stage a preliminary statistical criterion comprised ANOVA Post Hoc tests using the three groups as factor variables and these results are presented in the following section. Figure 5.1 summarises the research objectives and design.

Figure 5.1. Research objectives and design



5.4.2 Modeling response variables

Three variables were selected to describe marketing performance: brand and category sales and market share. Modeling brand sales measure was required because 70 petrol stations had not, at least in one month of their time series, bought from the company the branded product, swapping to unbranded in some periods. This resulted in irregular patterns of brand sales and this variable received the inclusion of one unit (1) to encompass the 195 observations from the data set. This is a solution normally employed in marketing response modeling studies (Hanssens & Parsons, 1993)

Category sales represent the sum, for each observation in a given month, of sales from all products (diesel, ethanol, branded and unbranded gasoline). Market share is category sales from a petrol station divided by the total sales of the aforementioned petroleum derived products from all government authorized distributors to petrol stations inside the state where the given observation (a petrol station under contract with the focal company) was located, in that month.

This is an official information published and regularly updated by the Brazilian National Agency of Petroleum, Natural Gas and Biofuels (ANP) (Agência Nacional do Petróleo, Gás Natural e Biocombustíveis, 2015a). Equations 5.1, 5.2 and 5.3 formalise the construction of the three dependent variables of the study.

$$\text{Brand sales}_{it} = \text{Ln}\left(\frac{\text{sales of the branded gasoline}+1}{\text{sales of the unbranded gasoline}+1}\right) \quad (5.1)$$

$$\text{Category sales}_{it} = \text{Ln}\left(\sum_j^t \text{total product sales}\right) \quad (5.2)$$

$$\text{Market share}_{it} = \text{Ln}\left(\frac{\sum_j^t \text{total product sales}}{\sum_{i,j}^t \text{sales from all companies to all gas stations, per state}}\right) \quad (5.3)$$

where “i” is the subscript for the observation, the petrol station, and “j” is the subscript for products sold at petrol stations, such as diesel, ethanol, gasoline, branded and unbranded gasoline.

5.4.3 Modeling price variable for brand sales model

Product sales are in cubic footage, a volume measure used to describe quantity. According to Hanssens and Parsons (1993), this is the most appropriate form to explain sales as a response function, because provide managers outcomes suitable for planning purposes. Subsequently, we conducted a double-logarithmic transformation to organize interpretations in terms of elasticities (Leeflang et al., 2015), since this procedure organizes into same units different variables (Burmester, Becker, Heerde, & Clement, 2015). Therefore, price also suffered a logarithm transformation, with price information retrieved from an ANP periodical publication. Nonetheless, the construction of this variable required additional procedures to build a monthly average price of resale⁴. This monthly information normally regards to almost every city in Brazil, where ANP computes it after a random survey in petrol stations (Agência Nacional do Petróleo, Gás Natural e Biocombustíveis, 2015b). Usually, the government organization carries on four surveys within a month.

⁴ We also estimated the empirical models using the wholesale average price retrieved from ANP. However, as price is a control variable, resale price resulted in better estimates and expected signals, in accordance with Bijmolt, Heerde and Pieters (2005) updated empirical generalizations about price elasticity. This based our choice for resale prices in the brand sales model (Model 1).

Price information published by ANP regarding four state capitals of the data set (Brasília, Campo Grande, Cuiabá and Goiânia) served as reference prices to smaller cities inside the four states where these capitals were located. Since for one state the data set did not have any petrol station located in the capital, monthly average price for the state of Minas Gerais was built from the city with the most inhabitants of the data set inside this state (Uberlândia). Eighteen from the 53 petrol stations from this state were located in this city. This procedure provided monthly average prices for unbranded gasoline.

Price for branded gasoline was more difficult to obtain, as ANP does not publish it. We resorted to an internal company verbal information, provided by a marketing employee of the sales region, to calculate the price for branded gasoline. This is not the most advisable procedure, but it is common in specific contexts (Leeflang et al., 2015), such as emerging and industrial markets, where data is particularly scarce (Narasimhan et al., 2015). According to this employee, price for branded gasoline in this company is regularly 0.075 cents higher than unbranded gasoline. This allowed the development of the price variable, shown in Equation 5.4.

$$\text{Price}_{it} = \text{Ln}\left(\frac{\text{monthly average estimated resale price for branded gasoline}}{\text{monthly average resale price for unbranded gasoline}}\right) \quad (5.4)$$

Table 5.2 describes the marketing variables of the study. Means for brand sales of low (1.88) service differentiation petrol stations are lower than moderated (8.23) and high (16.23) service differentiation. These results are all highly significant ($p < 0.001$) considering Tamhane's T2 multiple comparison test (Tamhane, 1977) for groups with heterogeneous variance. This ANOVA Post Hoc test also identified that means for category sales of the low (350.91) and high (332.75) service differentiation are statistically equal, while moderated services exhibit a higher and statistically different mean (466.07) than these two groups ($p < 0.001$ for both cases). Means and standard deviations for market share variable are closer to zero and exhibit a different structure than category sales. Tamhane's test results indicate that means for market share of moderated and high service differentiation are statistically equal, but both different from low differentiation ($p < 0.001$). Results for stage two of the study will discuss these issues in detail. Differences in means for price variable for low (1.02) and moderated (1.02) differentiation of services groups have low statistical power ($p < 0.1$) while differences in means for price of low (1.02) and high (1.02) differentiation of services are significant ($p < 0.05$). Finally, the difference in means for price between moderated (1.02) and high (1.02) differentiation of services is not significant.

Table 5.2.
Descriptive statistics of the response and price variables

Variable	Service differentiation						Variable notation
	Low		Moderated		High		
	Mean	SD	Mean	SD	Mean	SD	
Brand ^a sales	1.88	9.09	8.23	28.21	16.73	92.40	lnratio
Category ^b sales	350.91	453.96	466.07	453.22	332.75	221.37	lncatsales
Market share ^b	.00	.00	.00	.00	.00	.00	lnmktshare
Price ^a	1.02	.00	1.02	.00	1.02	.00	lnprice

Note. Variables are in raw values for descriptive statistics

^a Brand sales and Price values are means and standard deviations of exponentials taken from the difference in logarithms operations resulted from Equations 5.1 and 5.4.

^b Category sales and Market share are presented in volume, which in this case are expressed in cubic footage (m³)

5.4.4 Operationalization of control variables and empirical models

Category sales and market share models include five control variables, while brand sales model incorporates one additional control information for price. These variables are divided into three main groups. Firstly, an internal factor, represented by the size of the petrol station. Secondly, two economic factors that refer to a national measure of inflation rate and to state taxes which normally incur on energy products commercialization. Finally, two additional demographic factors, regarding the number of new registered cars in the state and the population size of the city where the petrol station is located. Table 5.3 summarises the descriptive analysis for control variables of the three GLM models, with the exception of price, detailed previously on Table 5.2.

Table 5.3.
Descriptive analysis of control variables

Control variable	Mean	SD	Transformation procedure before running the model	Notation
Size	100.68	41.65	Natural logarithm of petrol station size, measured as the capacity (in cubic footage) of the fuel tanks of the petrol station. Official information published on the ANP website ^a	size
National taxation	.51	.20	Natural logarithm of the average monthly value of the National Index of Consumer Price (IPCA), an inflation measure used in the country	nattax
State taxation	.21	.01	Natural logarithm of the geometric mean of a state-specific and variable per state tribute ^b	statetax
New registered cars	466917.30	52312.52	Natural logarithm of the quantity of new cars monthly registered in Brazil ^c	nrcars
Population	1061162.53	988274.96	Natural logarithm of the population of the city where the petrol station is located ^d	population

Note. Variables are in raw values for descriptive statistics

^aRetrieved information from the official Brazilian agency responsible for regulating the energy sector in Brazil. For missing data on seven observations, we resorted to the average size for all petrol stations inside the state where the information for size was missing.

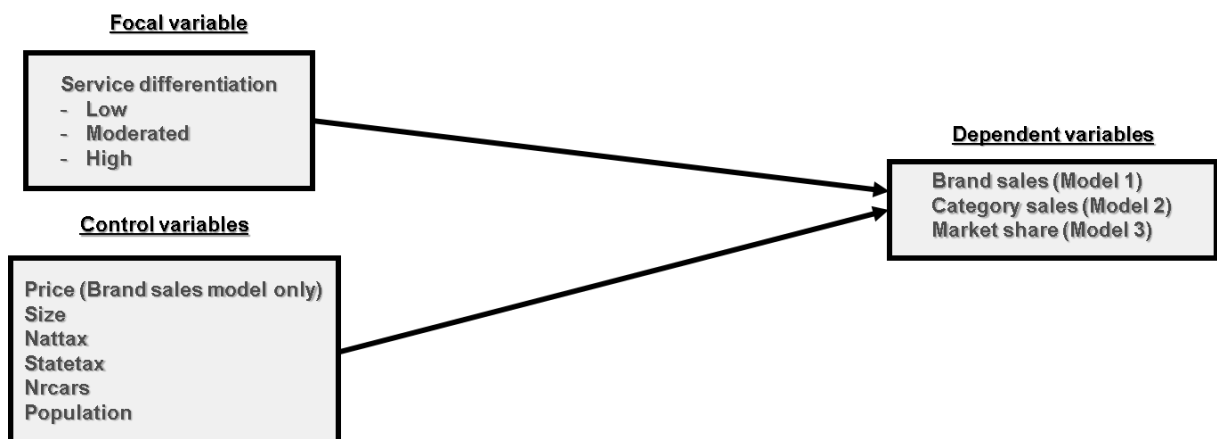
^bIn Brazil, there is a specific and variable per state tribute (Circulation of Goods and Services Tribute), which incur on energy products. Aliquot is different for diesel, ethanol and gasoline and for this reason we calculated a geometric mean per state to capture the dynamic effect of this variable.

^cData provided by the National Federation of Automotive Vehicle Distributors (FENABRAVE)

^dInformation retrieved from the 2010 Census conducted by the Brazilian Institute of Geography and Statistics (IBGE)

Figure 5.2 portrays the three models developed to address the first objective of the empirical study: assess the effect of service differentiation on marketing performance, expressed by the dependent variables brand and category sales and market share. Service is the focal variable, a factor represented by three levels: low, moderated and high service differentiation. Control variables are also expressed in the illustration and were constructed to avoid omitted-variable bias.

Figure 5.2. Empirical models for the first objective



5.5. Results

5.5.1 Results for explaining marketing performance on the GLMs

The first stage of the study involved the development of three GLMs to identify the impact of service differentiation on marketing performance, namely brand and category sales and market share. Despite the results of normality tests, histograms of the dependent variables showed unimodal distributions, with non-skewed shapes and certain symmetry. Figures 5.5, 5.6 and 5.7 on Appendix D exhibit the distributions. These characteristics guided the selection for a distribution of a Gaussian family for the dependent variables. Accordingly, once dependent (and continuous) variables were already transformed to logarithms to represent interpretations in the form of elasticities, the link function selected was Identity (Olsson, 2002).

The methodological procedures to run the models involved a preliminary estimation of the dependent variables against a constant-only model. After that, full models were estimated and allowed comparisons of Akaike information criterion (AIC), Bayesian information criterion (BIC) and the results of Likelihood Ratio chi-square tests between constant-only and full models. These methodological steps attended the basic principle of parsimony (Schwarz, 1978). In all situations, full model estimations resulted in better criteria and fit than constant-only models. Table 5.4 summarises the effects of service differentiation, control variables and model fit values for models one (brand sales), two (category sales) and three (market share).

The first important result is that service differentiation positively affects marketing performance. However, high differentiation (that is, the company-supported convenience stores) exerts superior impact than moderated differentiation only for brand sales. For Model 2, only moderated differentiation (the third party supported service) is statistically different from low differentiation. This result suggest that: 1) company support at services offered at the store level (in the form of a licensed-branded convenience store) can propel the sales of the branded (premium) product; but 2) this support does not necessarily lead to sales of the total category, nor even to higher market share.

Service differentiation at the store level also influences category sales, but in this case it refers to restaurants or mom and pop stores only, ran independently by owners of petrol stations. Another important outcome is the positive coefficient for moderated differentiation and negative for high differentiation in Model 3. These results indicate that a moderated service differentiation positively influences all marketing performance variables, while high differentiation company-supported affects only brand sales, revealing an interesting product-service interplay support for the branded product. Accordingly, the effects of service unveil relatively high coefficients to service effects on brand sales, which starts decreasing in Model

2 (category sales) and then in Model 3 (market share). Hence, service effects seem more prominent to specific brand sales than to the whole category and market share. Figure 5.3 shows the effect of service differentiation on marketing performance and the estimated margins for brand and category sales and market share.

Table 5.4
Effects of service differentiation on dependent variables

	Model 1		Model 2		Model 3	
	Parameter Estimate	Standard Error	Parameter Estimate	Standard Error	Parameter Estimate	Standard Error
Service differentiation ^a						
moderated	.45***	.06	.16***	.02	.08**	.03
high	.85***	.06	-.03	.02	-.06**	.03
Inprice (model 1 only)	-67.65**	27.47				
size	1.16***	.06	1.27***	.02	1.65***	.03
nattax	.02	.04	-.01	.01	.00	.02
statetax	.87**	.27	-.19**	.09	-.15	.13
nrcars	.03	.21	.29***	.07	-.01	.10
population	-.07***	.01	.02***	.00	.31***	.00
Constant	-3.22	2.98	-4.79***	1.01	-18.93***	1.44
Log Likelihood	-9732.79		-4527.95		-6284.67	
AIC (constant only)	3.99		2.33		3.20	
AIC (full model)	3.88		1.81		2.92	
BIC (constant only)	-26806.01		-39635.71		-35477.93	
BIC (full model)	-28323.81		-40.824		-39007.67	
LR chi ²	527.61***		2653.89***		3461.57***	

Note. ** $\leq .05$ is significant; *** $\leq .001$ is highly significant.

^a Low differentiation services is the base category.

An important remark about coefficients interpretations must be pointed out, as models encompass quantitative and qualitative variables. For quantitative independent variables interpretation is very straightforward and in terms of elasticities. For example: this means that an increase of 1% on price reduces the sales for the branded product by 67.65% (Model 1). However, for qualitative variables with more than two categories, interpretations must be compared to the base group (Wooldridge, 2012), which in the empirical study is low service

differentiation. Using again as an example Model 1, this means that, approximately, a petrol station with moderated service differentiation sells, on average, 45% more ratio of the branded gasoline than a petrol station with low service differentiation, holding all else constant. Consequently, petrol stations with high service differentiation sell, on average, 85% more of ratio of branded gasoline than the base group.

Control variables estimates are also inside the expected signals. First, price negatively affects brand sales, reproducing the results of the empirical generalizations published by Bijmolt et al. (2005) with FMCG and Brons, Nijkamp, Pels and Rietveld (2008) on gasoline demand context. Another important question regarding the estimates for the price variable is that raises in price negatively affects sales of the branded product only, indicating that sales movements probably go towards the unbranded product sold in petrol stations, since the dependent variable for Model 1 is measured as differences in logarithms. Size effect is strong and positive and becomes higher from Model 1 through Model 3, revealing that bigger petrol stations also sell more and possess more market share.

Economic factors also play a role and state taxes positively affects brand sales, but negatively affects category sales. This difference could be explained by the nature of the energy products: diesel sales (inside category sales) encompass heavy vehicles, responsible for commercial transportation. Where and when taxation is higher, commercial activity, expressed by sales, can drop. Lastly, population size is positively associated to category sales and market share and negatively associated to brand sales. A broader discussion on these issues is presented on Section 5.6.

5.5.2 Results for time series analysis of the effect of service differentiation on marketing performance

The second objective involved a time series analysis on the dependent variables for the three groups. An aggregation procedure sorted the three groups for the three dependent variables inside the 27-month period, generating nine time series. It is important to outline that in this procedure the single values for brand, category sales and market share were summed and then adjusted (divided) by the number of petrol stations inside each group: 129 for low differentiation services; 33 for moderated and 33 for high differentiation. Additionally, this aggregation considered the raw values (volume) of the variables, instead of logarithms. The objective was to identify the temporal behaviour of the dependent variables considering the service differentiation level for a “given” petrol station. Before conducting time series analysis,

ANOVA Post Hoc tests assessed the statistical difference in means. Figure 5.4 reveals the temporal behaviour of the three groups and includes details on the Post Hoc tests.

KPSS tests on individual time series resulted in the identification of stationarity or evolution in sales or market share. This procedure tests the null hypothesis of a mean-reverting behavior against the presence of a unit root (Kwiatkowski et al., 1992). Identify the time series pattern is important for marketing performance research because the absence of a unit root grants that fluctuations of performance measures are temporary deviations from deterministic components, while its presence allow stochastic behaviour and, therefore, susceptibility to long-term marketing actions (Dekimpe & Hanssens, 1995a; Hanssens et al., 2002). The automatic bandwidth selection procedure by Newey and West (1994) based the selection for the number of lags for KPSS tests. We also had set a 5% significance level to avoid Type I error (classify a time series as evolving when it was, in fact, stationary)

Figure 5.3. Predicted means for performance variables considering service differentiation

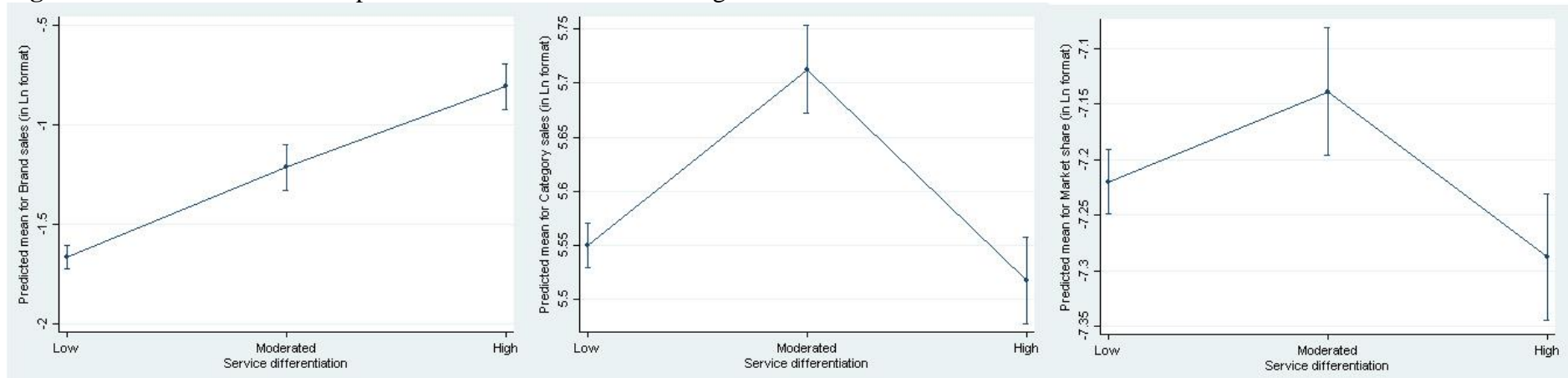


Figure 5.3. The values on the vertical axis are in logarithm form and is necessary to take exponentials to identify the actual raw values for brand, category sales and market share. Margins plotted with 95% confidence intervals.

Figure 5.4. Time series behaviour of performance variables considering service differentiation

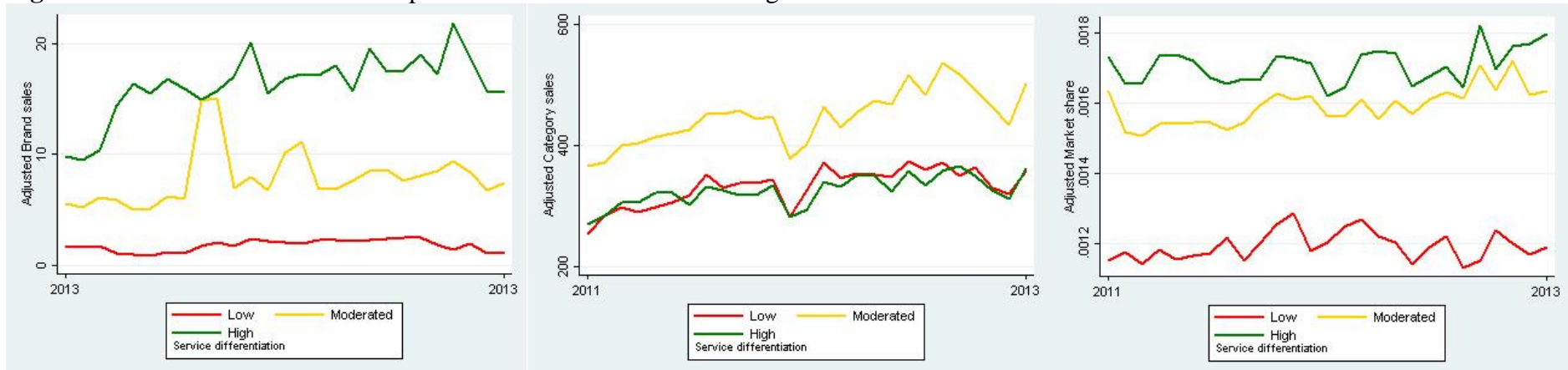


Figure 5.4. Difference in means is statistically different for all three groups for adjusted brand sales, according to Tamhane's T2 multiple comparison tests. For adjusted category sales, only the means for moderated difference are different from the other two groups, also according to Tamhane's tests. For adjusted market share, Tukey honest significant difference test (HSD) (Tukey, 1949) was used, because variances among the three means inside this group were identified as homogeneous. The results also indicate a statistical difference for all three means.

Individual time series analysis on brand sales model reveal that low and moderated differentiation services are stationary, while for high differentiation are evolving. An additional consideration is that means for high differentiation services are significantly higher than the other groups, based on the results of Tamhane's test. The same analytical procedure on category sales identified an evolution pattern for all groups, but in this case moderated differentiation service means are higher, as shown by the yellow line in Figure 5.4. Accordingly, there is no statistical difference between low and high differentiation services. Tests for market share variable identified once more an adjusted mean significantly higher for high differentiation services compared to moderated and low differentiation. However, the additional KPSS tests identified stationarity for low and high differentiation service and evolution for moderated service differentiation.

5.6. General discussion of study results

Econometric and time series empirical literature about marketing impact constantly focuses on measures of marketing effort to assess performance-influencing factors (Hanssens et al., 2012). The major issue for research is that normally these measures are limited to advertising and price strategies (Dekimpe et al., 2008; Dekimpe & Hanssens, 2000) and only a few studies consider the integrated mix implications for performance (Hanssens, 2015). Still, there are striking opportunities posed by marketing phenomenon on specific contexts, specially if we highlight service as the variable of interest and underscore how it is structured in the gasoline retailing in Brazil.

According to Díaz et al. (2007), several factors could explain the resiliency of unconventional retail on emerging economies, but Brazilian geographically sparse territory is definitely one of the factors responsible for the unstructured setting, where service offering can vary from a basic function (low differentiation) to a more specialized one (high differentiation). Venkatesan et al. (2015) approach to classify the retail heterogeneity was grounded on size characteristics and ownership structures, leading to two channel definitions, chain self-service and traditional full-service. This was suitable to the beverage category, but we believe that our definitions based on utilitarian functions (Oliveira-Castro et al., in press) are more appropriate to express the diversity in service access (Sheth, 2011).

Extant service research priorities are focusing on what is classified as outcomes, such as measuring service performance and impact (Ostrom et al., 2015). The results of our empirical study tackle these issues and identify how service differentiation can drive marketing performance measures and how is the behaviour over time of these measures given the level of

service differentiation. This is important because managers are always seeking rational explanations for the processes responsible for the variation on performance (Hanssens et al., 2002) and quantitative models about marketing phenomena can avoid common rule of thumb decisions, so persistent in emerging economies, where marketing data is still scarce (Narasimhan et al., 2015). Specifically, the first stage of the methodology identified that service differentiation can increase the levels of brand sales and this is crucial for the context studied, because the premium product is responsible for generating higher profit margins (Barron et al., 2000), for both the petrol station and the multinational company, in a context where there is a strong interdependence between these two parties to distribute the product.

Hence, the inclusion of additional and differentiated services, leading to its extension, can assist managers worried about a performance measure such as brand sales. This specific result is also important for franchising literature in services dedicated to relate this strategy to performance (Ribeiro & Akehurts, 2014), once the high differentiation involves the offering of a service franchised by the refinery company that can lead to more brand sales. However, this strategy does not seem important to influence category sales and market share, as moderated differentiated services perform better than high differentiated services. These questions are important to understand how a brand marketing strategy (Venkatesan et al., 2015) works outside the FMCG context, and in an emerging economy setting.

The second stage evaluated the time series behaviour of the marketing performance variables considering service differentiation. Research on service performance usually lacks volume when analysing the impact of service through time series lens. High service differentiation can lead to higher means over time for brand sales and market share and in an evolving time series for brand sales, when compared to moderated and low service differentiation. The results are salient for the context analysed, where a multinational company needs to distribute its primary product to heterogeneous and geographically sparse channels. This means that a fully licensed-branded convenience store, franchised by the multinational energy company, can produce evolving brand sales over time, signalling market conditions where sustained spending can lead to permanent positive directions (Dekimpe & Hanssens, 1999).

Evolving sales are persistent, instead of short-lived, and the identification of evolving patterns for brand sales and market share inside a 27-month time window is crucial for managers, who usually take marketing decisions based on analysis of short periods (Pauwels & Hanssens, 2007). Conversely, for category sales this result does not repeat, revealing higher means for moderated service differentiation. However, the three time series analysis reproduced

what was found in the first stage: service differentiation in a product-service interplay can increase marketing performance. The market share values close to zero suggest a similar pattern to what is discussed about marketing performance with FMCG: while sales exhibit more variability, market share tend to reveal long-term equilibrium (Graham, 2009), as only a moderated differentiation of services could be classified as evolving market share. Therefore, results of the second stage roughly confirm Dekimpe and Hanssens (1995a) empirical generalizations: sales are evolving while market share is basically stationary.

However, the discrepancy in this case is that low service differentiation is more related to stationary sales while moderated service differentiation can lead to an evolving market share, revealing, once more, the importance of higher levels of service differentiation. The results on the time series analysis contribute to the identification of additional conditions under which stationarity or evolution occur and provide further knowledge to Dekimpe & Hanssens (1995a) empirical generalizations. Their study solely concentrated on research in industrialized countries of North America and Europe whereas our approach is based on an emerging economy context, with data retrieved from a product category that is different from the durables and non-durables studied by the authors.

Control variables results reveal a very strong elasticity for price in Model 1, showing a magnitude of the coefficient for price higher than expected. This may be due to characteristics such as geographic area, time of the study and demand equation used (Brons et al., 2008). Economic factors used unveil additional characteristics that directly influence marketing performance measures in the gasoline retailing context. Specifically, population size signal on Models 2 (category sales) and 3 (market share) are in line with Goodwin, Dargay and Hanly (2004) review expect for fuel consumption. However, population is negatively associated to brand sales and this result may seem contradictory, but it is appropriate to outline the gasoline consumption in Brazil: consumers often find an alternative for the branded product, an unbranded version of the “premium” gasoline, especially in bigger cities.

5.7. Contributions and limitations

Research on performance and service is revolved around a complex performance system (Brignall & Ballantine, 1996) which not necessarily reflects marketing performance needs. Correspondingly, extant research on services marketing performance usually highlights individual and latent measures, such as loyalty and satisfaction (Askoy, Hogreve, Lariviere, Ordanini, & Orsingher, 2015), instead of response variables (Hanssens et al., 2002). A decisive contribution of this study is the discussion of a distribution context where channels also play a

primary, but different role, offering auxiliary services, such as convenience stores, that can propel sales of products sometimes treated as homogeneous (Iyer & Seetharaman, 2008), such as diesel, ethanol and gasoline.

Results are based on a unique transactional data of a multinational company in an emerging economy setting, in a clearly context of product-service interplay: the gasoline retailing. However, one important limitation refer to the number of 27 periods to analyse time series, lower than the methodological recommendation to use more than 30 uninterrupted periods (Hanssens et al., 2002). Nonetheless, managers base their decisions on short time periods (Pauwels & Hanssens, 2007) and there are results being published in scientific business journals using original data from companies based in developing countries containing a number lower than that (Baidya, Maity, & Ghose, 2012). Future studies should try to reproduce our variable operationalization in different contexts, since one characteristic related to service nature is its heterogeneity (Lovelock, 1983).

CHAPTER 6

Why is this thesis important? The contributions to marketing research and practice

6.1. Contributions to marketing research

Marketing models are being developed by researchers since the 1960's and numerous developments have been observed in a wide range of specific marketing streams (Wierenga, 2008). There are two areas covered by this thesis that are not usually a matter of concern by researchers. The first encompasses the potential possibilities presented by emerging markets, since a representative amount of contributions to scientific and practical problems were built from research conducted in contexts classified by Burgess and Steenkamp (2006) as high income and industrialized countries. Therefore, marketing issues raised in emerging economies may be responsible for theoretical and practical advances (Burgees & Steenkamp, 2013) and this thesis answers ongoing calls for research evoked in high-evaluated scientific publications (Burgees & Steenkamp, 2006; Narasimhan et al., 2015; Roberts, Kayande, & Srivastava, 2015; Sheth, 2011).

The second involves the market context where our research was conducted. Marketing models evolved to a point that empirical generalizations were published (Hanssens, 2015) and are being widely scrutinized. However, the scientific knowledge built overemphasizes specific variables (such as price and advertising) and sectors of the economy, usually Fast-moving consumer goods (FMCG). The theoretical framework and methodological approach developed in this thesis were based on the gasoline retailing in Brazil, a particular competition situation which deserves careful attention. One of the expected consequences is to engender new discussions and base new models concentrated on similar aspects raised in this space.

Table 6.1 summarises the main contributions to marketing research provided by this thesis. They refer to the theoretical and empirical chapters and are centered on: a) the problematization proposed on Chapter 2; and b) the primary results from the development of the econometric models specified on chapters 3 and 5.

Table 6.1
Thesis contributions to marketing research

Section	Contributions
Theoretical chapter Chapter 02	<ul style="list-style-type: none"> - The theoretical implications for Business-to-Business (B2B) performance when considering product differentiation, such as branded and unbranded products - The eventual theoretical consequences for performance variables when products analysed may (or may not) be substitutes
Empirical study 01 Chapter 03	<ul style="list-style-type: none"> - The time series delimitation of brand sales in a context where products may be substitutables and where marketing variables exert effect on brand sales positions over time - The separation of brand sales into two dimensions: behaviour in time and final position
Empirical study 02 Chapter 05	<ul style="list-style-type: none"> - The definition of service differentiation in three levels and the identification of the effect of these levels on marketing performance variables - A time series analysis on evolving or stationary patterns of performance variables, given levels of service differentiation

6.2. Contributions to marketing practice

Over the last two decades, a surge for marketing accountability is being observed, with managers and scholars receiving increasing pressure to demonstrate the impact of marketing efforts (Rust et al., 2004). This movement was followed by a recent call for practical pertinence in marketing academia, which reopened “the age-old debate on rigor versus relevance” (Roberts, Kayande, & Stremersch, 2014, p. 127). Literature on marketing models often highlights a gap in research outputs: while developments are obvious from a research and an empirical perspective, levels of trial and adoption of these models are significantly low (Lilien, 2011). This thesis presented one theoretical and two empirical approaches to response measures such as sales and market share as an attempt to provide guidance to managers about the impact of marketing.

Despite being theoretical in its nature, Chapter 2 detailed the extent of the relationship between a supplier and an intermediary and the resulting implications for managing product differentiation. A close relationship between these two parties is necessary because demand for the product studied is derived and, unlike FMCG, service offered on stores can drive performance, expressed in the form of sales and market share. Marketing managers can benefit from the B2B sales situation expressed in Figure 2.2, for example, where a competition of branded and an unbranded product is followed by a mix that encompasses substitutable and non-substitutable products. The practical importance of this scenario is to delineate retailing situations where managers face this rivalry among products.

Chapter 3 provided three crucial contributions to marketing practice, all related to the management of brand sales. First, it portrayed a straightforward framework where brand sales over time were classified using two components: the behaviour in time and the final position. This step allowed the construction of six descriptive and managerial-focused labels, identifying desirable and undesirable outcomes for sales, which managers can easily apply to their reality. Finally, a probability (multinomial logit) model recognized which marketing variables could increase the permanence of brand sales in neutral or positive positions. Therefore, the results demonstrated how marketing effort could drive and change sales state, using analytical techniques grounded on simple time series analysis.

Practical service marketing issues were addressed in Chapter 5 as service research is also showing concerns about the instrumental use of the knowledge generated (Kauppinen-Räsänen & Grönroos, 2015). Our approach to measure the impact of service differentiation on performance is relevant for managers because specifies how to categorize service in different levels, according to the addition of supplementary benefits. The methodology employed expressed this effects using two techniques, one responsible for generating predicted values of performance variables and another grounded on the time series behaviour of these measures.

This thesis concentrated on explaining marketing performance variables using market response models. Models are very important for increasing marketing knowledge and improving practice and specially significant to the context delineated by our approach: gasoline retailing in an emerging economy setting. The main concerns were contribute to the scientific advancement about marketing in emerging economies and supply managers with instrumental ability to explain performance.

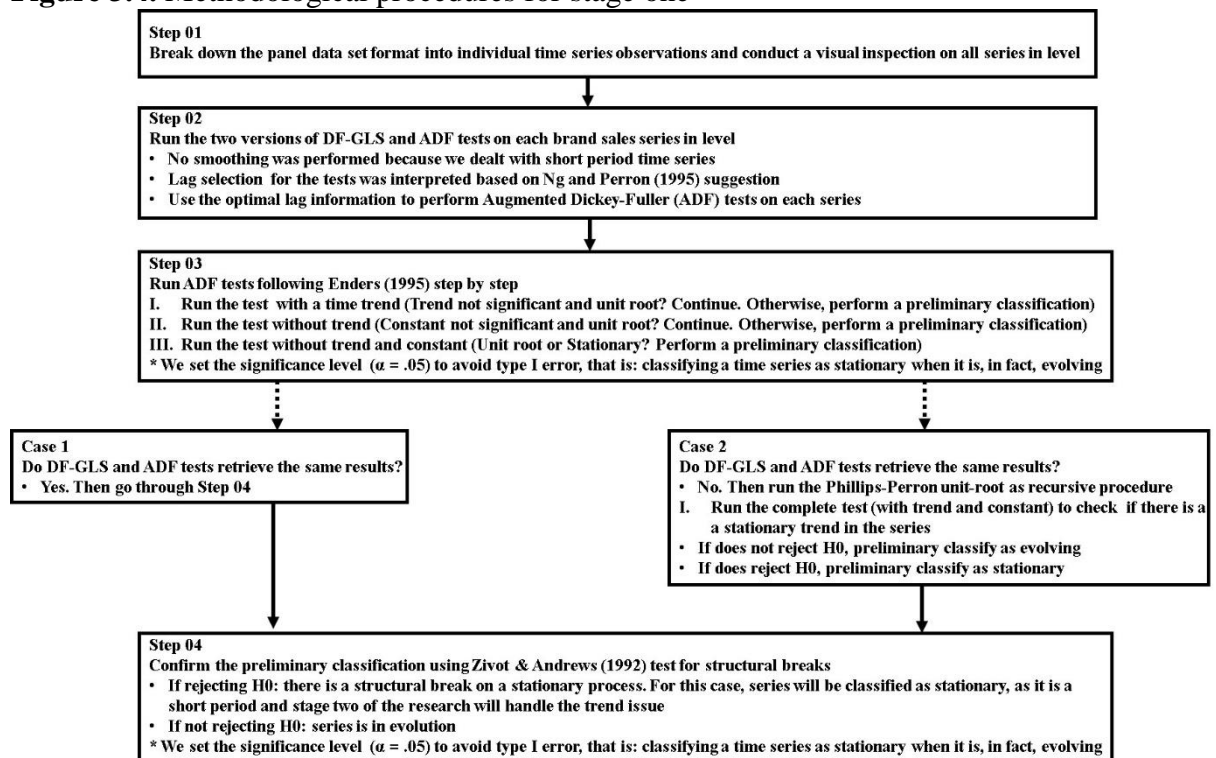
Appendix

Appendix A

Methodological procedures for stage one (Empirical Study 01)

Classification of time series in evolving or stationary behaviour can be very misleading. Stage 1 of our research classified each petrol station behaviour in time after the following steps.

Figure 3.4. Methodological procedures for stage one



Appendix B

Conditional probabilities of the dependent variable (Empirical Study 01)

The conditional probabilities of each outcome category (the sales behaviour and position), according to Hosmer Jr et al. (2013) notational system is:

$$\Pr (Y = 0, \text{Steady} \mid \mathbf{X}) = \frac{1}{1 + e^{g^1(x)} + e^{g^2(x)} + e^{g^3(x)} + e^{g^4(x)} + e^{g^5(x)}} \quad (3.8)$$

$$\Pr (Y = 1, \text{Promising} \mid \mathbf{X}) = \frac{e^{g^1(x)}}{1 + e^{g^1(x)} + e^{g^2(x)} + e^{g^3(x)} + e^{g^4(x)} + e^{g^5(x)}} \quad (3.9)$$

$$\Pr (Y = 2 \mid, \text{Ascending} \mathbf{X}) = \frac{e^{g^2(x)}}{1 + e^{g^1(x)} + e^{g^2(x)} + e^{g^3(x)} + e^{g^4(x)} + e^{g^5(x)}} \quad (3.10)$$

$$\Pr (Y = 3, \text{Unsteady} \mid \mathbf{X}) = \frac{e^{g^3(x)}}{1 + e^{g^1(x)} + e^{g^2(x)} + e^{g^3(x)} + e^{g^4(x)} + e^{g^5(x)}} \quad (3.11)$$

$$\Pr (Y = 4, \text{Faltering} \mid \mathbf{X}) = \frac{e^{g^4(x)}}{1 + e^{g^1(x)} + e^{g^2(x)} + e^{g^3(x)} + e^{g^4(x)} + e^{g^5(x)}} \quad (3.12)$$

$$\Pr (Y = 5, \text{Descending} \mid \mathbf{X}) = \frac{e^{g^5(x)}}{1 + e^{g^1(x)} + e^{g^2(x)} + e^{g^3(x)} + e^{g^4(x)} + e^{g^5(x)}} \quad (3.13)$$

Appendix C

Model output (Empirical Study 01)

Table 3.7.

Multinomial model using Descending sales as reference category

Group ^a	Variable	Beta	SE	Sig.	Exp(B) ^b
Ascending	Intercept	-10.97	17.04	.41	
	Diesel	28.75	11.89	.01**	3.07E+12
	Ethanol	-27.38	12.35	.02**	1.37E-01
	Service	2.19	.82	.00**	8.95
	Branding	.30	.77	.69	1.36
	Lnprice	-280.19	563.08	.61	1.00E-01
	Promotion	1.36	1.06	.19	3.92
	Lnloyalty	-.14	.38	.69	.86
	Salesforce	1.11	1.03	.28	3.04
	Lnsize	.34	.99	.72	1.41
	Statetaxation	24.53	18.21	.17	45148666607
Promising	Intercept	-8.64	17.39	.61	
	Diesel	3.72	8.46	.66	41.27
	Ethanol	-7.85	16.12	.62	00
	Service	2.09	.77	.00**	8.12
	Branding	-.33	.67	.61	.71
	Lnprice	106.43	481.65	.82	1.68E+04
	Promotion	.06	.90	.93	1.07
	Lnloyalty	.12	.36	.72	1.13
	Salesforce	2.00	.95	.03**	7.41
	Lnsize	1.39	.94	.13	4.04
	Statetaxation	25.06	16.59	.13	76890689039
Faltering	Intercept	-3.99	20.73	.84	
	Diesel	-2.55	2.55	.31	07
	Ethanol	-12.18	19.12	.52*	5.09E-00
	Service	1.49	.95	.11	4.45
	Branding	-1.19	.79	.13	.30
	Lnprice	440.73	442.28	.31	2.55E+19
	Promotion	-.68	.98	.48	.50
	Lnloyalty	-.13	.44	.76	.87
	Salesforce	1.82	1.20	.12	6.21
	Lnsize	2.28	1.12	.04**	9.78
	Statetaxation	37.60	19.29	.05*	2.15E+16
Steady	Intercept	12.20	14.01	.38	
	Diesel	15.33	8.60	.07*	4578283.02
	Ethanol	-29.12	11.95	.01**	3.24E-01
	Service	.85	.73	.24	2.35
	Branding	-.26	.56	.64	.76
	Lnprice	641.96	388.76	.09*	6.34E+27
	Promotion	.17	.67	.79	1.19
	Lnloyalty	-.01	.29	.95	.98
	Salesforce	.86	.94	.36	2.37
	Lnsize	-.09	.82	.90	.90
	Statetaxation	9.76	14.57	.50	17427.23
Unsteady	Intercept	22.39	13.76	.10	
	Diesel	-.53	2.56	.83	.58

Ethanol	-25.27	12.27	.03**	1.06E-01
Service	.79	.75	.29	2.20
Branding	.16	.63	.79	1.18
Lnprice	353.15	395.10	.37	2.35E+15
Promotion	-.01	.79	.98	.98
Lnloyalty	.28	.33	.39	1.32
Salesforce	1.80	.92	.05*	6.06
Lnsizes	.23	.92	.79	1.27
Statetaxation	6.99	15.74	.65	1095.58
R ² Nagelkerke			40%	
-2 Log Likelihood (Null model = 595.31)			510.47**	

Note. * $\leq .10$ is significant; ** $\leq .05$ is highly significant.

^a Reference category for group is what is considered the worst scenario (Descending sales).

^b According to Hosmer Jr. et al. (2013), taking the exponential from betas ensures an interpretation in terms of odds ratio for *dummy* independent variables.

Appendix D

Histograms of the dependent variables (Empirical Study 02)

Figure 5.5. Histogram of the brand sales (Model 1) variable

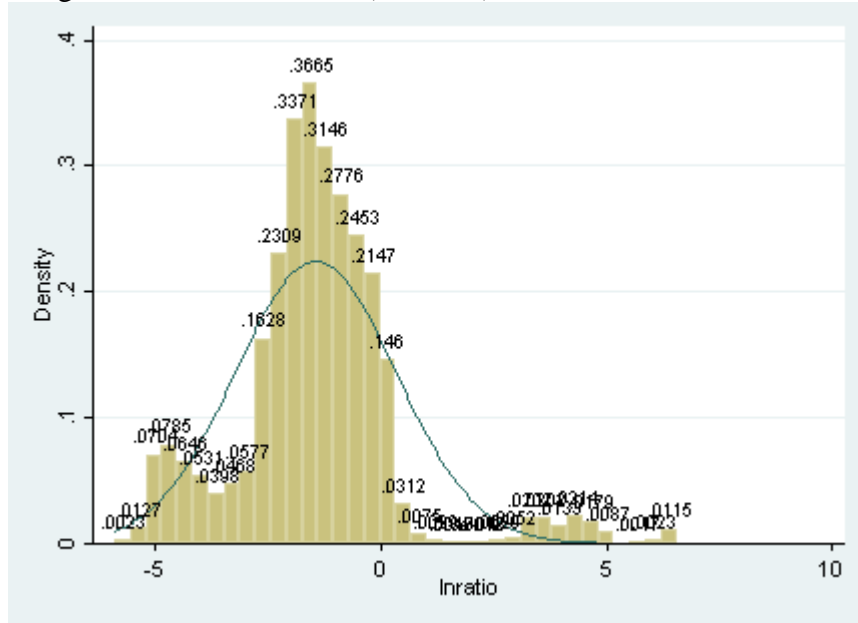


Figure 5.6. Histogram of the category sales (Model 2) variable

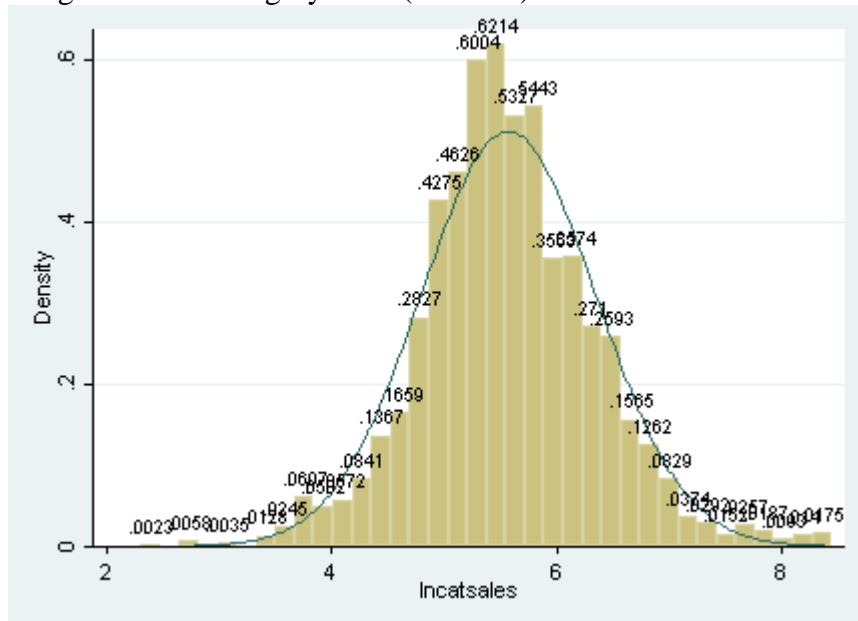
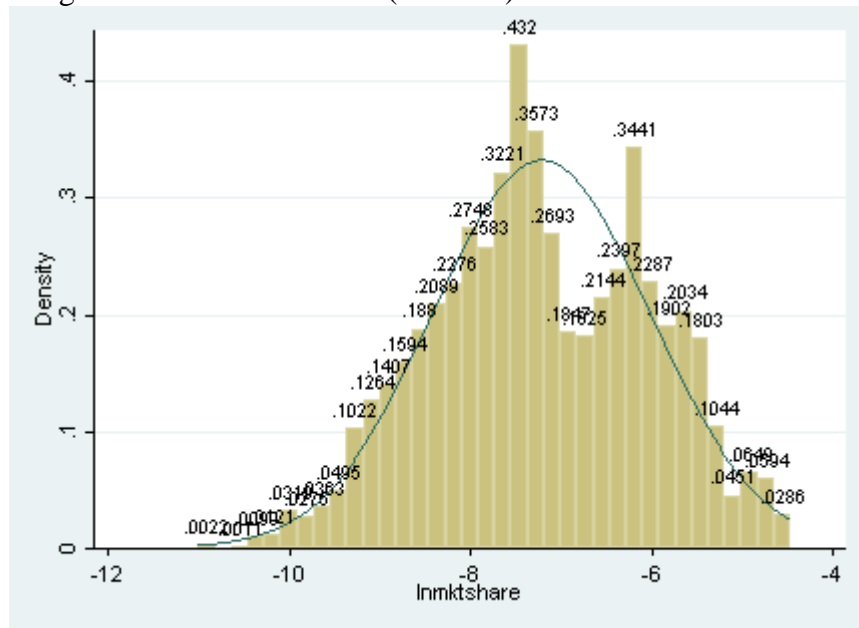


Figure 5.7. Histogram of the market share (Model 3) variable



References

- Aas, T. H., & Pedersen, P. E. (2011). The impact of service innovation on firm-level financial performance. *The Service Industries Journal*, 31(13), 2071-2090.
- Aaker, D. A., Carman, J. M., & Jacobson, R. (1982). Modeling advertising-sales relationships involving feedback: A time series analysis of six cereal brands. *Journal of Marketing Research*, 19(1), 116-125.
- Agência Nacional do Petróleo, Gás Natural e Biocombustíveis (2014). *ANP Resolution*, n. 1, January 6th, 2014. Retrieved from http://nxt.anp.gov.br/NXT/gateway.dll/leg/resolucoes_anp/2014/janeiro/ranp%201%20-%202014.xml
- Agência Nacional do Petróleo, Gás Natural e Biocombustíveis (2015a). *Dados estatísticos mensais – Vendas, pelas distribuidoras, dos derivados combustíveis de petróleo (metros cúbicos)*. Retrieved from <http://www.anp.gov.br/?dw=11031>.
- Agência Nacional do Petróleo, Gás Natural e Biocombustíveis (2015b). *Série histórica do levantamento de preços e de margens de comercialização de combustíveis*. Retrieved from <http://www.anp.gov.br/?pg=66510>.
- Åge, L., & Cederlund, C. A. (Eds.). B2B research and managerial relevance [Special issue]. *Journal of Business & Industrial Marketing*, 29,7/8, 562-651.
- Ailawadi, K. L., Pauwels, K., & Steenkamp, J. E. M. (2008). Private-label use and store loyalty. *Journal of Marketing*, 72(6), 19-30.
- Alderson, W. (1957). *Marketing behavior and executive action: A functionalist approach to marketing theory*. Homewood, United States: Irwin.
- Alderson, W. (1965). *Dynamic marketing behavior: A functionalist theory of marketing*. Homewood, United States: Irwin.
- Alderson, W., & Cox, R. (1948). Towards a theory of marketing. *Journal of Marketing*, 13(2), 137-152.
- Askoy, L., Høgreve, J., Larivière, B., Ordanini, A., Orsingher, C. (2015). Relative measures in service research. *Journal of Services Marketing*, 29(6/7).

- Ataman, M. B., Heerde, H. J. v., & Mela, C. F. (2010). The long-term effect of marketing strategy on brand sales. *Journal of Marketing Research*, 47(5), 866-882.
- Ataman, M. B., Mela, C. F., & Heerde, H. J. v. (2008). Building brands. *Marketing Science*, 27(6), 1036-1054.
- Azimont, F., & Araujo, L. (2010). The making of a petrol station and the “on-the-move consumer”: Classification devices and the shaping of markets. *Industrial Marketing Management*, 39(6), 1010-1018.
- Backhaus, K., Lügger, K., & Koch, M. (2011). The structure and evolution of business-to-business marketing: A citation and co-citation analysis. *Industrial Marketing Management*, 40(6), 940-951.
- Baghestani, H. (1991). Cointegration analysis of the advertising-sales relationship. *The Journal of Industrial Economics*, 39(6), 671-681.
- Bahadir, S. C., Bharadwaj, S. G., & Srivastava, R. K. (2015). Marketing mix and brand sales in global markets: Examining the contingent role of country-market characteristics. *Journal of International Business Studies*, 46(8), 596-619.
- Baidya, M., Maity, B., & Ghose, K. (2012). Measuring dynamic effects of advertising: a case study in India. *Journal of Indian Business Research*, 4(3), 158-169.
- Balestra, P. (1995). Introduction to linear models for panel data. In L. Mátyás & P. Sevestre (Eds.). *The econometrics of panel data – A handbook of the theory with applications*. Dordrecht, The Netherlands: Kluwer Academic Publishers.
- Baltagi, B. H. (2005). *Econometric analysis of panel data*. West Sussex, England: John Wiley & Sons.
- Baraldi, E., La Rocca, A., & Perna, A. (2014). Good for science, but which implications for business? An analysis of the managerial implications in high-impact B2B marketing articles between 2003 and 2012. *Journal of Business & Industrial Marketing*, 29(7/8), 574-592.
- Barron, J. M., Staten, M. E., & Umbeck, J. (1992). Discounts for cash in retail gasoline marketing. *Contemporary Economic Policy*, 10(4), 89-102.
- Barron, J. M., Taylor, B. A., & Umbeck, J. R. (2000). A theory of quality-related differences in retail margins: Why there is a “premium” on premium gasoline. *Economic Inquiry*, 38(4), 550-569.
- Bass, F. M. (1969). A simultaneous equation regression study of advertising and sales of cigarettes. *Journal of Marketing Research*, 6(3), 291-300.
- Bass, F. M. & Clarke, D. G. (1972). Testing distributed lag models of advertising effect. *Journal of Marketing Research*, 9(3), 298-308.

- Bijmolt, T. H. A., Heerde, H. J. V., & Pieters, R. G. M. (2005). New empirical generalizations on the determinants of price elasticity. *Journal of Marketing Research*, 42(2), 141-156.
- Bolton, R. N., & Rizley, R. (2010). *Essential readings in marketing – New advances in 2006-2010*. Cambridge, United States: Marketing Science Institute.
- Brennan, R., Tzempelikos, N., & Wilson, J. (2014). Improving relevance in B2B research: analysis and recommendations. *Journal of Business & Industrial Marketing*, 29(7/8), 601-609.
- Brignall, S., & Ballantine, J. (1996). Performance measurement in service businesses revisited. *International Journal of Service Industry Management*, 7(1), 1996.
- Brons, M., Nijkamp, P., Pels, E., & Rietveld, P. (2008). A meta-analysis of the price elasticity of gasoline demand. A SUR approach. *Energy Economics*, 30(5), 2105-2122.
- Burgess, S. M., & Steenkamp, J. E. M. (2006). Marketing renaissance: How research in emerging markets advances marketing science and practice. *International Journal of Research in Marketing*, 23(4), 337-356.
- Burgess, S. M., & Steenkamp, J. E. M. (2013). Editorial: Introduction to the special issue on marketing in emerging markets. *International Journal of Research in Marketing*, 30(1), 1-3.
- Burmester, A. B., Becker, J. U., Heerde, H. J. v., & Clement, M. (2015). The impact of pre- and post-launch publicity and advertising on new product sales. *International Journal of Research in Marketing*, 32(4), 408-417.
- Cainelli, G., Evangelista, R., & Savona, M. (2004). The impact of innovation on economic performance in services. *The Service Industries Journal*, 24(1), 116-130.
- Chamberlin, E. H. (1969). *The theory of monopolistic competition – A re-orientation of the theory of value*. Cambridge, United States: Oxford University Press.
- Chandy, R., & Narasimhan, O. (2015). Millions of opportunities: An agenda for research in emerging markets. *Customer Needs and Solutions*, 2(4), 251-263..
- Chintagunta, P., Erdem, T., Rossi, P., & Wedel, M. (2006). Structural modeling in marketing: Review and assessment. *Marketing Science*, 25(6), 604-616.
- Clark, J. M. (1961). *Competition as a dynamic process*. Washington, United States: Brookings Institution.
- Convenience Store and Fuel News (CSP) Daily News. (2010). *Branded vs. unbranded – KSS fuels' stein lays out multi-factored debate*. Retrieved from: <http://www.cspnet.com/fuels-news-prices-analysis/fuels-news/articles/branded-vs-unbranded>
- Cravens, D. W., Ingram, T. N., LaForge, R. W., & Young, C. E. (1993). Behavior-based and outcome-based salesforce control systems. *Journal of Marketing*, 57(4), 47-59.

- Dalrymple, D. J. (1978). Using Box-Jenkins techniques in sales forecasting. *Journal of Business Research*, 6(2), 133-145.
- David, A. H. (2014). A service classification scheme using economic data. *The Service Industries Journal*, 34(4), 335-353.
- DeJong, D. N., Nankervis, J. C., Savin, N. E., & Whiteman, C. H. (1992). Integration versus trend stationarity in time series. *Econometrica*, 60(2), 423-433.
- Dekimpe, M. G., Fransens, P. H., Hanssens, D. M., & Naik, P. A. (2008). Time-series models in marketing. In B. Wierenga (Ed.). *Handbook of marketing decision models* (pp. 373-398). New York, United States: Springer.
- Dekimpe, M., & Hanssens, D. (1995a). Empirical generalizations about market evolution and stationarity. *Marketing Science*, 14(3), G109-G121.
- Dekimpe, M., & Hanssens, D. (1995b). The persistence of marketing effects on sales. *Marketing Science*, 14(1), 1-21.
- Dekimpe, M. G., & Hanssens, D. M. (1999). Sustained spending and persistent response: A new look at long-term marketing profitability. *Journal of Marketing Research*, 36(4), 397-412.
- Dekimpe, M., & Hanssens, D. (2000). Time-series models in marketing: Past, present and future. *International Journal of Research in Marketing*, 17(2), 183-193.
- Dekimpe, M., Hanssens, D., & Silva-Risso, J. M. (1999). Long-run effects of price promotions in scanner markets. *Journal of Econometrics*, 89(1), 269-291.
- Diário Oficial da União (1989). *Brazilian government*. Section 1, 7-8.
- Díaz, A., Lacayo, J. A., Salcedo, L. (2007). Selling to 'mom-and-pop' stores in emerging markets. *The McKinsey Quarterly*, 71-81.
- Djellal, F., & Gallouj, F. (2005). Mapping innovation dynamics in hospitals. *Research Policy*, 34(6), 817-835.
- Dorotic, M., Bijmolt, T. H. A., Verhoef, P. C. (2012). Loyalty programmes: Current knowledge and research directions. *International Journal of Management Reviews*, 14(3), 217-237.
- Eckert, A. (2013). Empirical studies of gasoline retailing: A guide to the literature. *Journal of Economic Surveys*, 27(1), 140-166.
- Eggert, A., Hogueve, J., Ulaga, W., & Muenkhoff, E. (2014). Revenue and profit implications of industrial service strategies. *Journal of Service Research*, 17(1), 23-39.
- Eliashberg, J., & Lilien, G. L. (1993). *Handbooks in operations research and management science - Marketing*. London, England: North-Holland.

- Elliott, C. (2001). A cointegration analysis of advertising and sales data. *Review of Industrial Organization*, 18(4), 417-426.
- Enders, W. (1995). *Applied econometric time series*. New York: John Wiley & Sons.
- Esteve, V., & Requena, F. (2006). A cointegration analysis of car advertising and sales data in the presence of structural change. *International Journal of the Economics of Business*, 13(1), 111-128.
- Fang, E., Palmatier, R. W., & Steenkamp, J. E. M. (2008). Effect of service transition strategies on firm value. *Journal of Marketing*, 72(5), 1-14.
- Field, A. (2009). *Discovering statistics using SPSS*. Thousand Oaks: Sage Publications.
- Foekens, E. W., Leeflang, P. S. H., Wittink, D. R. (1999). Varying parameter models to accommodate dynamic promotion effects. *Journal of Econometrics*, 89(1), 249-268.
- Fok, D., Horváth, C., Paap, R., & Franses, P. H. (2006). A hierarchical bayes error correction model to explain dynamic effects of price changes. *Journal of Marketing Research*, 43(3), 443-461.
- Ford, D. (2011). IMP and service-dominant logic: Divergence, convergence and development. *Industrial Marketing Management*, 40(2), 231-239.
- Ford, D., & Håkansson, H. (2006). The idea of business interaction. *The IMP Journal*, 1(1), 4-27.
- Foxall, G. R. (1999). The substitutability of brands. *Managerial and Decision Economics*, 20(5), 241-257.
- Foxall, G. R. (2005). *Understanding consumer choice*. New York: Palgrave Macmillan.
- Foxall, G. R., Oliveira-Castro, J. M., & Schrezenmaier, T. C. (2004). The behavioral economics of consumer brand choice: patterns of reinforcement and utility maximization. *Behavioural Processes*, 66(3), 235-260.
- Franses, P. H. (1994). Modeling new product sales; an application of cointegration analysis. *International Journal of Research in Marketing*, 11(5), 491-502.
- Franses, P. H. (2005). On the use of econometric models for policy simulation in marketing. *Journal of Marketing Research*, 42(1), 4-14.
- Franses, P. H., & Paap, R. (2001). *Quantitative models in marketing research*. New York, United States: Cambridge University Press.
- Frederick, J. H. (1934). *Industrial Marketing*. New York, United States: Prentice Hall.
- Gadde, L., & Håkansson, H. (2010). Interaction in networks. In P. Maclaran, M. Saren, B. Stern, & M. Tadajewski (Eds.). *The SAGE handbook of marketing theory*. Thousand Oaks, United States: SAGE Publications.

- Gama, A. P. da. (2011). An expanded model of marketing performance. *Marketing Intelligence & Planning*, 29(7), 643-661.
- Gatignon, H. (1993). Marketing-mix models. In J. Eliashberg & G. L. Lilien (Eds). *Handbooks in operations research and management science – Marketing* (pp. 697-732). London, England: North-Holland.
- Goodhardt, G. J., Ehrenberg, A. S. C., Chatfield, C. (1984). The dirichlet: A comprehensive model of buying behaviour. *Journal of the Royal Statistical Society*, 147, 621-655.
- Goodwin, P., Dargay, J., & Hanly, M. (2004). Elasticities of road traffic and fuel consumption with respect to price and income: A review. *Transport Reviews*, 24(3), 275-292.
- Graham, C. D. A. (2009). What's the point of marketing anyway? The prevalence, temporal extent and implications of long-term market share equilibrium. *Journal of Marketing Management*, 25(9-10), 867-874.
- Greene, W. H. (2012). *Econometric analysis*. New York, United States: Prentice Hall.
- Guiltinan, J. P. (1987). The price bundling of services: A normative framework. *Journal of Marketing*, 51(2), 74-85.
- Hadjikhani, A., & LaPlaca, P. (2013). Development of B2B marketing theory. *Industrial Marketing Management*, 42(3), 294-305.
- Håkansson, H. (Ed.). (1982). *International marketing and purchasing of industrial goods: An interaction approach*. New York, United States: Wiley.
- Håkansson, H., & Snehota, I. (2002). Marketing in business markets. In B. Weitz & R. Wensley (Eds.). *Handbook of marketing* (pp. 513-526). Thousand Oaks, United States: SAGE Publications.
- Hanssens, D. M. (1980). Bivariate time-series analysis of the relationship between advertising and sales. *Applied Economics*, 12(3), 329-339.
- Hanssens, D. M. (1998). Order forecasts, retail sales, and the marketing mix for consumer durables. *Journal of Forecasting*, 17(34), 327-346.
- Hanssens, D. M. (2015). *Empirical generalizations about marketing impact*. Cambridge: Marketing Science Institute.
- Hanssens, D. M., & Parsons, L. J. (1993). Econometric and time-series market response models. In J. Eliashberg & G. L. Lilien (Eds). *Handbooks in operations research and management science – Marketing*. (pp. 409-464). London, England: North-Holland.
- Hanssens, D. M., Parsons, L. J., Schultz, R. L. (2002). *Market response models – Econometric and time series analysis*. New York: Kluwer Academic Publishers.

- Heuts, R. M. J., & Bronckers, J. H. J. M. (1988). Forecasting the Dutch heavy truck market: A multivariate approach. *International Journal of Forecasting*, 4(1), 57-79.
- Heyse, J. F. & Wei, W. W. S. (1985). Modelling the advertising-sales relationship through use of multiple time series techniques. *Journal of Forecasting*, 4(2), 165-181.
- Horváth, C., Leeflang, P. S. H., Wieringa, J. E., & Wittink, D. R. (2005). Competitive reaction- and feedback effects based on VARX models of pooled store data. *International Journal of Research in Marketing*, 22(4), 415-426.
- Hosmer Jr., D. W., Lemeshow, S., & Sturdivant, R. X. (2013). *Applied logistic regression*. New Jersey: John Wiley & Sons.
- Hunt, S. D. (1983). General theories and the fundamental explanation of marketing. *Journal of Marketing*, 47(4), 9-17.
- Hunt, S. D. (1995). The resource-advantage theory of competition: Toward explaining productivity and economic growth. *Journal of Management Inquiry*, 4(4), 317-332.
- Hunt, S. D. (1997a). Competing through relationships: Grounding relationship marketing in resource-advantage theory. *Journal of Marketing Management*, 13(5), 431-445.
- Hunt, S. D. (1997b). Resource-advantage theory: An evolutionary theory of competitive firm behavior? *Journal of Economic Issues*, 31(1), 59-77.
- Hunt, S. D. (2000). *A general theory of competition: Resources, competences, productivity, economic growth*. Thousand Oaks, United States: SAGE Publications.
- Hunt, S. D. (2013). A general theory of business marketing: R-A theory, Alderson, the ISBM framework, and the IMP theoretical structure. *Industrial Marketing Management*, 42(3), 283-293.
- Hunt, S. D., & Morgan, R. M. (1995). The comparative advantage theory of competition. *Journal of Marketing*, 59(2), 1-15.
- Hunt, S. D., & Morgan, R. M. (2005). The resource-advantage theory of competition: A review. In Naresh K. Malhotra (Ed.). *Review of marketing research*, Volume 1 (pp. 153-204). Bingley, United Kingdom: Emerald Group Publishing.
- Iacobucci, D., & Onyemah, V. (2015). JBBM at 21: Variety of theories, methods, and countries while giving further voice to emerging markets within Africa. *Journal of Business-to-Business Marketing*, 22(1-2), 73-85.
- Industrial Marketing Committee Review Board (1954). Fundamental differences between industrial and consumer marketing. *Journal of Marketing*, 19(2), 152-158.
- Iyer, G., & Seetharaman, P. B. (2008). Too close to be similar: Product and price competition in retail gasoline markets. *Quantitative Marketing & Economics*, 6(3), 205-234.

- Kabadayi, S. (2003a). Journal of Business-to-Business Marketing part I: Subject listing in ten year index: 1993-2003. *Journal of Business-to-Business Marketing*, 10(4), 73-93.
- Kabadayi, S. (2003b). Journal of Business-to-Business Marketing part II: Titles and abstracts – Chronological ten year index: 1993-2003. *Journal of Business-to-Business Marketing*, 10(4), 95-148.
- Kauppinen-Räisänen, H., & Grönroos, C. (2015). Are service marketing models really used in modern practice? *Journal of Service Management*, 26(3), 346-371.
- Kleinaltenkamp, M., & Ehret, M. (Eds.). (2006). Relationship theory and business markets [Special issue]. *Journal of Business & Industrial Marketing*, 21(2), 65-123.
- Kleit, A. N. (2005). The economics of gasoline retailing: Petroleum distribution and retailing issues in the U.S. *Energy Studies Review*, 13(2), 1-28.
- Kopalle, P. K., Mela, C. F., & Marsh, L. (1999). The dynamic effect of discounting on sales: Empirical analysis and normative pricing implications. *Marketing Science*, 18(3), 317-332.
- Kumar, V., Sunder, S., & Sharma, A. (2015). Leveraging distribution to maximize firm performance in emerging markets. *Journal of Retailing*, 91(4), 627-643.
- Kwiatkowski, D., Phillips, P. C. B., Schmidt, P., & Shin, Y. (1992). Testing the null hypothesis of stationarity against the alternative of a unit root. *Journal of Econometrics*, 54(1), 159-78.
- Lamey, L., Deleersnyder, B., Steenkamp, J. B. E., & Dekimpe, M. G. (2012). The effect of business-cycle fluctuations on private-label share: what has marketing conduct got to do with it? *Journal of Marketing*, 76(1), 1-19.
- LaPlaca P. J. (2013). Research priorities for B2B marketing researchers. *Revista Española de Investigación de Marketing*, 17(2), 135-150.
- LaPlaca, P. J. & Katrichis, J. M. (2009). Relative presence of business-to-business research in the marketing literature. *Journal of Business-to-Business Research*, 16(1-2), 1-22.
- Lee, R. P., Özsomer, A., & Zhou, K. Z. (2015). Introduction to the special issue on “Innovation in and from emerging economies”. *Industrial Marketing Management*, 50, 16-17.
- Leeflang, P. S. H., Bijmolt, T. H. A., Doorn, J. v., Hanssens, D. M., Heerde, H. J. v., Verhoef, P. C., Wieringa, J. E. (2009). Creating lift versus building the base: Current trends in marketing dynamics. *International Journal of Research in Marketing*, 26(1), 13-20.
- Leeflang, P. S. H., Wieringa, J. E., Bijmolt, T. H. A., & Pauwels, K. H. (2015). *Modeling Markets – Analyzing Marketing Phenomena and Improving Decision Making*. New York: Springer.

- Leone, R. P. (1987). Forecasting the effect of an environmental change on market performance: An intervention time-series approach. *International Journal of Forecasting*, 3(3-4), 463-478.
- Levitt, T. (1980). Marketing success through differentiation – of anything. *Harvard Business Review*, 83-91.
- Lichtenthal, J. D. (2004). Introduction. In D. A. Reid & R. E. Plank. *Fundamentals of business marketing research* (pp. xv-xxiii). New York, United States: The Haworth Press.
- Lilien, G. L. (2011). Bridging the academic-practitioner divide in marketing decision models. *Journal of Marketing*, 75(4), 196-210.
- Lilien, G., & Grewal, R. (Eds.). (2012). *Handbook of Business-to-Business Marketing*. Cheltenham, United Kingdom: Edward Elgar Publishing Limited.
- Lilien, G. L., Kotler, P., & Moorthy, K. S. (1992). *Marketing models*. New Jersey, United States: Prentice Hall.
- Lim, J., Currim, I. S., & Andrews, R. L. (2005). Consumer heterogeneity in the longer-term effects of price promotions. *International Journal of Research in Marketing*, 22(4), 441-457.
- Lin, Y. (2013). The gasoline industry: A review for marketing research. *The Marketing Review*, 13(1), 3-22.
- Lovelock, C. H. (1983). Classifying services to gain strategic marketing insights. *Journal of Marketing*, 47(3), 9-20.
- Low, J., & Blois, K. (2002). The evolution of generic brands in industrial markets: the challenges to owners of brand equity. *Industrial Marketing Management*, 31(5), 385-392.
- Ma, Y., Ailawadi, K. L., Gauri, D. K., & Grewal, D. (2011). An empirical investigation of the impact of gasoline prices on grocery shopping behavior. *Journal of Marketing*, 75(2), 18-35.
- Malhotra, N. K. (2009). *Marketing Research: An applied orientation*. New York: Prentice Hall.
- Mantrala, M. K. (2002). Allocating marketing resources. In B. Weitz & R. Wensley (Eds.). *Handbook of marketing* (409-435). Thousand Oaks, United States: Sage Publications.
- Marketing Science Institute. (2014). *2014-2016 research priorities*. Cambridge, MA.
- McAlister, L., Bolton, R. N., & Rizley, R. (2006). *Essential readings in marketing*. Cambridge, United States: Marketing Research Institute.
- McCulloch, C. E., & Searle, S. R. (2001). *Generalized, linear, and mixed models*. New York: John Wiley & Sons.

- McQuiston, D. H. (2004). Successful branding of a commodity product: The case of RAEX LASER steel. *Industrial Marketing Management*, 33(4), 345-354.
- Mesquita, M A. B. (2010). Valores do aditivo: o comportamento do consumidor de gasolina aditivada na perspectiva da Teoria das Cadeias Meios-Fins. *Gestão & Produção*, 17(3), 603-616.
- Michell, P., King, J., & Reast, J. (2001). Brand values related to industrial products. *Industrial Marketing Management*, 30(5), 415-425.
- Ministério de Minas e Energia no Brasil (1997). *Portaria MME*, January 16h, 1997. Retrieved from http://nxt.anp.gov.br/NXT/gateway.dll/leg/folder_portarias/portarias_mme/1997/pmme%209%20-%201997.xml.
- Möller, K. (2013). Theory map of business marketing: Relationships and networks perspectives. *Industrial Marketing Management*, 42(3), 324-335.
- Mulhern, F. J., & Leone, R. P. (1990). Retail promotion advertising: Do the number of deal items and size of deal discounts affect store performance? *Journal of Business Research*, 21(3), 179-194.
- Naik, P. A., & Raman, K. (2003). Understanding the impact of synergy in multimídia communications. *Journal of Marketing Research*, 40(4), 375-388.
- Narasimhan, L., Srinivasan, K., & Sudhir, K. (2015). Editorial: Marketing science in emerging markets. *Marketing Science*, 34(4), 473-479.
- Neelamegham, R., & Chintagunta, P. K. (2004). Modeling and forecasting sales of technology products. *Quantitative Marketing and Economics*, 2(3), 195-232.
- Newey, W. K., & West, K. D. (1994). Automatic lag selection in covariance matrix estimation. *Review of Economic Studies*, 61(4), 631-653.
- Ng, S., & Perron, P. (1995). Unit root tests in ARMA models with data-dependent methods for the selection of the truncation lag. *Journal of the American Statistical Association*, 90(429), 268-281.
- Nijs, V. R., Dekimpe, M. G., Steenkamp, J. E. M., & Hanssens, D. M. (2001). The category-demand effects of price promotions. *Marketing Science*, 20(1), 1-22.
- Okyere, N. Y. D., Agyapong, G. K. Q., & Nyarku, K. M. (2011). The effect of marketing communications on the sales performance of Ghana Telecom (Vodafone, Ghana). *International Journal of Marketing Studies*, 3(4), 50-62.

- Oliveira-Castro, J. R., Cavalcanti, P. R., & Foxall, G. R. (in press). What consumers maximize: Brand choice as a function of utilitarian and informational reinforcement. *Managerial and Decision Economics*.
- Olsson, U. (2002). *Generalized linear models*. Lund: Studentlitteratur.
- Ostrom, A. L., Parasuraman, A., Bowen, D. E., Patrício, L., Voss, A. (2015). Service research priorities in a rapidly changing context. *Journal of Service Research*, 18(2), 127-159.
- Özsomer, R. L. A., & Zhou, K. (Eds.). (2015). Innovation in emerging markets [Special section]. *Industrial Marketing Management*, 50(7), 16-68.
- Pauwels, K. (2004). How dynamic consumer response, competitor response, company support, and company inertia shape long-term marketing effectiveness. *Marketing Science*, 23(4), 596-610.
- Pauwels, K. et al. (2004). Modeling marketing dynamics by time series econometrics. *Marketing Letters*, 15(4), 167-183.
- Pauwels, K. & Hanssens, D. M. (2007). Performance regimes and marketing policy shifts. *Marketing Science*, 26(3), 293-311.
- Pauwels, K., Hanssens, D. M., & Siddarth, S. (2002). The long-term effects of price promotions on category incidence, brand choice, and purchase quantity. *Journal of Marketing Research*, 39(4), 421-439.
- Pauwels, K. & Srinivasan, S. (2004). Who benefits from store brand entry? *Marketing Science*, 23(3), 364-390.
- Peters, L. D., Pressey, A. D., Vanharanta, M., & Johnston, W. J. (2013). Theoretical developments in industrial marketing management: Multidisciplinary perspectives. *Industrial Marketing Management*, 42(3), 275-282.
- Porto, R. B., & Lima, N. S. R. (2015). Nonlinear impact of the marketing mix on brand sales performance. *Brazilian Business Review*, 12(5), 57-77.
- Rao, V. R., Wind, J., & DeSarbo, W. S. (1988). A customized market response model: Development, estimation, and empirical testing. *Journal of the Academy of Marketing Science*, 16(1), 128-140.
- Reid, D. A., & Plank, R. E. (2000). Business marketing comes of age: A comprehensive review of the literature. *Journal of Business-to-Business Marketing*, 7(2-3), 9-186.
- Ribeiro, D., & Akehurst, G. P. (2014). Franchising in services. *The Service Industries Journal*, 34(9-10), 751-756.

- Roberts, J., Kayande, U., & Srivastava, R. K. (2015). Editorial: What's different about emerging markets, and what does it mean for theory and practice? *Customer Needs and Solutions*, 2(4), 245-250.
- Roberts, J. H., Kayande, U., & Stremersch, S. (2014). From academic research to marketing practice: Exploring the marketing science value chain. *International Journal of Research in Marketing*, 31(2), 127-140.
- Russell-Bennet, R., & Baron, S. (2015). Fresh thinking in services marketing: contemporary, cutting-edge and creative thoughts. *Journal of Services Marketing*, 29(6/7), 421-424.
- Rust, R. T., Ambler, T., Carpenter, G. S., Kumar, V., & Srivastava, R. K. (2004). Measuring marketing productivity: Current knowledge and future directions. *Journal of Marketing*, 68(4), 76-89.
- Rust, R. T., & Chung, T. S. (2006). Marketing models of service and relationships. *Marketing Science*, 25(6), 560-580.
- Saunders, J. A., & Watt, F. A. W. (1979). Do brand names differentiate identical industrial products? *Industrial Marketing Management*, 8(2), 114-123.
- Schumpeter, J. (1933). The common sense of econometrics. *Econometrica*, 1(1), 5-12.
- Schwarz, G. (1978). Estimating the dimension of a model. *The Annals of statistics*, 6(2), 461-464.
- Sethuraman, R., & Gielens, K. (2014). Determinants of store brand share. *Journal of Retailing*, 90(2), 141-153.
- Shah, D., Kumar, V., Zhao, Y. (2015). Diagnosing brand performance: Accounting for the dynamic impact of product availability with aggregate data. *Journal of Marketing Research*, 52(2), 147-165.
- Shepard, A. (1993). Contractual form, retail price, and asset characteristics in gasoline retailing. *RAND Journal of Economics*, 24(1), 1993.
- Sheth, J. N. (2011). Impact of emerging markets on marketing: Rethinking existing perspectives and practices. *Journal of Marketing*, 75(4), 166-182.
- Sheth, J. N., & Sharma, A. (2006). The surpluses and shortages in business-to-business marketing theory and research. *Journal of Business & Industrial Marketing*, 21(7), 422-427.
- Shostack, G. L. (1977). Breaking free from product marketing. *Journal of Marketing*, 41(2), 73-80.
- Shugan, S. M. (2002). *Marketing Science*, models, monopoly models, and why we need them. *Marketing Science*, 21(3), 223-228.

- Siddhanta, S., & Banerjee, N. (2012). An econometric measurement of the impact of marketing communication on sales in the Indian cement industry. *European Journal of Business and Management*, 4(8), 65-75.
- Sinclair, S. A., & Seward, K. E. (1988). Effectiveness of branding a commodity product. *Industrial Marketing Management*, 17(1), 23-33.
- Slotegraaf, R. J., & Pauwels, K. (2008). The impact of brand equity and innovation on the long-term effectiveness of promotions. *Journal of Marketing Research*, 45(3), 293-306.
- Srinivasan, S. & Bass, F. M. (2000). Cointegration analysis of brand and category sales: Stationarity and long-run equilibrium in market shares. *Applied Stochastic Models in Business and Industry*, 16(3), 159-177.
- Srinivasan, S., Vanhuele, M., & Pauwels, K. (2010). Mind-set metrics in market response models: An integrative approach. *Journal of Marketing Research*, 47(4), 672-684.
- Steenkamp, J. E. M., Nijs, V. R., Hanssens, D. M., & Dekimpe, M. G. (2005). Competitive reactions to advertising and promotion attacks. *Marketing Science*, 24(1), 35-54.
- Storey, C., & Easingwood, C. J. (1998). The augmented service offering: A conceptualization and study of its impact on new service success. *Journal of Product Innovation Management*, 15(4), 335-351.
- Tamhane, A. C. (1977). Multiple comparisons in model I one-way ANOVA with unequal variances. *Communications in Statistics-Theory and Methods*, 6(1), 15-32.
- Tellis, G. J. (2006). Modeling marketing mix. In R. Grover & M. Vriens (Eds.). *The handbook of marketing research* (pp. 506-522). Thousand Oaks, United States: Sage Publications.
- Tellis, G. J. & Weiss, D. L. (1995). Does tv advertising really affect sales? The role of measures, models, and data aggregation. *Journal of Advertising*, 24(3), 1-12.
- The Association for Convenience & Fuel Retailing (NACS) Retail Fuels Report. (2015). *The value of premium*. Retrieved from:
<http://www.nacsonline.com/YourBusiness/FuelsReports/2015/Fuels/Pages/The-Value-of-Premium.aspx>
- Tukey, J. W. (1949). Comparing individual means in the analysis of variance. *Biometrics*, 5(2), 99-114.
- Vandenbosch, M. B. & Weinberg, C. B. (1995). Product and price competition in a two-dimensional vertical differentiation model. *Marketing Science*, 14(2), 224-249.
- Varey, R. J. (2010). The economics basis of marketing. In M. J. Baker & M. Saren (Eds.). *Marketing theory: a student text* (pp. 101-120). Thousand Oaks, United States: SAGE Publications.

- Venkatesan, R., Farris, P., Guissoni, L. A., Neves, M. F. (2015). Consumer brand marketing through full-and self-service channels in an emerging economy. *Journal of Retailing*, 91(4), 644-659.
- Venkatesan, R., Farris, P., & Wilcox, R. T. (2015). *Cutting-edge marketing analytics – Real world cases and data sets for hands on learning*. Upper Saddle River: Pearson Education.
- Wierenga, B. (2008). *Handbook of marketing decision models*. New York, United States: Springer.
- Wieringa, J. E. & Horváth, C. (2005). Computing level-impulse responses of a log-specified VAR systems. *International Journal o Forecasting*, 21(2), 279-289.
- Woodside, A. G. (1997). Contributions of business-to-business marketing journals: Introduction to the special issue. *Journal of Business Research*, 38(3), 177.
- Woodside, A. G. (2004). Sensemaking about business-to-business strategies and relationships: A comentary on Reid and Plank's review. In D. A. Reid & R. E. Plank. *Fundamentals of business marketing research* (pp. 243-252). New York, United States: The Haworth Press.
- Wooldridge, J. (2012). *Introductory econometrics: A modern approach*. Boston: Cengage Learning.
- Yoo, M., & Bai, B. (2013). Customer loyalty marketing research: A comparative approach between hospitality and business journals. *International Journal of Hospitality Management*, 33, 166-177.
- Zanias, G. P. (1994). The long run, causality, and forecasting in the advertising-sales relationship. *Journal of Forecasting*, 13(7), 601-610.
- Zivot, E. & Andrews, D. W. K. (1992). Further evidence on the great crash, the oil-price shock, and the unit-root hypothesis. *Journal of Business & Economic Statistics*, 10(3), 25-44.
- Zoltners, A. A., Sinha, P., & Lorimer, S. E. (2012). Breaking the sales force incentive addiction: A balanced approach to sales force effectiveness. *Journal of Pesonal Selling & Sales Management*, 32(2), 171-186.