# ANALYSIS OF DEMAND AND PRICING POLICIES IN TURKEY BEER MARKET

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Approval of the Graduate School of Natural and Applied Sciences.

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I certify that this thesis satisfies all the requirements as a thesis for the degree of Master of Science.

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This is to certify that we have read this thesis and that in our opinion it is fully adequate, in scope and quality, as a thesis for the degree of Master of Science.

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# ABSTRACT

ANALYSIS OF DEMAND AND PRICING POLICIES
IN TURKEY BEER MARKET

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The purpose of this work is to study the beer market in Turkey in respect of demand analysis and with a view to assess whether the marketing and in particular pricing policies adopted by industry players in the period 1997-2002 have been efficient. Of specific interest is the near duopolistic structure of the market and the question whether pricing policies followed during the period 1997-2002 have been determinant in the observed sales volumes. The investigation focuses first on the analysis of the determinants of demand, and secondly on questioning whether pricing policies practiced in the market are optimal with respect to the objectives of the industry players. The major finding of the study is that beer prices in Turkey are below the optimal level, with respect to both revenue and profit maximizing objectives. Moreover, seasonality in beer demand can be exploited further with a high-low pricing scheme to improve the industry revenue.

Keywords: Turkey Beer Market, Demand Analysis, Pricing Policies

# ÖZ

TÜRKİYE BİRA PAZARINDAKİ
TALEBİN VE FİYATLANDIRMA POLİTİKALARININ İNCELENMESİ

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Bu çalışmanın amacı, Türkiye bira pazarını hem talep analizi ve hem de pazar oyuncuları tarafından 1997-2002 yılları arasında uygulanan pazarlama ve özellikle de fiyatlandırma politikalarının etkinliği açısından incelemektir. Pazarın duopol benzeri yapısı ile 1997-2002 yılları arasında izlenen fiyatlandırma politikalarının gerçekleşen satış hacimleri üzerindeki belirleyiciliğinin sorgulanması, çalışmanın kendine özgü yanlarıdır. Araştırma, ilk olarak, talep belirleyici unsurların analizine, ikincil olarak da, pazarda güdülen fiyatlandırma politikalarının pazar oyuncularının hedefleri açısından optimal olup olmadığının değerlendirmesine odaklanmıştır. Çalışmanın en önemli bulgusu Türkiye'deki bira fiyatlarının hem gelir hem de karlılık açısından optimal seviyenin altında olmasıdır. Bununla birlikte, bira talebindeki mevsimlik değişmeler de gelirleri arttırmak amacıyla daha etkin kullanılabilir.

Anahtar Kelimeler: Türkiye Bira Pazarı, Talep Analizi, Fiyatlandırma Politikaları

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# CHAPTER 1

# INTRODUCTION

The Turkish economy has long functioned under high inflation and has gone through successive financial crises in the last two decades. This has not only thrown several macroeconomic indicators off-balance, but has also confounded the market mechanism and obstructed microeconomic efficiency. One affected area is pricing as practiced especially in the consumer goods sector, in which the distorting effects of persistent inflation has tended to obscure the importance of efficient pricing on the part of the producer and the perception of price changes on the part of the consumer. It is possible that this has resulted in slowed market growth for some goods or loss of market share for some producers. In any case, pricing decisions which normally would occupy first place of importance for management have been overshadowed by other concerns. If the recent success in the efforts to reduce inflation can be sustained in the middle term, there is the possibility of renewed interest in pricing and in demand-side analysis in general, as marketing managers would perceive pricing as a tool to secure firm objectives and to deal with competition, rather than as a remedy to offset the effects of inflation.

The purpose of this work is to study the beer market in Turkey in respect of demand analysis and with a view to assess whether the marketing and in particular pricing policies adopted by industry players in the period 1997-2002 have been efficient; not in any sense of welfare efficiency, but in the sense of profit maximization. Of specific interest is the near duopolistic structure of the market and the extent to which pricing policies followed during the period 1997-2002 have had an effect on observed sales volumes. The analysis, therefore, is from the short term perspective of the individual producer facing a market demand, but without regard to cost, finance or any other strategic particulars of the producer. Thus the investigation focuses first on analysis of the determinants of demand, and secondly on questioning whether pricing policies practiced in the market are optimal with respect to the short term profit maximization. The adoption of a short term perspective makes sense when the entire market is considered, but findings from such a study can only serve as an input that informs the specific marketing strategies of any individual producer.

Although demand analysis for beer has been widely reported for industrial countries and indeed for Turkey, such studies have not been connected with the pricing problem. Previous studies identify the determinants of demand and the sensitivity to changes in these determinants. However an analysis of supply and demand based on retail prices and product availability has not been conducted before. In the present study, market data encompassing a 60-month period is used to analyze both the market demand and the demand for a specific brand. The data is provided by an international market information firm and is accepted as the most reliable data available by the industry experts. Demand analysis is used to examine the optimality of the current pricing practices prevailing in the market.

It has long been debated in management literature whether pricing is more of an art or of a science. Nagle (1984) states on this issue that: "Pricing, like most business decisions, is an art. This is not, however, a justification for basing pricing decisions purely on the \`hunch\` of a talented manager. Art is beyond neither critical judgment nor scientific analysis." The present study aims to bring recent practice in light of the context of the beer industry, thereby informing practicing managers to improve pricing decisions.

Price is obviously not the only factor that determines demand and we undertake a full investigation of all the relevant factors. Our results indicate that distribution is at least as influential on brand-specific demand as price; although it is no longer a significant determinant at its current level for the total market demand. The main finding of this study is that producers set beer prices below the optimal level, with respect to both revenue and profit maximizing objectives. There is also an indication that seasonality in beer demand can be exploited with a high-low pricing scheme to improve revenues.

In the following report, Chapter 2 reviews the literature on pricing and demand analysis in detail. It describes the changing role of pricing in today's business life with a review of developments in pricing literature and offers an alternative classification of pricing problems. It also draws up a four-step approach to product line pricing problem, which puts demand analytics at the centre of the pricing problem. Finally, a number of selected pricing studies are presented, with a brief summary of problem context, model formulation and study findings.

Key particulars of the Turkey beer market, including beer products, market structure, market development, and sales regulation, are reviewed in Chapter 3 in order to set the context of this study.

The four-step approach described in Chapter 2 is followed in Chapter 4 using real market data. The growth prospect of Turkey beer market and optimality of the current pricing practices are assessed.

Chapter 5 summarizes the results and findings of the study in a compact manner, and points out further possible investigations that seem promising.

# CHAPTER 2

# LITERATURE ON PRICING AND DEMAND ANALYSIS

As was explained in the Introduction, this chapter reviews the literature on pricing and demand analysis in detail. In the first section, we establish the marketing terminology, as well as the concept of marketing mix and product line pricing. We then define a four-step approach to product line pricing, which unifies the common line of reasoning followed by most of the prior studies in the area. Finally, we briefly review a set of selected studies, covering a diverse collection of cases where product line pricing is tackled with an approach similar to the one described in section 2. Our concern in this survey is not to provide a detailed account of the literature on demand analysis, but only those studies conducted with a view to pricing decision.

## 2.1. The Pricing Problem

### 2.1.1. Marketing Mix

American Marketing Association (AMA) provides the following definition of marketing:

> *"Marketing is the process of planning and executing the (product) conception, pricing, promotion, and distribution of ideas, goods, and services to create exchanges that satisfy individual and organizational goals."*

This definition contains four major elements of marketing: product, pricing, promotion, and place (in replacement of distribution). These four elements constitute the *marketing mix* and called as "4 Ps of marketing" in most references. This shorthand was first published by Prof. Jerome McCarthy. Marketing mix elements are also called *controllable or managerial factors*, as they constitute the set of marketing actions that can be taken under different market circumstances. There are also some factors, on which an individual marketing manager has very limited or no control. These *uncontrollable or environmental factors* include consumer needs, competitor actions, technological changes, state of the economy, and government legislation. We will briefly review the four controllable factors next.

*Product* is a good, service, or idea that satisfies consumers' needs. There are two levels in defining a product: core product and augmented product. Core product is the basic good or service that fulfills the fundamental need of the consumer. Augmented product is a set that includes not only the core product, but also the other product benefits like packaging, servicing, warranties, and brand image.

In the product system terminology, a *product category* is a group of products that fulfills the same fundamental consumer need. A *product line* is a group of products belonging to the same product category and offered by the same firm. A *product mix* or *product portfolio* is the total array of product categories that a specific firm offers. A *brand* is the name or symbol that represents a product of a specific firm and is usually referred as the indivisible unit in marketing.

One of the key success factors in marketing management is to understand the relations among the products. Two products are called to be related if they are cost- and/or demand- dependent. Cost-dependency is a vague subject, because it is related to a firm's financial policies at least as much as it is related to the nature of costs. Products using the same production facility or the same sales premise in case of a retailer are cost-dependent due to the common or joint costs, but they are usually assumed to be cost-independent in marketing analysis.

Demand-dependency is more complex matter, as it involves the dynamics of consumer behavior. There are two basic types of demand dependency: *substitutability* and *complementariness.* If two products share the same demand, these two products are called substitutes and an increase in one product's sales volume causes the other's sales volume to decrease. Two products are called complementary if an increase in one product's sales volume causes the other's sales volume also to increase. Balderston (1956) describes two types of complementary products: *use-complements* and *purchase-complements.* For example, all products in a retailer are purchase-complements, as a store visit to purchase a product can lead to an impulse purchase of the other. Two products are called independent if change in one product's sales volume has no effect on the other's sales volume.

*Price* is what the consumer pays to get the right to use the product. Price can take other names like fee, due, fare, rent, wage, commission, tuition, interest, premium, or retainer, when the product is not physical, as in the case of an idea or service. Whatever the name used, price has a fundamental characteristic: it is the give-up by the consumer in an exchange.

The pricing of a consumer product is a two-step process: producers charge retailers and retailers subsequently charge consumers, ignoring any distribution intermediaries. Dynamics of the pricing problem differ for a retailer and a producer. The retailer determines the final price on the shelf, whereas the producer can only affect the final price by changing the cost to retailer. The retailer has the control of prices for all products in a category, but producer can control the prices of its products only. Moreover, the retailers' inherent power in pricing is substantially strengthened with the recent developments in retailing. These developments include the consolidation into large retail institutions, fragmentation of consumer markets, and availability of store scanner data. As the retailers gain power in determining the consumer prices, regarding retailers as the "final intermediaries in the distribution channel" becomes inappropriate. Consequently, *retailer orientation* dominates *producer orientation* in recent marketing literature.

*Promotion* is a means of communication between the seller and buyer. There are four distinct promotional channels: advertising, publicity, personal selling, and sales promotion. Advertising is a paid form of mass communication by an identified sponsor and involves mass media like TV, radio, or press. Publicity is an indirectly paid form of mass communication and can take the form of a news story or editorial. Payment is indirect in publicity, as the firm does not actually pay for the media space, but rather spends on other occasions like donations or charity activities to get a favorable story on the media. Personal selling is any paid form of face-to-face communication and usually it is the most expensive means when compared on a cost-per-contact basis. A sales promotion is a temporary reduction in prices to generate incentives for the consumer to purchase a product.

*Place* is a means of getting the product to the consumer. Products flow from the producer to the end-users through a distribution system, which encompasses a series of intermediary parties. These intermediaries are called wholesaler, distributor, dealer, agent, or retailer in different channel structures, but middleman is the generic name used to represent a party between the producer and the end-user. Webster (1979) groups middleman functions into three main categories: transaction, logistics, and facilitation.

The foregoing discussion on marketing can be summarized as follows:

> *"Marketing encompasses providing a **product** that satisfies consumer needs at an appropriate **price**, **promoting** it effectively to all potential consumers, and **distributing** it to the all feasible exchange points through an efficient channel."*

Today, most marketing executives cite pricing as the most important element of the marketing mix. This is an easily justifiable claim, as price is a key variable in all business equations like unit sales, sales revenue, and profit. The impact of price on business results is usually immediate and quantifiable. Moreover, price has significant interaction with all the other marketing mix elements and appeals based on price – like higher price for better quality – are easily communicable to the consumers.

Pricing problems are now being addressed with more sophisticated approaches, as their importance is appreciated by more and more marketing executives. Before the 1980s, pricing was perceived as procedural work of adding a target return on costs: *cost-oriented era*. Today, pricing is rather perceived as a key subject and its relation with demand is carefully engineered: *demand-oriented era*. Recent developments in academic literature appear to be parallel with the renewed interest in pricing.

### 2.1.2. Early Developments in Pricing Literature

Traditionally pricing has been the playground of economic theorists, until the second half of the past century. Their “microeconomics oriented” pricing work has been primarily related to the equilibrium market price in relation to a specific market structure. Even though the extent of this work is wide, the market level approach provides only limited insights in determining the optimal prices.

More recently, managerial economists and then marketing academician have stepped into the field of pricing. Their “business or marketing oriented” pricing work provides the managers with a repertoire of techniques and approaches. Most reviewers name Joel Dean (1976) – originally published in 1950 – as the first work of managerial economists in pricing. In this work, Dean emphasizes *skimming price* – charging relatively high price – and *penetration price* – charging relatively low price – as the two major alternatives for pricing new products.

Development in the business-oriented pricing field and adoption of more scientific methods has been slow during the two decades after Dean’s work. In the late 1960s, Dean argued that *cost-plus pricing* is the most common technique in the United States. Gillis (1969) claimed that Dean’s proposition is too weak, as cost-plus is almost universal. Meanwhile, Darden (1968) defined unformulated combination of experience, intuition and the cost-plus rule as the usual recipe for pricing for the businessman. In the early 1970s, Oxenfeldt (1973) suggested that all pricing decisions in the business have either been highly intuitive – as in the case of new product introductions – or based on routine procedures – as in the cost-plus or *imitative pricing*. Although there have been developments in the business-oriented pricing field during the last three decades, the proportion of businessmen switching to more scientific methods is not very significant.

### 2.1.3. Classification of Pricing Problems

Pricing is setting a compensation value to an owning, which in this study is assumed to be a consumer product, rather than an asset or industrial product and includes a valuation process. The basic question in pricing is: "What is the right price that best serves reaching the defined firm objective(s) under current and prospective market circumstances?" Diversification among pricing problems arises, as the basic pricing question is tackled under different market circumstances and with attention to different firm interests. There is no unique classification of pricing problems and pricing research in the literature. Rao (1984, 1993), Monroe and Della Bitta (1978), Tellis (1986), Nagle (1987), and DeVinney (1988) are the major reviewers in the field.

In this text, we provide an alternative classification of the pricing problems by grouping the proximate issues. Three major problem categories are identified: ***Product line pricing*** deals with determining the optimal steady-state prices, ***promotional pricing*** deals with determining temporary price cuts over the steady-state level to stimulate the sales volume, and ***life cycle pricing*** deals with the evolution of optimal prices in time.

a. <u>Life Cycle Pricing:</u>

A product often has four distinct phases in its life cycle: introduction, growth, maturity, and decline. Based on an empirical study, Simon (1979) concludes that consumer response, and therefore absolute price elasticity (ε), for a product varies over the life cycle as follows:

(1)... $e_{\mathrm{int}roduction} \geq e_{growth} \geq e_{maturity} \leq e_{decline}$

Such an elasticity structure lends itself to an optimal pricing scheme where profit margins are lower in the introduction phase, increasing throughout the growth and maturity phases and then deteriorating again. The most distinct characteristic of life cycle pricing is that dynamic issues are more important in this category compared to the others.

New product pricing is a special case of life cycle pricing, in which case limited information is available about the consumer response before the product is actually on the market. Dean's penetration price and skimming price remain as the major options in pricing a new product.

b. Product Line Pricing:

Attempts to meet competition and serve the needs of different market segments lead to the introduction of product diversification and new product launches. This explains the emergence of multi-product firms that provide consumers with a set of related products. Product line pricing seeks to simultaneously determine the optimal prices of all demand-dependent products in a firm's portfolio.

Single product pricing and monopoly pricing − no substitutability − are the simple and well-documented cases of the general product line pricing problem.

c. Promotional Pricing:

Price promotion is offering a price reduction in order to stimulate the sales volume on a temporary basis. The design of this temporary price reduction constitutes a well-defined subset of pricing problems in marketing and includes the determination of key parameters like amount of price cut or deal size, duration of price cut, frequency of price cut, and long-term effects of price cut. Mulhern and Leone (1991) provide a summary of empirical research on price promotion.

The major distinction between product line pricing and promotional pricing is that the former refers to determination of the permanent or base price level, whereas the later refers to the determination of a temporary price level or temporary price cut over the base price level.

Bundle pricing is a special type of promotion pricing problem. Some firms attempt to raise the sales revenue by providing the consumer with a more favorable deal in case of bundle purchases. Three bundling strategies are widely discussed in the literature: pure bundling − products are only sold in a bundle −, mixed bundling − unbundled products are available, but bundles are sold at a discount −, and premium bundling − unbundled products are available, and bundles are sold at a premium. Schmalensee (1984) provides a detailed discussion on bundle pricing.

Completing the brief discussion on classification of pricing problems, we review product line pricing in greater detail in the following section.

## 2.2. Product Line Pricing

The problem of pricing a competition-free product, when demand of the product is not dependent on the demand of any other product in the market, is straightforward. The profit maximizing price is a function of the associated cost ($c$) and the own-price elasticity ($e$) only. This solution is widely known as the ***monopoly pricing rule***[1] in microeconomics:

(2)... $p^* = \frac{e}{e+1}c$

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[1] Derived by equalizing marginal revenue to marginal cost, where $MR = p\left(1+\frac{1}{e}\right)$ and $MC = c$

Pricing decisions are more complex in reality, because there are at least a few demand-dependent products in a typical consumer goods market. Consequently, product prices cannot be optimized individually and demand dependency is the key phenomenon in product line pricing.

Product line pricing studies in the literature tend to follow a four-step approach: defining the pricing problem, market modeling, estimation of the model parameters, and determination of optimal prices.

### 2.2.1. Step 1: Defining the Pricing Problem

The recognition of the need for a pricing decision is the starting point for a pricing problem. Symptoms leading to the recognition of such a need might form a long list, but the most usual ones are: decline in sales or profits, higher or lower prices compared to the rivals, frequent price changes, unjustifiable price differentials, and large variation in prices among the sales regions. Moreover, there are two other common occasions calling for a pricing decision: price as a strategic weapon to shape the competitive environment and price as an obligation to meet.

The recognized need defines the pricing objective, which can be of four types:

1. Financial: Managing long-run profits, maximizing current profits, achieving a target return, maximizing sales revenue, and securing a sound cash flow are typical financial objectives.
2. Operational: Securing a target market share or unit sales volume are typical operational objectives.
3. Competitive: Discouraging new entrants and survival are typical competition related objectives.
4. Social: Meeting the social obligations means provision of products at lower prices, rather than exploiting consumer demand for higher profit on sales. This objective is

more related to non-profit organizations like government agencies, but can be appropriate for industrial firms with a tarnished image in being exploitative of consumers, and thus regarded as untrustworthy.

We also define all the relevant constraints to narrow the range of pricing alternatives. Pricing constraints can be attributable to four factors:

1. Demand: Consumer demand restricts the amount of products a firm can sell at a given price. This is the fundamental restriction in a pricing problem, as in case of unlimited demand, pricing would be of no issue.
2. Product line: Most firms provide a set of partially substitutable products. These multi-product firms should establish reasonable price differentials, if a balanced sales structure is desired.
3. Cost: Cost restriction is related to financial survival; firms should set their prices so that the sales revenue covers the costs in the long-run.
4. Competition: Firms should include competitor price levels in the decision process, as consumers often use "reference pricing" while evaluating the competing products.

### 2.2.2. Step 2: Market Modeling

We need to know the sensitivity of demand to different determinants, including both marketing initiatives and environmental factors, while making the pricing decisions; so that, we can select the best level of a managerial initiative like price increase, under the given operating conditions like income level of consumers. A mathematical market model, which is a less complex abstraction of the real market environment, can serve us best in uncovering the relation between the demand and its determinants. Market models are used to describe, explain, and predict marketing situations, and also to prescribe marketing decisions.

Several evaluation criteria have been used in the literature, while developing a market model. The most important criteria are:

1. Decision relevance: Model should encompass all the consumer choice factors and established market structure affecting the problem solution
2. Realistic assumptions: Model assumptions should not be restrictive and unrealistic, limiting the model applicability to real-world situations
3. Information needs: Model should be built on easily obtainable information
4. Parsimony: Model should be as simple as possible

A market model is developed by a priori expectations, and its explanatory power is tested based on empirical market data.

Hanssens, Parsons, and Schultz (1990) define a market model to encompass not only a *sales response function*, which defines demand as a function of its determinants, but also supply curves, competitive behavior, vertical market structures, cost functions and identities. Nevertheless, sales response function is the most important component of the market model, such that it is referred synonymously to the market model itself in most of the studies[2].

Sales response function describes the functional relation between the sales volume[3] and relevant sales determinants. Sales volume can be quantified both in absolute terms like number of units, kg, lt., $ and in relative terms like market share.

Urban (1969) defines modeling scope to range from the individual consumer choice process considerations – highly disaggregated, micro-analytic simulation – to simple regression of aggregate market results – highly aggregated, aggregate demand models. In any aggregation level, all significant sales determinants should be included in the model to achieve a satisfactory prediction capability. On the aggregate market level models, sales determinants might be average price level, distribution, advertising

[2] This text is no exception; sales response function and market model are often used interchangeably
[3] Sales volume and demand are often used synonymously in the text

spending, national or large regional promotions. On the store or household level models, sales determinants might be store prices, shelf space, in-store displays, store promotions, special features.

Provided that sales determinants are properly identified, the practitioner searches for a functional relationship between the sales and its determinants. This functional form may belong to any one of the two broad categories based on the dependent variable: sales volume models and market share models.

**Sales volume models**

There are five widely encountered functional forms: linear model, semi-logarithmic model, power model, exponential model, and S-shaped models. We demonstrate the implications of these functional forms for a two-variable model; extension to more variable models is straightforward.

1. Linear model:

The simplest response model is represented as:

(3)... $q = b_0 + b_1 x_1 + b_2 x_2$

$q$ : Sales volume

$x_1, x_2$ : Level of managerial variable 1 and 2, respectively

If $x_1$ is set to be the price level, then $b_1$ is expected to be negative. On the other hand, if $x_2$ is set to be advertising spending level or distribution level, then $b_2$ is expected to be positive. These a priori expectations provide useful insights, when testing the model with real data.

Implied elasticity is calculated as:

(4)... $e_{x_1} = \dfrac{b_1 x_1}{b_0 + b_1 x_1 + b_2 x_2}$

Hence, elasticity depends on the level of the variable itself. The linear model is often extended to include interaction effects:

(5)... $q = b_0 + b_1 x_1 + b_2 x_2 + b_3 x_1 x_2$

Implied elasticity becomes:

(6)... $e_{x_1} = \dfrac{b_1 x_1 + b_3 x_1 x_2}{b_0 + b_1 x_1 + b_2 x_2 + b_3 x_1 x_2}$

In the simple linear model, response sensitivity of $x_1$, defined as $dq/dx_1$, is a constant such as $b_1$. In the modified linear model, response sensitivity of $x_1$ is $b_1 + b_3 x_2$ and its value might increase or decrease as the level of $x_2$ increases, depending on the sign of $b_3$. Modification of the simple linear model to include interaction effects enables us to establish such a dependency.

Linear model is often tried first, as it is easy to estimate, interpret and communicate. It is also proved that a linear function provides a good approximation to an underlying nonlinear function when the observations are over a limited range.

2. Semi-logarithmic model:

The semi-logarithmic model is represented as:

(7)... $q = b_0 + b_1 \ln x_1 + b_2 \ln x_2$

This formulation carries the risk of generating negative sales volume for certain combination of $x_i$ values. A restriction should be imposed on formulation to avoid this risk. In single variable model case, non-negativity restriction is explicitly formulated as:

(8)... $x \geq e^{-\frac{b_0}{b_1}}$

In the multi-variable model case, the non-negativity restriction is implicitly formulated as:

$$(9)\ldots \prod_{i=1}^{n} x_i^{b_i} \geq e^{-b_0}$$

In the semilog model, the response sensitivity of $x_1$ is equal to $b_1 / x_1$ and its absolute value diminishes as the level of marketing effort $x_1$ increases.

Implied elasticity is:

$$(10)\ldots e_{x_1} = \frac{b_1}{b_0 + b_1 \ln x_1 + b_2 \ln x_2}$$

As diminishing returns to scale is generally observed in advertising spending, semilog models have been frequently used to model the response to advertising in the literature.

3. Power model:

The most general power model is represented as:

$$(11)\ldots \ q = e^{b_0} + e^{b_{10}} x_1^{b_1} + e^{b_{20}} x_2^{b_2} + e^{b_{12}} x_1^{b_3} x_2^{b_4}$$

Power model considers all the interactions among the marketing variables, but it quickly becomes impractical due to the large number of parameters it needs; such that, 3 parameters for a single variable model, 8 for two variable case, 20 for three variable case, 48 for four variable case, 112 for five variable case. Sample sizes and current estimation procedures do not allow for precise estimation of so many parameters. Consequently, the general power model is often simplified by setting some parameters equal to each other or equal to 0 or 1.

The multiplicative model is the simplified form of the power model and is represented as:

(12)... $q = e^{b_0} x_1^{b_1} x_2^{b_2}$

The multiplicative model has the special property that power coefficients are directly interpreted as elasticities:

(13)... $e_{x_1} = b_1$

For this reason, the multiplicative model is also known the constant elasticity model in the literature. Constant elasticity property is a source of strength, as it reduces the number of parameters required and therefore simplifies the sample size requirements and estimation procedures. This simplification makes multiplicative model the most widely used functional form in the literature, especially for data intensive studies like cross-price elasticity estimation. Yet, the constant elasticity property also attracts deep criticism for being an unrealistic assumption from many authors. The multiplicative model has the same functional form with the Cobb-Douglas production function, a well-known model in the economics literature.

4. <u>Exponential model:</u>

Exponential model is represented as:

(14)... $q = e^{b_0} e^{b_1 x_1} e^{b_2 x_2}$

In the exponential model, the response sensitivity of $x_1$ is equal to $b_1 q$ and its absolute value increases as the sales volume $q$ increases. Although this is a contradiction to the a priori expectation of diminishing returns to scale, exponential models are also used in the literature, especially for modeling the effects of price. One potential application can be the promotion pricing, where price inverse ($1/p$) is plugged into the exponential model. The larger the price cut in a promotion, more consumers would realize the deal and the impact on sales volume might be greater. Nevertheless, increasing returns to promotional price cut should be observable only over a limited range of prices, as the demand is likely to plateau or even bend backward at the extreme cheapness levels. Monroe (1971) discusses “price limit hypothesis” in detail.

5. <u>S-shaped models:</u>

An S-shaped function implies increasing returns to scale up to an inflection point, and decreasing returns to scale afterwards. Three well-known functional forms depicting S-shaped relation are: log-reciprocal model, Gompertz growth model, and logistic model.

Log-reciprocal model is represented as:

$$(15)\ldots q = e^{b_0 - \frac{b_1}{x}}, b_0, b_1 > 0$$

Gompertz growth model is represented as:

$$(16)\ldots q = b_0 b_1^{-b_2 b_1^{-b_3 x}}$$

Logistic model is represented as:

$$(17)\ldots q = \frac{q_0}{1 + e^{-(b_0 + b_1 x)}}$$

Although the existence of S-shaped functions is still debatable, distribution − number of retail sales points on the macro level and shelf space on the micro-level − and promotion − amount of advertising spending − are the two factors in which S-shaped relations are often assumed to exist.

Transcendental logarithmic or translog function is also used to model the effects of advertising in the literature. More importantly, translog model is a quadratic approximation to any continuous function, and is represented as:

$$(18)\ldots \ln q = b_0 + b_1 \ln x_1 + b_2 \ln x_2 + b_{12} \ln x_1 \ln x_2 + b_{11} \left(\ln x_1\right)^2 + b_{22} \left(\ln x_2\right)^2$$

Implied elasticity is:

$$(19)\ldots e_{x_1} = b_0 + 2b_{11} \ln x_1 + b_{12} \ln x_2$$

The translog model reduces to the simple multiplicative model, if the coefficients of the higher order terms (i.e. $b_{12}, b_{11}, b_{22}$) are all set to zero.

Comparison of Sales Volume Models:

Of the five forms reviewed above, linear, multiplicative and exponential formulations dominate the market modeling literature. It is often questioned whether any one of these three formulations is superior or the better formulation is case-dependent. In a product line pricing problem, determination of price elasticity estimates is the most critical step. Robustness of these estimates is the key indicator of the model dependability.

Bolton (1989) assesses the robustness of the elasticity estimates, derived from linear, multiplicative, and exponential models. Author defines the general form of store-level sales volume as:

(20)... $q_t = f(p_t, x_t, s_t) + u_t \qquad \forall t = 1, \mathbf{K}, T$

$p_t$ : Vector of prices of major products in week t, measured in US dollar per standard unit basis and adjusted for changes in consumer price index

$x_t$ : Vector of variables indicating the presence of store promotions (e.g. gondola head, shelf tags, flyer advertising, newspaper advertising, discount coupons, etc.)

$s_t$ : Vector of dummy variables indicating the month of the year to reflect any seasonality in consumer purchases

$u_t$ : Disturbance term reflecting model specification and measurement error

To compare the explanatory power of the three functional forms, Bolton uses sales data for four frequently purchased, nondurable household product categories: frozen waffles, liquid bleach, toilet tissue, ketchup. Data is collected from 12 stores, six in each of the two cities, over a period of 75 weeks. Three major brands are selected in each category and a total of 144 sales equations are estimated: 4 categories times 3 brands times 12 stores.

Across all equations, average $R^2$ value is 0.79 for linear, 0.74 for multiplicative and exponential models. The author suggests that fit does not vary significantly with functional form. In all three models, about 55% of the own-price elasticities and about 15% of the cross-price elasticities are significant and different from zero at 95% confidence level. Furthermore, price elasticity estimates derived from these three models are significantly correlated, indicating reasonably similar estimates: similar in direction and relative magnitude. Based on this similarity, Bolton concludes that idiosyncrasies in the data, rather than the model form, are responsible for the general characteristics of the elasticity estimates.

However, this conclusion does not suggest that functional form is not an important issue. Difference among the estimates of the same elasticity parameter derived from the alternative three models range within the [-1.0, +1.0] band, averaged across all the stores. Magnitude of the variation is large, when compared to the average magnitude of own-price elasticity, ranging from -2.2 to -2.6, and cross-price elasticity, ranging from +0.4 to +0.6. Moreover, statistic tests indicate that estimates derived from all three models have a systematic bias relative to estimates derived from the models with highest $R^2$. All models overstate own- and cross-price elasticities. In fact, this is the well-expected bias of omitted variables; models force price elasticity estimates to higher values to partially explain the variation attributable to the omitted variables. Bias is smallest for the multiplicative model and highest for the linear model. Larger bias in the linear case is not surprising, as linear formulation does not consider interaction among the model variables.

**Market Share Models**

When market share is the dependent variable in the sales response function, logical constraints should be added to the market model, which introduce an additional complexity to the formulation. These are referred as bound – market share for any product must be between 0 and 1 – and sum constraints – i.e. sum of the market shares for all products must equal 1 – in the literature. The *attraction model* is a widely used formulation, successfully handling the complexity induced by the logical constraints.

The basic attraction model is represented as:

$$(21)\ldots\ m_i = \frac{A_i}{\sum_{j=1}^{n} A_j}$$

$m_i$ : Market share of a product i

$A_i, A_j$ : Attractiveness of product i, and any product j

$n$ : Number of products in the market

Definition of attractiveness is the differentiating factor in attraction models. Although numerous definitions of attractiveness exist in the literature, two types of models remain fundamental: multiplicative model and exponential model. Almost all the other attractiveness formulations in the literature are the extensions of these two fundamental models.

1. Multiplicative model:

Multiplicative model, or more fully the Multiplicative Competitive Interaction (MCI) model, is represented as:

$$(22)\ldots\ A_i = e^{b_{i0}} \prod_{j=1}^{n} \prod_{k=1}^{K} x_{jk}^{b_{ijk}}$$

$K$ : Number of managerial variables used in the model

$x_{jk}$ : Level of managerial variable k for product j

$b_{ijk}$ : Competitive interaction parameter, measuring the degree of the competitive impact of managerial variable k for any product j on the product i

Implied own elasticity is:

$$(23)\ldots e_{x_{iik}} = b_{iik} - \sum_{j=1}^{n} m_j b_{jik}$$

Implied cross elasticity is:

$$(24)\ldots\ e_{x_{ilk}} = b_{ilk} - \sum_{j=1}^{n} m_j b_{jlk}$$

The above formulation is known as the Fully Extended version of the multiplicative model, as it captures all the possible cross effects among the products by the individual $b_{ijk}$ parameters. This version is often used to model the *asymmetric competition*. Asymmetry arises when marketing actions of a firm reflect on the sales of the competitors not in proportion to their respective market shares, but selectively depending on the marketing strategy.

The Fully Extended version quickly becomes impractical due to the large number of parameters it demands. Cooper and Nakanishi (1988) provide the formula of the parameter requirement as $Kn^2 + n$. For a model of 4 variables and 10 products, the number of parameters required is 410. Sample sizes and current estimation procedures do not allow precise estimation of such a large number parameters. Full model is usually simplified by keeping the fundamental asymmetry parameters and setting the others to zero.

Simple versions of the full model are widely used in the literature. There are two levels of simplification:

- Disregarding asymmetrical competition effects among the products: $b_{ijk} = b_{ik}$
- Disregarding asymmetrical effectiveness of managerial instruments among the products: $b_{ik} = b_k$

The former is known as the Differential MCI model, and the later is known as the Simple MCI model in the literature. These models are used to model the symmetrical competition at the market level analysis.

2. <u>Exponential model:</u>

The exponential, or more fully the Exponential Competitive Interaction (ECI) model, is represented as:

$$(25)\ldots\ A_i = e^{b_{i0}} \prod_{j=1}^{n} \prod_{k=1}^{K} e^{b_{ijk} x_{jk}}$$

Implied own elasticity is:

$$(26)\ldots e_{x_{iik}} = \left( b_{iik} - \sum_{j=1}^{n} m_j b_{jik} \right) * x_{ik}$$

Implied cross elasticity is:

$$(27)\ldots\ e_{x_{ilk}} = \left( b_{ilk} - \sum_{j=1}^{n} m_j b_{jlk} \right) * x_{lk}$$

Similar to the multiplicative model, the differential version and simple version of the exponential model are widely used to reduce the number of parameters required. The exponential formulation is usually referred as Multinomial Logit (MNL) model in the literature and it is often used to model the individual choice behavior, referred as micro-level modeling.

### 2.2.3. Step 3: Estimation of Model Parameters

In Step 2, the parametric form of the market model has been constructed. In this step, model parameters are estimated by fitting the response function to some kind of market data. Validity of the fit determines the prediction capability of the model[4] and it is measured with the magnitude of discrepancy between the model predictions and the market data.

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[4] Power is the common term used to describe the prediction capability of a model.

There are three approaches to determine the sales response: statistical methods, in-store experiments, and consumer surveys. *Statistical analysis* applied to either cross-sectional or time series data is the traditional estimation method. The major source of market data for statistical methods like regression analysis is the retailer audit in consumer goods. Retailer audit is automatically performed in supermarkets by optical scanners. Scanner data can be used as in case of store-level modeling or can be aggregated to the retail chain, or regional level. To extract household-level data, the scanner system is used with a retailer card like frequent visitor card that identifies the purchasing consumer. For small retailers like groceries, snacks, gas stations, sales data is actually accounted by regularly visiting auditors and it is recorded together with price and any in-store promotion data. Auditing small retailers is a voluminous and expensive process, but also necessary, if market wide analysis is sought. Demand characteristics are usually very different in these small retailers, compared to the supermarkets. Purchases are rather impulsive in small retailers, whereas it is more planned in supermarkets. Product variety and price transparency – ease of getting price information for different products – is lower in small retailers.

Model parameters should be estimated with data driven from the sources commensurate with the degree of model aggregation. For example, nationwide market data should not be used in modeling store-level promotion decisions. Nationwide data represents a gross average of thousands of sales territories, and what is true for this gross average can be incorrect for a store located in a high income neighborhood. Similarly, a single household-level or store-level data should not be extrapolated to represent the nationwide market. A representative and sufficiently large sample is required to be conclusive. Link (1995) provides further details on market data selection.

After selecting the right set of market data, the model function defined in the preceding section is fit to the data set by using a statistics program. The prediction capability of the model is assessed by an implicit function of the discrepancy between the model predictions and market data. Major causes of low prediction capability are improper functional formulations, and omission errors, defined as neglecting some significant predictors.

In the *experimental approach*, a feature of the selected product (like price) is systematically varied, while external influences on demand like the prices of the other products are either held constant, or measured, or randomized. Doyle and Gidengil (1977) provide a review of in-store experiments.

The *consumer survey approach* provides direct measures in purchase quantity, price responsiveness, loyalty, and brand switching on household level. Although consumer surveys are designable and relatively cheap, their representativeness and projectability are still debatable. Major problem with surveys is that they are claim-based, and there are many occasions in which claims do not represent the actual purchasing behavior, as in the case of addictive products like alcoholic beverages and tobacco.

The survey approach became more popular with the advent of conjoint methodology. In this methodology, respondents are exposed to trade-offs between the desire to obtain certain product attributes and the higher prices paid for these attributes. Respondents rank or rate numerous product attribute - price combinations. If the number of attributes tested is more than three, then a fractional factorial design is used to determine the combinations. Utility associated to each product attribute is determined according to the respondent ratings. These utility values can be used in an attraction model to predict expected market share of a product with a certain product attribute-price combination. Green, Rao, and Srinivasan (1978) and Mahajan, Green, and Goldberg (1982) provide further details on the conjoint methodology.

### 2.2.4. Step 4: Determination of Optimal Prices

In the final step, an optimization algorithm is run to determine the optimal price levels for a firm operating in an environment, described by the market model.

The most frequently encountered pricing objective in the literature is the maximization of current profits. A simple profit optimization problem can be formulated as follows:

$$(28)\ldots\ Max\, p=\sum_{j=1}^{n}\left(p_j-c_j\right)*q_j$$

$$s.to\quad q_j=f_j\left(x_{11},\ldots,x_{ik},\ldots,x_{NK}\right)\quad \forall j=1,\ldots,n$$

Problem constraints represent the demand for the products of the selected firm, as a function of the managerial variables for all the products in the market. The problem solution is straightforward. Assuming constant cost per unit and differentiating the profit function with respect to $p_i$:

$$(29)\ldots\ \frac{dp}{d\,p_i}=q_i+\sum_{j=1}^{n}\left(p_j-c_j\right)*\frac{d\,q_j}{d\,p_i}$$

Equating first derivate to zero and replacing $\frac{d\,q_j}{d\,p_i}$ with the price elasticity term $e_{p_{ji}}*\frac{q_j}{p_i}$, the optimality condition is written as:

$$(30)\ldots\ q_i+\sum_{j=1}^{n}e_{p_{ji}}\frac{\left(p_j-c_j\right)q_j}{p_i}=0$$

Each sales volume variable is substituted with the relevant demand constraint:

$$(31)\ldots\ f_i\left(x_{11},\ldots,x_{ik},\ldots,x_{NK}\right)+\sum_{j=1}^{n}e_{p_{ji}}\frac{\left(p_j-c_j\right)}{p_i}f_j\left(x_{11},\ldots,x_{ik},\ldots,x_{NK}\right)=0$$

Optimal price for product $i$ can be derived by rearranging the Equation (31):

$$(32)\ldots\ p_i^*=\frac{-e_{p_i}*+\sum_{\substack{j=1\\ j\neq i}}^{n}e_{p_{ji}}\frac{\left(p_j-c_j\right)}{c_i}\frac{f_j\left(x_{11},\ldots,x_{ik},\ldots,x_{NK}\right)}{f_i\left(x_{11},\ldots,x_{ik},\ldots,x_{NK}\right)}}{-e_{p_i}-1}c_i$$

This is the fundamental microeconomic equality to determine prices for a set of interrelated product.

Little and Shapiro (1980) derive an optimal price formula for the related products in a retailer. Their work is based on the "two-stage theory of price setting". At one stage, consumers purchase goods to maximize utility, which determines the short-run price response. At the other stage, the retailer sets the prices to maximize short-run profit, subject to the long-run attractiveness constraint. Consumer loyalty, thereby long-run attractiveness of the store, calls for lower prices compared to the pure short-run profit case.

Consumer's problem is formulated as:

(33)... $Max\, u_j = v_j\left(q_{1j}, q_{2j}, \mathbf{K}, q_{nj}\right) - w_j(\sum_i p_i q_{ij})$

$s.to\;\; q_{ij} \geq 0 \quad \forall i$

$q_{ij}$ :Quantity of product i purchased by consumer j

$u_j$ : Net utility perceived by consumer j after the purchase

$v_j$ :Utility received by consumer j after purchase

$w_j$ :Utility lost by consumer j as a result of spending $\sum_i p_i q_{ij}$ dollars

Concavity of $u_j$ guarantees a global maximum, satisfying the first order optimality condition:

(34)... $\dfrac{d\,v_j}{d\,q_{ij}} - \dfrac{d\,w_j}{d\,(\sum_i p_i q_{ij})}\, p_i = 0$ provided that $q_{ij} > 0$

Retailer's problem is formulated as:

(35)... $Max\, p = \sum_i (p_i - c_i) * q_i(p_1, p_2, \mathbf{K}, p_n)$

$s.to\;\; \sum_j v_j\left(q_{1j}, q_{2j}, \mathbf{K}, q_{nj}\right) - w_j(\sum_i p_i q_{ij}) \geq u_0$

$u_0$ : Smallest permitted consumer utility, to maintain long-run attractiveness

Starting with the Lagrangian for the retailer's problem and simplifying it with the optimality condition defined in Equation (34), the authors formulate the optimal price for product i as:

(36)... $$p_i^* = \frac{-e_{p_i} + \sum_{j \neq i} e_{p_{ji}} \frac{(p_j - c_j)}{c_i} \frac{q_j}{q_i}}{-e_{p_i} - 1 + z_i} c_i$$

$e_{p_i}, e_{p_{ji}}$ are the own- and cross-price elasticities, whereas $z_i$ is the consumer utility parameter. $z_i$ is a function of the Lagrangian parameter, quantity of brand i purchased and total utility lost as a result of spending to purchase brand i. All the parameters in the price formula can be determined, except for $z_i$, which is regarded as an exogenous parameter used to reflect the managerial desire to maintain long-run attractiveness.

If the $z_i$ term is neglected, the formula gives the optimal prices for a retailer aiming only to maximize its short-run profit. The simplified price formula is equivalent to Equation (32).

Price elasticity is the key parameter in the optimal price formulae. Neslin and Shoemaker (1983) report own-price elasticity estimates from numerous representative studies. Almost all the reported estimates are negative and range in absolute magnitude from zero to three. Brand-level estimates are higher than category-level estimates in general, with the average value of -1.8 and -0.6, respectively. Tellis (1988) supports this finding, by reporting an average own-price elasticity of -1.8 in his meta-analysis of price elasticities from 42 econometric studies.

Considering the average estimates given above, it can be concluded that demand is inelastic at the category-level and elastic at the brand-level. In fact, this is an expected finding. When the price of a brand is raised, a certain group of consumers cease to purchase that brand. Among these consumers, some switch to the lower priced brands. Switching consumers add to the brand-level elasticity, but do not add to the category-level elasticity. If there were only one firm in the market enjoying a price elasticity of -0.6, then it would increase its price until the consumer response to rising prices becomes unfavorable, and price elasticity exceeds -1.0. Monopoly benefits from the fact that consumers do not have any alternative brand to switch. Competition in a market restricts the flexibility of the firms in pricing and provides consumers with greater economic surplus.

## 2.3. Product Line Pricing Studies

In this section, a set of product line pricing studies is presented to illustrate the application of the methodology discussed in the foregoing sections. These studies form a representative set, covering most of the model types discussed and using very diverse data sources. Findings from these empirical studies are heavily case dependent, and thus details of the results are excluded from the discussion and only methodological findings are presented.

Urban (1969):

Urban provides a pioneer article on analytical approach to product line pricing in 1969. In this work, Urban combines two multiplicative models in a hierarchical formulation. He defines two types of interaction among the related products: inter-category and intra-category effects. Product categories can be complementary or substitutable, but products within the same category are purely substitutable. Urban uses a multiplicative regression model to represent the inter-category competition and multiplicative attraction model to represent the intra-category competition. He includes price, advertising, and distribution effects in the models.

Total sales volume for a category is given by:

(37)... $q_j = k\prod_{r=1}^{n} p_r^{e_{p_{jr}}} a_r^{e_{a_{jr}}} d_r^{e_{d_{jr}}} \quad \forall j = 1, \mathbf{K}, n$

$q_j$ : Total category j sales volume

$k$ : Scale constant

$p_r$ : Average price level of all products in any category r

$a_r$ : Total advertising of all products in any category r

$d_r$ : Total distribution level for all products in any category r

$e_{p_{jr}}, e_{a_{jr}}, e_{d_{jr}}$ : Price, advertising, and distribution elasticities for category j

Market share for a firm k, which sells a product belonging to the category j, is given by:

(38)... $m_{kj} = \dfrac{p_{kj}^{e_{p_{kj}}} a_{kj}^{e_{a_{kj}}} d_{kj}^{e_{d_{kj}}}}{\sum_{i \in F} p_{ij}^{e_{p_i}} a_{ij}^{e_{a_i}} d_{ij}^{e_{d_i}}}$

$e_{p_i}, e_{a_i}, e_{d_i}$ : Competitive price, advertising, and distribution sensitivities for any firm i

$i \in F$ : For all firms participating product category j

To test the descriptive adequacy and usefulness of the proposed model, Urban uses 100 grocery audits of three related and frequently purchased consumer good categories. Shelf price, number of facings, deals, and special displays are recorded in the audits. Urban does not include deals, which are frequent, but almost all deals are in terms of price cut, and special displays, which are very infrequent, in the model. Also, advertising is excluded due to the lack of data. It is assumed that none of the brands received disproportionate amount of advertising at the audited stores.

Urban’s formulation is hierarchical; consumers first choose the product category, and then choose the brand. He bundles all products in the same category, and represents the interaction among the categories with a single elasticity estimate. This is an obvious pitfall; consider two firms (A, B) both selling one product in each of the two substitutable categories, 1: carbonated soft drinks, and 2: fruit juices. Products in the same categories are substitutes. Firm A's product in category 2 and Firm B's product in category 1 are substitutes, and vice versa. However, it is not straightforward to conclude that products of the same firm in different categories are pure substitutes. These products share the same brand name or firm image, and benefit from the distribution strength of the same firm. Bundling the products of different firms may lead to elasticity estimates with low explanatory power.

Urban realizes the pitfall of bundling and updates his model by allowing different inter-category elasticity estimates for different firms. This split-category approach is partially successful, explaining 30% more of variation compared to the earlier formulation. Nevertheless, the best approach to the problem would be the nonhierarchical formulation, as it allows full flexibility in determining the interactions among the products belonging to different categories.

Urban reveals a sort of asymmetry in interdependency between two categories, such as $e_{p_{ij}} > 0, and e_{p_{ji}} < 0$. Asymmetry is a difficult concept to accept, as it is not in line with a priori expectations. Moreover, it can be a consequence of the modeling approach followed or low $R^2$ values achieved. Urban also states the need for further behavioral research to justify the asymmetry.

Reibstein and Gatignon (1984):

Reibstein and Gatignon use a nonhierarchical multiplicative model to determine the optimal prices for five egg varieties: extra large, large, medium, private label, and 20-pack. Authors include only price in the model:

(39)... $q_{it} = e^{b_{i0}} \prod_{j=1}^{5} p_{jt}^{b_{ij}} \quad \forall i = 1, \mathbf{K}, 5$

$q_{it}$ :Sales volume for product i in period t

Profit maximizing price for product i is derived as:

(40)... $p_i^* = \frac{b_i}{b_i+1}c_i - \sum_{j \neq i} \frac{b_{ji}}{b_i+1}\frac{q_j}{q_i}\left(p_j - c_j\right) \quad \forall i = 1, \mathbf{K}, 5$

It is not possible to provide an explicit solution for the optimal prices, but Equation (40) clearly shows how model parameters affect the optimal prices. First term in Equation (40) represents the optimal price charged when the demand for each product is not interrelated. The second term reflects the effect of demand inter-dependence on the optimal monopoly pricing. Profit maximizing price formula is a reordered form of Equation (32), noting that $e_{p_{ji}} = b_{ji}$.

The authors fit the multiplicative model to 25 weeks sales data, collected from two supermarkets via scanners. They construct a 5x5 elasticity matrix, which is partially full as not all products are significantly interdependent.

Multiplicative formulation provides constant elasticity over the entire price range. This oversimplifying assumption leads to unrealistic optimal prices in this work. For extra large eggs, own price-elasticity is between 0 and -1. Consequently, the profit function is ever increasing with price and optimal price is undetermined. This is not true, because no one would buy extra eggs if they were extremely expensive. For the other egg varieties, optimal prices turn out to be outside the reasonable price range. These results are well-expected as the model assumes the same consumer responsiveness even at very high price levels.

The authors impose upper bounds on prices, assuming that optimal prices should be close to the range of observed prices. This approach causes optimality to lose its absolutistic nature, because optimality becomes dependent on the subjective assessment of current price levels. Not surprisingly, modified optimal prices turn out to be the maximum values permitted. This article is deeply criticized by Vilcassim and Chintagunta (1995) with similar arguments.

Vilcassim and Chintagunta (1995):

The authors determine the optimal retailer prices for four yogurt brands, using an exponential formulation to model the household level brand choice probabilities. The probability of purchasing a specific brand is formulated as a function of purchase determinants, including marketing activities, intrinsic household choice, and household inventory.

The conditional probability of brand i purchase ( $\Pr_{i/c}^{h}$ :), provided that the household certainly buys yogurt, is:

(41)... $$\Pr_{i/c}^{h} = \frac{\exp\left(b\,x_i^h + g_i^h\right)}{\sum_{j=1}^{n} \exp\left(b\,x_j^h + g_j^h\right)}$$

$x_j^h$ : Vector of marketing activities faced by the household

$b$ : Vector of unknown parameters, describing the effectiveness of marketing activities

$g_j^h$ :Intrinsic preference coefficient of the household for brand j

The unconditional probability of yogurt purchase is:

(42)... $$\Pr_c^h = \frac{\exp\left(t^h + q\,Z_c^h\right)}{1 + \exp\left(t^h + q\,Z_c^h\right)}$$

$Z_c^h$ :Vector of purchase determinants

$q$ : Vector of effectiveness parameters

$t^h$ :Intrinsic purchase propensity, household specific intercept

Household's product inventory ( $I^h$ ) and category specific, brand invariant category value ( $CV_c^h$ ) are the two purchase determinants. Category value and category attractiveness are given by:

(43)... $$CV_c^h = \ln\left[\sum_{j=1}^{n} \exp\left(b\,x_j^h + g_j^h\right)\right]$$

(44)... $qZ_c^h = l I^h + qCV_c^h$

The probability of purchasing brand i is given by:

(45)... $\Pr_i^h = \Pr_{i/c}^h * \Pr_c^h$

Probability that a randomly selected household purchases brand i is given by:

(46)... $\Pr_i = \mathrm{E}\left[\Pr_i^h\right]$

The expected sales volume for brand $i$ is given by:

(47)... $q_i = \mathrm{M} * \mathrm{E}\left[\Pr_i^h q_i^h\right]$

$\mathrm{M}$ : Number of total retailer visits made by the selected households

$q_i^h$ : Quantity purchased by household $h$ if brand $i$ is selected

To estimate the model parameters, the authors select a random sample of 100 households from the AC Nielsen yogurt database. Over the analyzed time period, these households make about 12,900 visits to the retailers, and approximately 19% of these visits result in purchase of yogurt.

Price and feature advertisements are used in the model. A dummy variable (0, 1) is coded to represent the presence of a feature advertisement. An interaction term is also included to capture any synergistic effects. Statistics tests suggest a reasonable fit of the model to the market data. Moreover, the sign and size of the estimated model coefficients are turned out to be consistent with a priori expectations.

The authors run a simple optimization procedure to determine the profit maximizing prices for the yogurt brands. Optimal prices are within the reasonable price band and fairly close to the observed average prices unlike the results of Reibstein and Gatignon (1984). The authors conclude that household level models aggregated to the market level are both theoretically and empirically superior to aggregate market models, with rigid specifications such as constant elasticity or linear demand.

Carpenter, Cooper, Hanssens, and Midgley (1988):

The authors use a multiplicative market share model to represent the asymmetrical competition among eleven brands in the market of a mature, nonseasonal, regularly purchased household product. Asymmetries arise from two main sources: unique features of brand strategy like comparative advertising, unique distribution, strong brand name and period-to-period variation in marketing mix like temporary distinctiveness provided by an advertising campaign.

The authors formulate market share for product i in time period, sales region, or consumer segment t as:

(48)... $m_{it} = \dfrac{A_{it}}{\sum_{j=1}^{N} A_{jt}} \qquad \forall i = 1, \ldots, N \qquad \forall t = 1, \ldots, T$

Differential formulation is used to define the product attraction:

(49)... $A_{it} = e^{a_i} \prod_{k=1}^{K} x_{kit}^{b_{ki}} \qquad \forall i = 1, \ldots, N \qquad \forall t = 1, \ldots, T$

Model variables, $x_{kit}$ denote the level of marketing activity k for product i in period t.

Cooper and Nakanishi (1982) demonstrate that this market share model is equivalent to a linear specification in logarithms with period- and brand-specific intercepts added:

(50)... $\log m_{it} = a_0 + \sum_{i'=1}^{N-1} a_i d_{i'} + \sum_{t'=1}^{T-1} g_t c_{t'} + \sum_{k=1}^{K} b_{ki} x_{kit} + u_{it} \qquad i = 1, \ldots, N \qquad t = 1, \ldots, T$

$a_i$ : Brand-specific intercept

$d_{i'}$ : Dummy variables for brands with $d_{i'} = 0$ if $i' \neq i$

$g_t$ : Time-period coefficient

$c_t$ : Time-period dummy variables with $c_{t'} = 0$ if $t' \neq t$

$a_0$ : Overall intercept

$u_{it}$ : Stochastic disturbance, combining specification error and sampling error

Market share and price data is collected over a period of 26 months, by means of a consumer panel of about 3000 families in Australia. Price and advertising are included in the market model. Advertising effects are significant, because the predominant channel in communication is television and media spending is sizeable. Advertising data is supplied by media agencies. Distribution is excluded from the model, because all major brands have similar distribution levels. Log-linear model is fit to the market data, and results validate prediction capability of the model.

Net profit for a brand is given by the gross profit minus advertising spending:

(51)... $p_{it} = q_t m_{it}(x_{pit} - c_i) - x_{ait}$

Nash equilibrium strategy requires all brands to maximize profits simultaneously:

(52)... $\dfrac{dp_{it}}{d\,x_{kit}} = 0 \quad i = 1, \mathbf{K}, 11 \quad k = a, p$

Provided that profit for each brand is strictly quasi-concave in each marketing-mix variable, Friedman (1977) provides the solution to the optimization problem:

(53)... $X^*_{pit} = c_i\left(\dfrac{1}{1+(1/e_{pit})}\right)$

(55)... $X^*_{ait} = a_t m_{it}(x^*_{pit} - c_i)e_{ait}$

(55)... $e_{kit} = b_{ki}\left(1 - m_{it}\right) \qquad k = a, p$

<u>Basuroy, Mantrala and Walters (2001):</u>

More recently, Basuroy, Mantrala and Walters use symmetric product-level demand functions - linear in prices - to analyze the impact of category management on business results. The authors indicate a paradigm shift for retailers, from brand-centric management to category management. Category management is concerned with maximizing the overall profit of the category by articulating the interrelatedness of the category products, rather than dealing with the profit generated by individual brands or brands sourced from the same producer.

The authors formulate the sales volume for product i in retailer r as:

$$(56)\ldots \quad q_{ir} = b_i + \sum_j e_{ij} p_{jr} + \sum_k g_{rk} p_{ik} \quad \forall i, r$$

$e_{ij}$ : Inter-brand cross-price sensitivity, accounting for the interaction among the related products sold in the same retailer

$g_{rk}$ : Inter-store cross price sensitivity, accounting for the interaction among the same products sold in different retailers

The authors use the sales data for laundry detergent category to test their hypotheses on the impacts of category management. They empirically prove that category management calls for higher retail prices. This is an expected result, as coordinated and cooperative pricing dampens the competition among the products sold in the same retailer. Higher prices cause a decrease in sales volume and sales revenue, but increase the profit. This finding is almost universal as it is supported by many product line pricing studies.

<u>Bucklin and Srinivasan (1991):</u>

This article is not a product line pricing study per se, but it is worthwhile to include it in the review to demonstrate an alternative approach to market modeling and parameter estimation.

Most research in the market modeling literature is based on the data derived from Universal Product Code (UPC) scanners located at sales points. These historical records of consumer purchases provide the best indication of what consumers actually do in practice. However, using the scanner data has some important limitations: inadequate number of observations, insufficient magnitude of price changes, statistical deficiencies like multicollinearity in econometric approaches. Moreover, scanner data hides different preferences within a household, as it is collected at the household level. Bucklin and

Srinivasan develop an alternative methodology: a survey-based approach to determine price elasticities and brand choice probabilities.

The authors specify the indivisible choice unit as "sub-household", instead of the widely accepted household. They define a sub-household as the combination of users and usage situations for which similar benefits are sought. For example, a household may have three sub-households for the coffee category: instant caffeinated coffee for the father at breakfast, ground caffeinated coffee for the mother throughout the day, and instant decaffeinated coffee for everyone in the evening. Modeling at the household level incorrectly inflates the switching behavior among the brands; observed purchasing behavior implies that household in the above example frequently switches among the three coffee types. More switching indicates closer competition and higher elasticity estimates.

To illustrate the application of the methodology, a survey is conducted by telephone interviewing. It consists of two major steps: determining the sub-households and understanding the preference structure. The number of sub-households, defined by the number of non-interchangeable brands in current use, total coffee consumption, and share of each brand are secured in the first step. It is found that 80% of the households have a single sub-household, whereas 17% have two and 3% have three sub-households. The intrinsic brand preference and trade-off between brand preference and price are secured in the second step.

Using the conjoint analysis framework, the authors represent the perceived value of brand i at price $P_i$ for sub-household s as:

(57)... $V_{si} = U_{si} / a_s - P_i$

$U_{si}$ : Utility attributed to brand i by sub-household s

$a_s$ : Trade-off factor for sub-household s, converting attributed utility to $ units

Brand choice probability is formulated by the exponential model:

$$(58)\ldots\ pr_{si} = \frac{\exp\left(b_s V_{si}\right)}{\sum_k \exp\left(b_s V_k\right)}$$

If $q^s$ is the reported coffee usage for sub-household s, then total the sales volume for brand $i$ is given by:

$$(59)\ldots\ q_i = \sum_s q^s pr_{si}$$

Steps in determination of price elasticities are rather straightforward: change $p_i$, recalculate perceived value by each sub-household, recalculate brand choice probabilities for each sub-household, sum expected purchase quantities, and calculate the sales volume change following to the price change.

To assess the reliability of the methodology, households are re-interviewed in three months time and updated results are contrasted with the original results. Depending on the high level of correlation (88%) found, the authors conclude that survey-based approach is reliable. To assess the predictive validity of the methodology, the authors compared their results with the results of a research based on household-level scanner data. Two results correlated at 77%, despite the time lag and household selection differences between the studies. The authors conclude that survey-based approach has predictive validity. These conclusions are immature because they are only based on the existence of high correlation. Two data series can correlate at +/-100%, but can imply totally different things in terms of sign and magnitude.

This completes the literature review on pricing and demand analysis. In the next chapter, we review the key facts about the Turkey beer market

# CHAPTER 3

# OVERVIEW OF TURKEY BEER MARKET

In this chapter, we define the basic concepts in order to provide consistency in terminology and review the key facts about the Turkey beer market[5].

## 3.1. Beer Taxonomy

Beer belongs to the *Fast Moving Consumer Goods* (FMCG) family, which is typically defined to include consumable non-durables and light durables. A broad, but practical definition for FMCG would be the range of products found in a hypermarket. FMCG family includes food, tobacco, personal care products, and housekeeping products.

Beverages are categorized into two groups, each representing almost equal turnover: soft drinks and alcoholic beverages. Soft drinks include the product categories of carbonated soft drinks, fruit juices, bottled water, and sparkling water. On the other hand, alcoholic beverages encompass spirits like raki, vodka, wine, and beer. Consequently, the taxonomy for beer is given as consumer good / fast moving / food / beverage / alcoholic beverage / beer.

## 3.2. Key facts on the Turkey Beer Market

Beer is typically a concentrated market all over the globe and the majority of even the mature markets are monopolies (e.g. Argentina, Ireland, South Africa), duopolies (e.g. France, Italy, Portugal, Baltic States, India, Indonesia, Australia, New Zealand, Canada, Mexico, Brazil), or oligopolies (e.g. USA, Spain, England, Poland, Japan). Russia,

[5] All the market data presented in this chapter is from the retail measurement conducted by a leading market information firm. Further details on the source is disguised for confidentiality.

Germany, and China are the exceptions to the usual industry structure, with their highly fragmented markets.

Turkey is no exception to the usual industry structure and its beer market lends itself to a duopolistic structure. Tekel produced beer until the end of the 1960s as a state monopoly. In 1969, two private-owned companies stepped into the market, providing the consumers with more alternatives in choice and better product quality. In 35 years, these two companies increased their market share to 99%, almost driving the state company out of the market. Despite a few attempts to enter the market, no other companies were able to survive in the market – they either ceased operations or were acquired by the two incumbents.

Beer is a closed market by nature, such as it is produced and consumed domestically. Only high-priced premium beers are imported due to inhibiting freight costs, and these are mostly sold in upscale hotels and cafes. Consequently, import volume is negligibly small compared to the size of the beer market. On the export side, the volume is even smaller, because Turkey has no local premium brand that is accepted among the foreign beer consumers.

Compared to the peer countries, Turkey beer market is relatively small with an annual sales volume of 750 Million liters and a per capita consumption of 11 liters/year. Two major reasons behind the low beer consumption rate are prohibition of alcohol consumption in Islam and the consumer preference for raki.

In the last three decades, Turkey beer market experienced both fast growth and stabilization. Following the establishment of the two private companies in 1969, Turkey beer market experienced a fast growth period and reached a sales volume of 650 Million liters in the mid 1990s, up from 50 Million units in the late 1960s. This fast growth period is characterized by increasing per capita consumption. However, in the last decade, market growth has been stalled and sales volume has increased only by 100 Million liters. This stabilization period is characterized by fairly stable per capita consumption and an average annual growth rate of 2%, rather driven by the new consumers entering the market.

Beer is sold in both ***on-premise*** and ***off-premise*** points. On-premise sales points are those where beer is consumed at the point of sale. Off-premise sales points are those where beer is consumed away from the point of sale, like supermarkets, groceries, etc. In Turkey, beer experts estimate that on-premise sales account for the one third of total sales. Canadean Beer Services reports that on-premise sales correspond to 35-40% of the total beer sales in most EU countries. UK is an exception to this with on-premise share reaching 70%, due to the widespread "visiting the pub for a beer" custom.

On- and off- premise sales exhibit different sales dynamics. In on-premise sales, the beer price is not proportional to its cost to the retailer. Moreover, competition is restricted due to the high exclusivity present; in the majority of the sales points only one producer's brands are promoted and sold. In off-premise sales points, retail sales price is usually within a justifiable margin − typically 20-25% − of the cost to the retailer. Exclusivity is limited and more than 95% of the off-premise sales points in Turkey carry brands of more than one producer.

High markup margin in on-premise sales limit the power of beer producers on managing the consumer prices. Consequently, exclusivity agreements drive the sales volume in these points, rather than any marketing initiative such as pricing. Moreover, on-premise sales are not transparent and no reliable market data exists. In this study, we focus only on off-premise sales, assuming that two premises represent separable markets. Hereafter, all the comments, analyses and conclusions are related to off-premise sales only.

Off-premise points are further grouped into two types: modern retailers – hypermarkets, supermarkets – and traditional retailers – groceries, snacks, dry fruit vendors, gas stations. Beer is a typical grocery (bakkal) product and only 12% of off-premise sales take place in modern retailers, unlike the most of the other FMCG products. This highly fragmented sales structure has two immediate implications:

- *Low negotiation power on the buyer's side:* Traditional retailers purchase in low volume, and lack the power to negotiate with the producers on price and payment terms. Beer producers usually exercise a fixed mark-up margin on traditional retailers and tightly control their retail prices.
- *Complicated beer distribution:* Traditional retailers usually have limited financial power. Consequently, they carry a few brands and purchase in small quantities. On the other hand, large retailers carry all the brands present in the market and purchase in large quantities. When the distribution cost for one liter of beer is considered, it is much more costly to reach traditional retailers. Therefore, the distribution of beer is both complicated and costly.

Alcohol sales are restricted by law in Turkey; alcohol cannot be sold within 200 meters of schools, mosques, and hospitals. Municipalities grant alcoholic beverage sales licenses to the retailers satisfying certain criteria. Consequently, beer is sold in a smaller number of retailers compared to the other FMCG products. In that regard, market information firms provide a well-accepted measure of distribution. By distribution of a product, they refer to the percentage of retail sales points carrying that product in the investigated product. The distribution of beer fluctuates within the year; it increases in the summer time, as new retail sales points are opened at vacation regions and some retailers carry beer only at high season. Even in the summer time, 35% of the distribution is reported for beer, meaning that two thirds of the retailers are not carrying beer at anytime. On the other hand, 98% distribution is reported for carbonated soft drinks and fruit juices, 90% for sparkling water and 75% for bottled water. Compared to these beverage categories, alcoholic beverage distribution is definitely limited; also noting that spirit distribution only reaches 30%. Some beer sector experts pinpoint low distribution as the most important factor limiting the total sales volume. This is one of the major propositions questioned in this study.

Beer has three defining product attributes: brand, package type and package size. In the investigated period, a total of eleven brands were being offered in the market. These eleven brands are sold in three package types (returnable bottle, non-returnable bottle, can) and in three sizes (33 cc, 50cc, 66cc). The returnable bottle is the most preferred package type in Turkey with more than a 50% share, followed by can (30-35%) and non-returnable bottle (10%). On the package size, 50cc is the dominant one with more than 90% share, followed by 66cc (5%) and 33cc (2-3%). These three product dimensions are fairly interrelated. Premium brands are offered in neither 66cc nor the returnable bottle format, whereas discount brands are usually offered in the 66cc format and never offered in the 33cc format. On the other hand, the 50cc format is the representative package size for the standard priced brands. Prices of different package offerings for the same brand are proportional with their relative production costs. Consequently, it is possible to unify all the three product dimensions under the brand dimension, especially while analyzing market demand and pricing practices.

# CHAPTER 4

# ANALYSIS OF DEMAND AND PRICING POLICIES

This is the main chapter that reports the results of our study. We present the work in line with the four-step approach to the product line pricing discussed in Chapter 2. In the first section, the pricing problem is defined in perspective of the price setter. In the second section, hypothetical models are specified as the mathematical abstraction of Turkey beer market. In the following section, calculations and model results are presented. Finally, model findings and conclusions are discussed.

## 4.1. Step 1: Defining the Price Leader's Problem

One of the two large producers holds near monopoly power with its share of more than 80% of the market, although the market has been described as a duopoly earlier. The dominant producer takes all the pricing initiatives, and the smaller one follows by positioning itself accordingly. The pricing problem should be defined in perspective of the dominant producer in order to make sense.

Turkey beer market is growing slowly and the market share of each company is almost stable, making the beer business a "cash cow" for the dominant company – which generates cash in Turkey and makes investments in the growing markets abroad. In the existing market structure, it can be concluded that the dominant producer is the price setter and its pricing policies are determined by financial concerns. Hence, the pricing problem for the dominant company can be defined as: "What is the price level that maximizes short-term profits, without losing market leadership in the long-term?" Optimal price should balance short-term and long-term concerns of the dominant producer and assumed to be located between the profit maximizing price level and revenue maximizing price level.

## 4.2. Step 2: Turkey Beer Market Model

Managerial build-up, experience, gut feeling and fact-based market information are the ingredients of an executive while making price decisions. Our work aims to provide the managers with fact-based market information. The crucial information needed in pricing is the sensitivity of sales volume to different marketing initiatives and to environmental factors. Sales volume sensitivity should be identified at both the aggregate market level and the individual brand level. The former can be used to determine the stability of the market growth, whether low growth is permanent or conditional. The latter can be used to formulate the revenue and profit equation for each brand to discover optimal prices. We build two separate models: a market-level model and a brand-level model.

### 4.2.1. Formulation of the Market Level Model

The market-level model aims to identify the factors affecting the beer demand and to forecast the aggregate beer sales volume in Turkey. In the first step of the modeling work, we identify the list of variables that determine the beer demand. While preparing the list, we use two information sources: the *reference article* on beer demand by Erkip, Köksalan and Moskowitz (1997) and *industry expert interviews*. Five controllable and five environmental factors are identified to be relevant. The controllable factors are quality, price, distribution, promotion, and advertising. The environmental factors are price of substitute goods, income level, ambient temperature, level of tourism activity, and Ramadan.

**Controllable factors**

1. <u>Quality:</u> Quality is defined as the sum of the positive and negative associations attributed to beer as a consumer product. Quality depends on both the product itself,

and the consumers' perception. Beer quality is excluded from the model for three reasons:

a. There is no significant change in beer quality within the period investigated in this work: the same producers, the same production facilities, almost the same brand portfolio.
b. Market research shows that beer drinkers in Turkey are not sensitive to changes in beer taste, except for the large alterations in liquid color.
c. There is no robust measure of beer quality.

2. <u>Price:</u> Price is defined as the average price that consumers have to pay for a liter of beer in an off-premise sales point. Beer price ( $p_b$ ) is the weighted average price of all beer brands present in the market. Nominal prices are adjusted to offset the effects of high inflation. The constant, or real, beer price for any month T is calculated, by correcting for accumulated inflation:

$$(60)\ldots\ p_{bT} = p_{bT}^{R} = \frac{p_{bT}^{N}}{\prod_{t=2}^{T}(1+ir_t)} \qquad T \neq 1$$

$R/N$ : Real / Nominal

$ir_t$ : Inflation rate for month t

3. <u>Distribution:</u> Distribution is defined as the percentage of retail sales points carrying at least one beer Stock Keeping Unit (SKU). Beer distribution, $d_b$ measures the availability of beer.

4. <u>Promotion:</u> Promotion is defined as a temporary reduction in price to make the product more affordable to the consumer. Three major types of promotion are practiced in the beer market: free good, free beer, and price discount. Free goods can be in the form of a cheap gift like glass, cooler bag, peanuts granted at the sales point or an expensive gift like automobile, consumer durables granted following a lottery process. Free good type promotions are rare compared to the other two types. Effects of the free beer and price discount type promotions are reflected as a decrease in

retail sales price. Consequently, promotion should be excluded from the model in order to avoid double counting.

5. Advertising: Beer cannot be advertised freely in Turkey, as TV commercials of alcohol are not allowed. Advertisements in other media channels can neither reach the effective critical mass nor properly communicate the value proposed. Consequently, advertising can safely be excluded from the market model.

**Environmental factors**

1. Price of Substitute Goods: Price of a substitute good is defined as the average price that consumers have to pay for a liter of an alternative beverage in an off-premise point. Beer is a hybrid product, providing two basic values for the consumers: thirst quenching and mental relaxation. The former value is associated with soft drinks, and the later one with alcoholic beverages. Consequently, both groups are regarded as possible substitutes. However, there is a subtle point in this argument: consumers substitute beer and soft drinks only when consuming from the household inventory or when ordering in an on-premise point. They barely perceive beer and soft drinks as substitutes when purchasing in an off-premise point, due to the differentiating alcohol ingredient. Based on the foregoing discussion, we refer to spirits as the substitute for beer. The majority of the spirits are produced and distributed by the state monopoly, which was recently privatized in January 2004. This firm sets the prices of different spirits in a way to keep constant parities, so it is safe to assume the raki price to be representative for all the other spirits' prices. Nominal raki price is adjusted by price index to offset the effects of high inflation and is symbolized by $p_s$ in the model. Aggregate spirit sales volume can also be used to account for the category-level substitution. However, this is not feasible in our study, as we lack dependable data on spirit sales.

2. Income Level: Macroeconomic growth is a major sales driver for consumer goods. When the economy is growing, consumers can generate more funds for spending,

boosting the consumer off-take. The Gross Domestic Product (GDP) is assumed to be the best single indicator of economic growth. It is a composite index, accounting both for the number of households in the economy and income per household. However, it is not possible to track a monthly GDP, because the State Institute of Statistics provides GDP estimates on quarterly basis. Therefore, the same GDP figure is assumed for the months in the same quarter. Moreover, considering the significant seasonality in quarterly GDP figures, a 12-month rolling GDP estimate should be used to represent the economic growth.

3. Ambient Temperature: Significant seasonality is experienced in beer sales, mainly due to its thirst quenching characteristics. Summer is the high- and winter is the low-season for beer sales. Temperature ($Temp$) is used to account for this seasonality.

4. Level of Tourism Activity: Industry experts believe that foreign tourists contribute significantly to the domestic beer consumption volume, even though they spend a limited time in Turkey. This can be attributable to the fact that per capita beer consumption is much higher among foreign tourists, compared to the average beer drinker in Turkey. The number of foreign tourists ($f$) is included as a variable in the model to account for the tourism effect.

5. Ramadan: Some consumers refuse to drink alcoholic beverages in the Muslim holy month of Ramadan. Industry experts point to a significant negative correlation between the monthly sales volume and the number of days coinciding with Ramadan ($r$).

We use linear and multiplicative formulation in both market- and brand-level models, and therefore ensuring the compatibility between the model results. The linear model is a good approximation to any underling nonlinear function, as our observations are over a limited range. On the other hand, the multiplicative model is especially useful in data intensive brand-level model, as its constant elasticity property deeply reduces the number of parameters required.

With the explanatory variables described above, a linear model for the aggregate beer sales volume ( $q_{bt}$ ) is formulated as:

$$(61)\mathbf{K}\quad q_{bt} = b_0 + b_1 p_{bt} + b_2 d_{bt} + b_3 p_{st} + b_4 GDP_t + b_5 Temp_t + b_6 f_t + b_7 r_t + b_8 t + e_t$$

A multiplicative model is formulated as:

$$(62)...\quad q_{bt} = b_0 p_{bt}^{b_1} d_{bt}^{b_2} p_{st}^{b_3} GDP_t^{b_4} Temp_t^{b_5} f_t^{b_6} r_t^{b_7} t^{b_8} e_t$$

The multiplicative model is expressed in linear form:

$$(63)...\ \ln q_{bt} = b_0^{'} + b_1 \ln p_{bt} + b_2 d_{bt} + b_3 \ln p_{st} + b_4 \ln GDP_t + b_5 \ln Temp_t + b_6 \ln f_t + b_7 \ln r_t + b_8 \ln t + e_t^{'}$$

There are eight explanatory variables in the full model - including a trend variable *t*, which is added to identify any tendencies in the beer sales volume.

### 4.2.2. Formulation of the Brand Level Model

The brand-level model aims to understand the factors affecting the demand for a selected brand, which competes with several other beer brands in the marketplace, and to forecast the sales volume for that brand. In compliance with the literature, we refer the demand for a specific brand as “selective” demand in the remainder of the text.

Factors expected to affect the selective demand are almost the same as the market demand, except for a fine distinction in price and distribution variables. In the market-level model, there is a single beer price and beer distribution. In the brand-level model, there are two different types of price and distribution: own and competitors’.

1. <u>Own price:</u> Own price is defined as the average price that consumers should pay to buy a liter of the selected beer brand in an off-premise point. Own price is expected to have a negative impact on the selective demand; an increase in own price causes a decrease in the quantity demanded.

2. Price of competitors: The price of a competitor is defined as the average price that consumers should pay to buy a liter of an alternative beer brand in an off-premise point. A separate price variable is added to the model for every competitor brand. The price of the competitor is expected to have a positive impact on the selective demand; an increase in the competitor's price causes an increase in the quantity demanded.

3. Own distribution: Own distribution is defined as the percentage of retail sales points carrying at least one SKU of the selected brand. Own distribution is expected to have a positive impact on the selective demand.

4. Distribution of competitors: Distribution of a competitor is defined as the percentage of retail sales points carrying at least one SKU of an alternative brand. A separate distribution variable is added to the model for every competitor brand. Own distribution is expected to have a positive impact on the selective demand.

To ensure the compatibility with market-level model and to be able to determine the impact of environmental factors even if these factors have similar effects on the sales volume of different brands, we also use sales volume – instead of market share – as the dependent sales variable in the brand-level model.

The linear model for the selective sales volume ($q_{it}$) is formulated as:

$$(64)\ \mathbf{K}\ \ q_{it} = b_{0i} + \sum_{j=1}^{N} b_{1ij} p_{jt} + \sum_{j=1}^{N} b_{2ij} d_{jt} + b_{3i} p_{st} + b_{4i} GDP_t + b_{5i} Temp_t + b_{6i} f_t + b_{7i} r_t + b_{8i} t + e_{it} \ \ \forall i$$

$N$: Number of brands competing in the marketplace

$i$: Index identifying the selected brand

The multiplicative model is formulated as:

$$(65)\ \mathbf{K}\ \ q_{it} = b_0 \left( \prod_{j=1}^{N} p_{jt}^{b_{1ij}} \right) \left( \prod_{j=1}^{N} d_{jt}^{b_{2ij}} \right) p_{st}^{b_{3i}} GDP_t^{b_{4i}} Temp_t^{b_{5i}} f_t^{b_{6i}} r_t^{b_{7i}} t^{b_{8i}} e_{it} \ \ \forall i$$

The multiplicative model is expressed in linear form:

$$(66)\,\mathbf{K}\;\ln q_{it} = b_{0i}^{'} + \sum_{j=1}^{N} b_{1ij} \ln p_{jt} + \sum_{j=1}^{N} b_{2ij} \ln d_{jt} + b_{3i} \ln p_{st} + b_{4i} \ln GDP_t + b_{5i} \ln Temp_t + b_{6i} \ln f_t + b_{7i} \ln r_t + b_{8i} \ln t + e_{ti}^{'}$$

In the model formulations, $b_1$ and $b_2$ coefficients have different implications depending on the value $j$ takes;

- If $j = i$, then $b_{1ij} = b_{1ii} = b_{1i}$ and $b_{2ij} = b_{2ii} = b_{2i}$. These coefficients are associated with the demand sensitivity of own- price and distribution. Expected coefficient sign is negative for $b_{1i}$ and positive for $b_{2i}$.
- If $j \neq i$, then $b_{1ij}$ and $b_{2ij}$ coefficients are associated with the demand sensitivity of cross- price and distribution. Expected coefficient sign is positive for $b_{1ij}$ and negative for $b_{2ij}$.

## 4.3. Step 3: Estimation of Model Parameters

Multiple regression runs are performed by using the SPSS software for estimation. Market data for a five-year period, encompassing 60 monthly data points, is used in the regression process. Linear and multiplicative model formulations are estimated with both full set and reduced set of explanatory variables, where variable reduction is carried out by backward, forward and stepwise elimination procedures. Eight model fits are identified for each sales volume equation, and these fits are compared with each other to select the best performing one in terms of both statistical measures and compliance to the a priori expectations. Before proceeding with the details of the regression results, we review the sources of regression data and the statistical measures taken.

### 4.3.1. Data Sources

In market-level and brand-level regressions, the data source for the dependent sales volume, price and distribution is the retail measurement carried out by a leading market information firm. The firm regularly tracks consumer purchases at the point of sale and provides detailed information on actual purchases, market shares, distribution, pricing, and merchandising and promotional activities. The firm combines the data read from the UPC scanners of large retailers with audit data collected from the small retailers to represent the whole market. This data is accepted as the most reliable data available by the industry experts. Sales volume, price and distribution data for the investigated period is presented in Appendices A.1, A.2, and A.3, respectively.

Data for the environmental variables are publicly available, and can be easily accessed in the related websites. Relevant data for the investigated period is presented in Appendix A.4.

By taking the natural logarithm of the previous three data tables, the data set for the multiplicative model is formed. However, a problem arises in this transformation, as some of the values are zero: $\ln\left[x_t = 0\right] = -\infty$. To get around the indefiniteness problem, the value of one is added to each observation of the problematic variable: $\ln\left[x_t + 1 = 0 + 1\right] = 0$. Appendices A.5, A.6, A.7, and A.8 present the data set used in the multiplicative regression analysis.

### 4.3.2. Statistical Measures

Fitting a regression model requires several assumptions. The validity of the underlying assumptions and the adequacy of the model are further examined, before solidifying the tentatively determined model. The tentative model is subjected to a series of measures and tests:

1. Coefficient of Multiple Determination
2. Goodness-of-Fit Test

3. t-Test
4. Residual Analysis
   - **a.** *Normality:* Normality is checked by both mapping the residuals on a normal probability plot and investigating the spread of standardized residuals.
   - **b.** *Independence:* Durbin-Watson (d) statistics is used as a measure of the degree of first order autocorrelation.
   - **c.** *Zero mean and constant variance:* Residual plots against the (in)dependent variables are used to check the mean and variance assumptions. More formal tests like the Goldfeld-Quandt test or Breusch-Pagan test can also be conducted to check the constant variance assumption.

5. **Multicollinearity check:** Multicollinearity is a problem that arises in multiple regression when some explanatory variables are highly correlated with each other. When multicollinearity exists, it becomes difficult to differentiate the independent effects of the variables and parameter estimates are no longer robust. There are no formal tests to detect the presence of multicollinearity, but we analyze the correlation matrix for the explanatory variables and mark correlations in excess of 0.9 as potential multicollinearity problem generator. However, as long as the regression has a high $R^2$ value and all the parameter estimates have high t-values, we assume that multicollinearity is unlikely to be a problem.

   Pairwise correlation coefficients for the market-level explanatory variables are presented in Appendix A.9. Only the temperature and number of foreign tourists are highly correlated with each other. In fact this is a well-expected finding, as Turkey is more preferred for summer tourism, attracting more foreign tourists in the hotter months of the year. The other coefficients in the correlation matrix are safely low, discounting the multicollinearity threat.

   The pairwise correlation matrix, presented in Appendix A.10, signals the existence of high correlation among some brand-level explanatory variables:

- *Prices of mainstream brands:* It can be interpreted that two large beer producers synchronize the timing and magnitude of their price increases for their mainstream brands.
- *Distributions of the same producer's brands:* Beer producers distribute their brands through exclusive distributors. These distributors supply each retailer with a portfolio of brands, and the portfolio extension depends on the size, location and financial capability of the retailer.
- *Distributions of the discount brands:* Consumers with low purchasing power (LPP) are the typical purchasers of the discount brands. Retailers usually carry all the brands of the discount segment, in order to provide LPP consumers with more choice alternatives.
- *Raki price and Brand C1 price:* It can be explained by the fact that common producer adjusts raki and beer prices at the same time.
- *Temperature and number of foreign tourists*

Unlike the market-level model, existence of high correlations among some brand-level explanatory variables signals a potential multicollinearity problem.

Completing the review on the data sources the statistical tests and measures, we next discuss the regression details.

### 4.3.3. Estimation of the Market Level Model Parameters

The market level model includes eight explanatory variables in its full version: two controllable factors, five environmental factors and a trend variable. Consequently, nine unknown parameters, including a constant, should be estimated.

*Linear regression with full set of variables* produces a model with high explanatory power (adj-$R^2$ = 0.891). The described model adequately fits the data set, as $F_0 = 61.2 >> F^{crt}_{0.05,8,51} = 2.1$. The complete regression output is presented in Appendix B.1

and regression coefficients for the explanatory variables are given in Table 4.1. Only two out of eight variables are significant at the $a = 0.05$ level.

Table 4.1: Regression coefficients – Market level model, full linear regression

| | Unstandardized Coefficients | Standard Error | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|
| (Constant) | -175,665.9 | 159,390.0 | | -1.10 | 0.28 |
| P_BEER | -630.6 | 412.6 | -0.08 | -1.53 | 0.13 |
| D_BEER | 3,895.9 | 4,846.8 | 0.07 | 0.80 | 0.43 |
| P_RAKI | 94.4 | 62.5 | 0.13 | 1.51 | 0.14 |
| GDP | 2,712.8 | 1,411.6 | 0.11 | 1.92 | 0.06 |
| TEMP | 5,226.4 | 1,088.7 | 0.59 | 4.80 | 0.00 |
| TOURIST | 35.0 | 24.3 | 0.22 | 1.44 | 0.16 |
| RAMADAN | -2,767.9 | 494.4 | -0.27 | -5.60 | 0.00 |
| TREND | 210.1 | 300.3 | 0.06 | 0.70 | 0.49 |

Dependent: Q_BEER

It is possible to increase model efficiency by excluding some variables from the model. In fact, linear regression with any elimination procedure produces model with higher adj-$R^2$ value, noting that all the three elimination methods result in the same model. Reduced model adequately fits the data set, as $F_0 = 83.5 >> F^{crt}_{0.05,6,53} = 2.3$. Complete regression output is presented in Appendix B.2 and regression coefficients for the explanatory variables are given in Table 4.2.

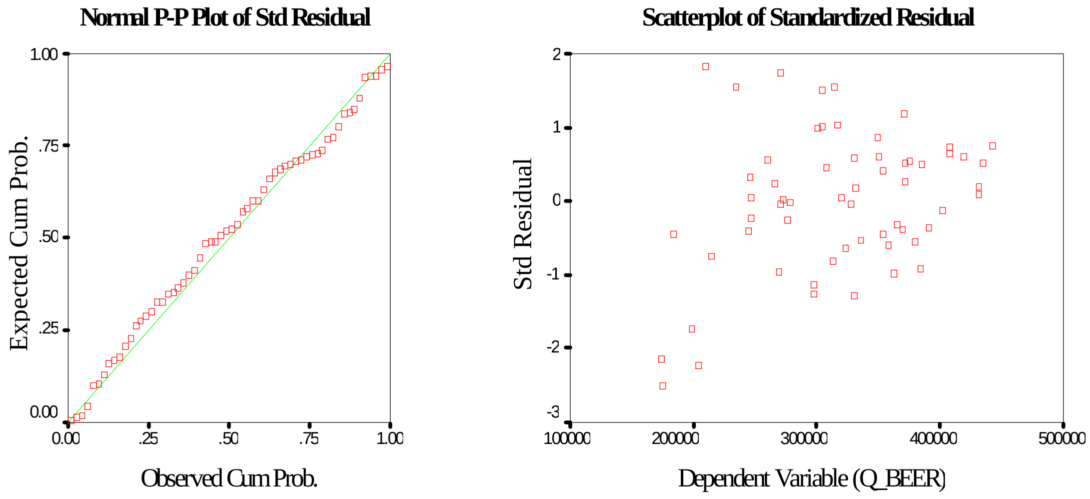
Six explanatory variables are significant at $a = 0.05$ level, and 89.4% of the variation in the dependent variable is explained. Standardized residuals perfectly fit the normality plot. However, scatter plot demonstrates even but nonrandom distribution. Although variable transformation can be used to rehabilitate the nonrandom residuals, we continue with the bearable risk of failing to validate “constant variance” assumption.

Table 4.2: Regression coefficients – Market level model, stepwise linear regression

| | Unstandardized Coefficients | Standard Error | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|
| (Constant) | -124,168.0 | 139,841.8 | | -0.89 | 0.38 |
| P_BEER | -777.9 | 367.2 | -0.09 | -2.12 | 0.04 |
| P_RAKI | 133.9 | 37.8 | 0.18 | 3.54 | 0.00 |
| GDP | 3,426.5 | 1,100.5 | 0.14 | 3.11 | 0.00 |
| TEMP | 4,957.5 | 1,022.7 | 0.56 | 4.85 | 0.00 |
| TOURIST | 46.8 | 19.4 | 0.29 | 2.41 | 0.02 |
| RAMADAN | -2,681.9 | 477.1 | -0.26 | -5.62 | 0.00 |

Dependent: Q_BEER

Residual plots are given in Figure 4.1. Durbin-Watson statistics ($d_0 = 1.66$) reject any autocorrelation among the errors for significance level $a = 0.01$.




(a) Normal probability plot (b) Scatter plot

Figure 4.1: Residual plots – Market level model, stepwise linear regression

The multiplicative model variants have lower explanatory power, compared to the previous the linear model; lower adj-$R^2$ values, ranging between 0.857 and 0.861. Therefore, it can be concluded that linear formulation better explains the idiosyncrasies in the beer sales data.

Hence, the best model for aggregate market sales volume on monthly basis is:

$$(67)\mathbf{K}\quad q_{bt} = -124{,}168 - 778_1\, p_{bt} + 134\, p_{st} + 3{,}427 GDP_t + 4{,}957 Temp_t + 47 f_t - 2{,}682 r_t + e_t$$

Two variables (i.e. beer distribution and trend) turn out to be insignificant in explaining the aggregate market sales volume.

- *Beer distribution:* Regression findings reject the proposition that regulation on alcoholic beverage sales is a major limiting factor for the beer demand. This can be interpreted as there is no consumer in the market who wants to consume beer but fails to find any within his reach.
- *Trend:* There is no clear trend in the 12-month rolling market sales volume; it is level in the 2nd and 3rd years, and first slowly increases, then slowly decreases in the following two years. In the existence of the other explanatory variables, the lack of a trend supports the saturation in beer penetration level, implying stable per capita consumption rates.

It takes a simple calculation to derive explanatory variable elasticities by using the linear regression coefficients:

$$(68)\mathbf{K}\quad e_x = \frac{dq_b / q_b}{dx / x} = \frac{dq_b}{dx}\frac{x}{q_b} = b_x \frac{\bar{x}}{\bar{q}_b}$$, where x represents the explanatory variable.

Average monthly beer sales volume is 325,377 hl, and average beer price per liter is 155 (‘000) TL for the investigated period. Hence, the price elasticity of beer is calculated as:

$$(69)\mathbf{K}\quad e_{p_b} = -778 * \frac{155}{325{,}377} = -0.37$$

The price elasticity of beer is in the inelastic range. This result is in line with the a priori expectations and findings of the prior studies:

- Market or category level elasticities are in the inelastic range for almost all consumer goods
- Consumers are insensitive against the changes in the prices of addictive products like beer and cigarettes compared to ordinary products

- Price elasticity of beer is found out to be -0.23 in USA by Gao, Wailes, Cramer (1995)

Elasticities of the other explanatory variables also have the expected signs. The cross-price elasticity of raki is +0.12, implying a 0.12% increase in beer sales volume following 1% increase in raki price. GDP elasticity is +1.20, temperature elasticity is +0.21 and foreign tourist elasticity is +0.12.

### 4.3.4. Estimation of the Brand Level Model Parameters

We analyze the brand offering in the market before proceeding with the details of the brand level regression modeling. Brand names are disguised and producers are referred as A, B and C for confidentiality. Three beer producers offer an unequal number of brands in the investigated period:

- Producer A with six brands: A1, A2, A3, A4, A5, A6
- Producer B with four brands: B1, B2, B3, B4
- Producer C with a single brand: C1

Among the eleven brands offered, Brand A1 dominates the market with 77% average volume share (81% max, 74% min) and 79% average revenue share (82% max, 74% min). Brand A1 is the leading brand in Turkey beer market in price and distribution related initiatives:

- Brand A1 is the first brand in any price adjustment. Prices of the other Producer A brands are fixed in a way to preserve a constant price ratio. Thereafter, Producer B determines prices of its brands in line with the leader followership model. It is also interesting to note that price of Brand A1 is called the “reference price” in the industry.
- Being the most preferred brand, all retailers are willing to hold at least one SKU of Brand A1. This bias provides strength to Producer A in implementing any distribution projects.

Development of real sales prices for all the eleven brands is provided in Figure 4.2, noting that price of Brand A1 is shown with a heavy line in the graph. According to their price positioning, brands can be grouped into two distinct segments: mainstream and discount. There are eight brands in the mainstream segment, which is characterized by Brand A1. The remaining three brands are positioned in the discount segment and sold at 25% discount on average, compared to mainstream prices. The graph identifies three major product repositioning in the market: two formerly discount brands have moved to the mainstream segment, and one formerly extreme cheap brand has moved to the discount segment in the investigated period.

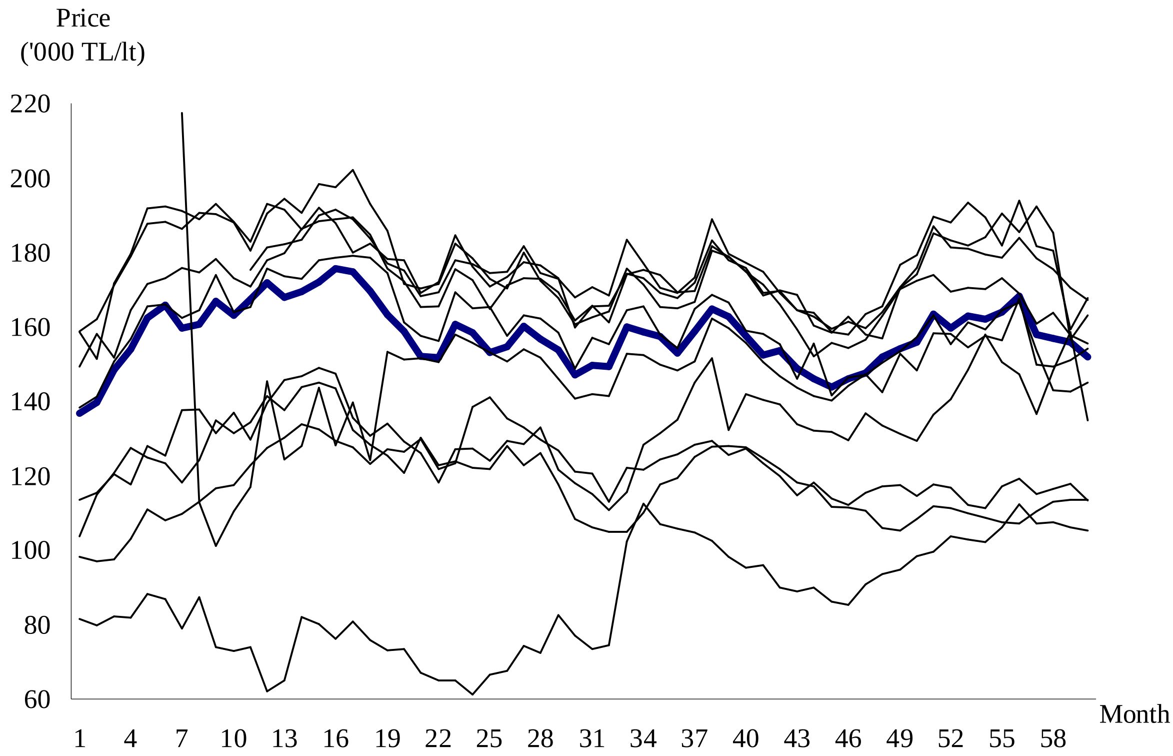



Figure 4.2: Development of Retail Sales Prices

Having completed the brief review on brand offering, we start our discussion on the regression details. The brand-level model is a system of 11 sales volume equations, one for each brand, and each equation has 28 explanatory variables in its full version. Multiple regression is performed by using the SPSS software to estimate a total of 319 unknowns; 29 unknown parameters, including the constant, for each of the 11 equations.

With 28 explanatory variables, one can construct 268.4 million different models:

$$(70)\mathbf{K}\ \sum_{j=0}^{28}\binom{28}{j}=\binom{28}{0}+\binom{28}{1}+\binom{28}{2}+\mathbf{K}+\binom{28}{28}=268.4M$$

The first term in the summation represents the model with no explanatory variables, but just a constant, equal to the average sales volume. The last term represents the full model. Our aim in regression modeling is to find the best combination of variables out of the millions of possibilities. The regression of each model version, defined by a unique variable combination, produces a unique set of coefficients that maximizes the fraction of variation in the dependent variable explained. If we conceptualize each of the models as a point in the multi-dimensional solution space, it would be the case that these points are not uniformly distributed. Models with similar variable set and regression coefficients would be located at proximate points, causing concentration at some locations. We can define such a concentration, or equivalently a set of similar models, as a *model cluster*. We refer to a movement in the same model cluster as a *solution evolution* and a movement across the model clusters as *solution revolution*.

We detail the regressions runs for Brand A1 (dominant brand in the market), in order to clarify the whole regression process, together with the extent of multicollinearity problem and the resolution method taken.

**The Linear Regression Process: Brand A1**

*Linear regression with full set of explanatory variables* produces a model which has a high explanatory power ($R^2$ = 95.3%, adj-$R^2$ = 91.0%) and adequately fits the explained data set ($F_0 = 22.2 >> F^{crt}_{0.05,28,31} = 1.8$). Complete regression output is presented in Appendix B.3 and regression coefficients for the explanatory variables are given in Table 4.3. Only two out of 28 variables, temperature and Ramadan, are significant at the $a = 0.05$ level. To increase the model efficiency by excluding some variables, linear regression is run with each of the three elimination procedures with p=0.05 for entry and p=0.10 for removal.

Table 4.3: Regression coefficients – Brand level model, full linear regression

| | Unstandardized Coefficients | **Standard Error** | **Standardized Coefficients** | **t** | **Sig.** |
|---|---|---|---|---|---|
| (Constant) | -318,679.5 | 260,436.5 | | -1.22 | 0.23 |
| P_A1 | 519.9 | 1,648.5 | 0.08 | 0.32 | 0.76 |
| D_A1 | 4,254.7 | 5,563.5 | 0.09 | 0.77 | 0.45 |
| P_A2 | -781.7 | 809.4 | -0.15 | -0.97 | 0.34 |
| P_A3 | 308.5 | 594.5 | 0.06 | 0.52 | 0.61 |
| P_A4 | 19.3 | 209.6 | 0.02 | 0.09 | 0.93 |
| P_A5 | -554.7 | 817.0 | -0.10 | -0.68 | 0.50 |
| P_A6 | 594.6 | 547.1 | 0.12 | 1.09 | 0.29 |
| P_B1 | 574.8 | 975.3 | 0.11 | 0.59 | 0.56 |
| P_B2 | 107.4 | 121.5 | 0.10 | 0.88 | 0.38 |
| P_B3 | 75.6 | 922.7 | 0.02 | 0.08 | 0.94 |
| P_B4 | -860.0 | 655.9 | -0.17 | -1.31 | 0.20 |
| P_C1 | -223.4 | 679.9 | -0.06 | -0.33 | 0.75 |
| D_A2 | 983.4 | 4,182.8 | 0.04 | 0.24 | 0.82 |
| D_A3 | 7,151.6 | 4,123.1 | 0.19 | 1.74 | 0.09 |
| D_A4 | 1,088.5 | 3,032.4 | 0.09 | 0.36 | 0.72 |
| D_A5 | 325.8 | 3,937.1 | 0.02 | 0.08 | 0.94 |
| D_A6 | -1,432.5 | 4,470.0 | -0.07 | -0.32 | 0.75 |
| D_B1 | -1,927.4 | 5,441.8 | -0.05 | -0.35 | 0.73 |
| D_B2 | 3,514.5 | 2,831.3 | 0.34 | 1.24 | 0.22 |
| D_B3 | 11,450.3 | 6,173.8 | 0.28 | 1.86 | 0.07 |
| D_B4 | 7,901.6 | 4,381.6 | 0.14 | 1.80 | 0.08 |
| D_C1 | -579.1 | 5,604.9 | -0.02 | -0.10 | 0.92 |
| P_RAKI | 84.9 | 108.6 | 0.14 | 0.78 | 0.44 |
| GDP | 1,095.7 | 2,127.5 | 0.06 | 0.52 | 0.61 |
| TEMP | 3,052.0 | 1,353.9 | 0.43 | 2.25 | 0.03 |
| TOURIST | 25.7 | 24.1 | 0.20 | 1.06 | 0.30 |
| RAMADAN | -2,108.1 | 463.6 | -0.26 | -4.55 | 0.00 |
| TREND | -2,767.3 | 1,581.7 | -0.91 | -1.75 | 0.09 |

Dependent: Q_A1

Hence, we start multiple regression from the beginning by adding a variable elimination method. *Forward and stepwise elimination* produces the same model, which has a high explanatory power ($R^2$ = 91.7%, adj-$R^2$ = 90.9%) and adequately fits the data set ($F_0 = 118.6 >> F^{crt}_{0.05,5,54} = 2.4$). Complete regression output is presented in Appendix B.4 and regression coefficients for the explanatory variables are given in Table 4.4.

Table 4.4: Regression coefficients – Brand level model, 1st stepwise linear regression

| | Unstandardized Coefficients | Standard Error | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|
| (Constant) | -118,192.3 | 84,992.2 | | -1.39 | 0.17 |
| D_A1 | 7,889.4 | 2,884.0 | 0.17 | 2.74 | 0.01 |
| D_A3 | 5,114.9 | 1,592.7 | 0.14 | 3.21 | 0.00 |
| TEMP | 3,372.3 | 762.2 | 0.48 | 4.42 | 0.00 |
| TOURIST | 31.8 | 16.8 | 0.25 | 1.89 | 0.06 |
| RAMADAN | -2,347.3 | 357.1 | -0.29 | -6.57 | 0.00 |

Dependent: Q_A1

There are five significant explanatory variables in the model, and monthly sales volume for Brand A1 is formulated as:

$$(71)\mathbf{K}\quad q_{A_1t}^{(Ls1)} = -118{,}192 + 7{,}889 d_{A_1t} + 5{,}115 d_{A_3t} + 3{,}372 Temp_t + 32 f_t - 2{,}347 r_t + e_{A_1t}$$

Standardized residuals perfectly fit the normality plot, and the scatter plot displays even and random distribution. The Durbin-Watson statistics reject any autocorrelation among the errors for $a = 0.01$ significance level (as $d_0 = 1.71 > d_{0.01,U} = 1.60$).

All the explanatory variables in Equation (71) have the expected signs, except for the distribution of Brand A3. Distribution of any other brand is expected to have a negative impact on the sales volume of the selected brand, which is not the case for the regression equation found; Brand A3's distribution affects Brand A1's sales volume positively. The unexpected sign can be attributable to the existence of multicollinearity, which is also supported by the high variance inflation factor for Brand A3's distribution.

Multicollinearity primarily affects the stability of regression coefficients. Hines and Montgomery (1990) present a few remedies to resolve the multicollinearity problem:

- Augmenting the data with new observations, specifically designed to breakup the approximate linear dependencies that currently exists.
- Using an alternative estimation method that is less sensitive to multicollinearity than ordinary least squares, such as the Ridge regression proposed by Hoerl and Kennard (1970).
- Deleting certain explanatory variables from the model.

It is not possible to implement the first remedy in our case, as we do not have option to expand the data set. The second remedy necessities excessive involvement in unusual statistical tools, which is regarded to be out of the scope of this work. So, we apply the third remedy at the expense of discarding the information contained in the deleted variables. Explanatory variables with unexpected signs are deleted one at a time from the model. If there are multiple candidates for deletion, the one with the largest regression coefficient is selected. The stepwise linear regression model for Brand A1, given in Equation (71), has only one variable with unexpected sign: distribution for Brand A3. This variable is excluded from the input data set and the regression is run again.

*Stepwise regression (2nd iteration)* produces satisfactory results in statistical measures: $F_0 = 88.3 >> F^{crt}_{0.05,6,53} = 2.4$, $R^2$ = 90.9%, adj-$R^2$ = 89.9%. Standardized residuals exhibit a random and balanced spread around the dependent variable axis and fit the normality plot. However, the autocorrelation test is inconclusive and requires more data to be collected. The complete regression output is presented in Appendix B.5 and regression coefficients for the explanatory variables are given in Table 4.5.

The 2nd stepwise model has six significant explanatory variables, and four of them, distribution of Brand A1, temperature, tourism, and Ramadan, are also present in the prior model. Two more distribution variables are added on top:

$$(72)\ \mathbf{K}\quad q_{A_1t}^{(Ls2)} = -106,881 + 7,629 d_{A_1t} + 1,918 d_{A_6t} + 3,487 d_{B_1t} + 2,756 Temp_t + 40 f_t - 2,257 r_t + e_{A_1t}$$

Table 4.5: Regression coefficients – Brand level model, 2nd stepwise linear regression

| | Unstandardized Coefficients | Standard Error | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|
| (Constant) | -106,880.8 | 91,618.4 | | -1.17 | 0.25 |
| D_A1 | 7,629.2 | 3,205.6 | 0.16 | 2.38 | 0.02 |
| D_A6 | 1,917.8 | 1,037.7 | 0.09 | 1.85 | 0.07 |
| D_B1 | 3,487.1 | 1,976.8 | 0.09 | 1.76 | 0.08 |
| TEMP | 2,755.8 | 874.3 | 0.39 | 3.15 | 0.00 |
| TOURIST | 40.1 | 18.9 | 0.31 | 2.12 | 0.04 |
| RAMADAN | -2,257.0 | 382.6 | -0.28 | -5.90 | 0.00 |

Dependent: Q_A1

Regression coefficients of the four old variables are almost stable; the 2nd model coefficients are within 25% variation of the 1st model coefficients. It can be concluded that these two models belong to the same model cluster. However, both of the added variables have coefficients with unexpected signs, necessitating another iteration. Brand B1's distribution is deleted from the model, as its coefficient is larger than that of Brand A6's distribution, and the linear regression is run again.

*Stepwise regression (3rd iteration)* also produces satisfactory statistical results: $F_0 = 138.4 \gg F^{crit}_{0.05,3,56} = 2.8$, $R^2$ = 88.1%, adj-$R^2$ = 87.5%. Standardized residuals exhibit a random and balanced spread around the dependent variable axis and fit the normality plot. Moreover, the Durbin-Watson test rejects any autocorrelation among the error terms at $a = 0.01$ significance level (as $d_0 = 1.61 > d_{0.01,U} = 1.52$). The complete regression output is presented in Appendix B.6 and regression coefficients for the explanatory variables are given in Table 4.6.

The 3rd stepwise model has only three significant variables:

$$(73)\mathbf{K} \quad q_{A_1t}^{(Ls3)} = 153,279 + 2,638 d_{A_6t} + 103 f_t - 1,892 r_t + e_{A_1t}$$

Table 4.6: Regression coefficients – Brand level model, 3rd stepwise linear regression

| | Unstandardized Coefficients | Standard Error | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|
| (Constant) | 153,279.0 | 8,726.2 | | 17.57 | 0.00 |
| D_A6 | 2,637.9 | 1,002.5 | 0.12 | 2.63 | 0.01 |
| TOURIST | 103.5 | 6.5 | 0.80 | 15.81 | 0.00 |
| RAMADAN | -1,891.7 | 410.8 | -0.23 | -4.60 | 0.00 |

Dependent: Q_A1

3rd stepwise model belongs to a different model cluster, as it is dissimilar to the two previous models in three critical aspects:

1. The constant term is positive.
2. Two anchor variables, Brand A1's distribution and temperature, are missing.
3. Coefficients of the common variables are dissimilar.

Brand A6's distribution has an unexpected sign and to iterate the solution once more, it is deleted from the model. *Stepwise regression (4th iteration)* produces satisfactory statistical results: $F_0 = 124.5 >> F^{crt}_{0.05,4,55} = 2.6$, $R^2$ = 90.1%, adj-$R^2$ = 89.1%. The standardized residuals exhibit a random and balanced spread around the dependent variable axis, and there is a tolerable distortion in the normality plot. However, the auto-correlation test is inconclusive. The complete regression output is presented in Appendix B.7 and regression coefficients for the explanatory variables are given in Table 4.7.

Table 4.7: Regression coefficients – Brand level model, 4th stepwise linear regression

| | Unstandardized Coefficients | Standard Error | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|
| (Constant) | -155,621.2 | 91,038.6 | | -1.71 | 0.09 |
| D_A1 | 10,658.2 | 2,976.1 | 0.23 | 3.58 | 0.00 |
| TEMP | 3,317.9 | 824.0 | 0.47 | 4.03 | 0.00 |
| TOURIST | 30.7 | 18.2 | 0.24 | 1.69 | 0.10 |
| RAMADAN | -2,335.7 | 386.1 | -0.29 | -6.05 | 0.00 |

Dependent: Q_A1

The 4th stepwise model has four significant variables and all these have expected signs:

$$(74)\ \mathbf{K}\quad q_{A_1t}^{(Ls4)} = -155,621 + 10,658 d_{A_1t} + 3,318 Temp_t + 31 f_t - 2,336 r_t + e_{A_1t}$$

This model is almost the same as the 1st model except for two important corrections:

1. The variable with an unexpected sign, Brand A3's distribution, is dropped from the original model.
2. Contribution of the dropped variable is added to the distribution of Brand A1, the primary variable in the regression, increasing the associated regression coefficient by 35% and leaving all the other coefficients almost the same.

Equation (74) is referred as the best sales volume model, achieved by the stepwise linear regression.

We restart multiple regression from the beginning with *backward elimination* method. In its first iteration, backward elimination produces a model with high explanatory power ($R^2$ = 93.9%, adj-$R^2$ = 92.6%) and adequate fit ( $F_0 = 75.0 >> F^{crt}_{0.05,10,49} = 2.0$ ). There is no serious violation in error-term assumptions. The complete regression output is presented in Appendix B.8. The model has ten significant explanatory variables:

$$\begin{aligned}(75)\ \mathbf{K}\ q_{A_1t}^{(Lb1)} = & -304,098 + 745 p_{B_1t} + 142 p_{B_2t} - 958 p_{B_4t} + 8,827 d_{A_1t} + 7,429 d_{A_3t} + 7,250 d_{B_3t} + 8,765 d_{B_4t} \\ & + 4,501 Temp_t + 2,525 r_t - 1,141 t + e_{A_1t}\end{aligned}$$

Four of the explanatory variables have unexpected signs: three distribution variables and Brand B4's price. The variable deletion procedure is applied, and nine more iterations are made to clean all the unexpected coefficients. The long iteration process can be attributable to the presence of four problematic variables in the 1st iteration, noting that there is only one in the stepwise case. 10th backward model has strong statistical stand: $R^2$ = 91.5%, adj-$R^2$ = 90.3%, $F_0 = 79.7 >> F^{crt}_{0.05,7,52} = 2.2$. Moreover, residual plots do not reveal any violation in error-term assumptions. The complete regression output is presented in Appendix B.9. The model has seven significant variables, and all these have expected signs:

$$(76)\,\mathbf{K} \quad q_{A_1 t}^{(Lb10)} = -126{,}930 - 1{,}240 p_{A_1 t} + 10{,}999 d_{A_1 t} + 158 p_{B_2 t} + 759 p_{B_3 t} + 3{,}042 Temp_t + 39 f_t - 2{,}205 r_t + e_{A_1 t}$$

Backward and stepwise regression models belong to the same model cluster as they have four explanatory variables in common and regression coefficients of these variables are almost the same. However, the backward model is as an enhancement of the stepwise model, as it produces better statistical results with the addition of three extra variables: Brand A1's price, Brand B2's price and Brand B3's price. Similarity of the models formulated by different elimination techniques and robustness of the regression coefficients, coupled with satisfactory statistical performance, generate confidence in the results obtained for Brand A1.

**The Multiplicative Regression Process: Brand A1**

We revise the same regression process with the multiplicative formulation. The *full multiplicative model* (i.e. model with full set of explanatory variables) also has high explanatory power ($R^2$ = 93.4%, adj-$R^2$ = 87.4%) and adequately fits the data set ($F_0 = 15.6 >> F^{crt}_{0.05,28,31} = 1.8$). The complete regression output is presented in Appendix B.10.

However, only three out of 28 variables, Brand A5's distribution, Brand A6's distribution, and Ramadan, are significant at the p=0.05 level and collinearity statistics signal the existence of high variance inflation factors. "Variable selection – deletion" procedure is followed to increase the efficiency of the multiplicative model.

The *stepwise and forward multiplicative regression* produces a model with high explanatory power ($R^2$ = 87.8%, adj-$R^2$ = 86.6%), adequate fit (i.e. $F_0 = 77.5 >> F^{crt}_{0.05,5,54} = 2.4$), and a proper Durbin-Watson statistics ($d_0 = 1.94 > d_{0.05,U} = 1.77$). However, standardized residuals fail to satisfy the zero mean and constant variance assumption. The complete regression output is presented in Appendix B.11.

The model has five significant explanatory variables and one of these variables, Brand A3's distribution, has an unexpected sign, as in the stepwise linear regression:

$$(77)\mathbf{K}\quad q_{A_1t}^{(Ms1)} = e^{7.86} d_{A_1t}^{0.91} d_{A_3t}^{0.17} Temp_t^{0.13} f_t^{0.11} r_t^{-0.09} e^{e_{A_1t}}$$

The *backward multiplicative regression* produces a model with better statistical results (i.e. adj-$R^2$ = 90.2%) and no violation in error-term assumptions. The complete regression output is presented in Appendix B.12.

However, five distribution variables out of the eleven model variables have unexpected signs:

$$(78)\mathbf{K}\ q_{A_1t}^{(Mb1)} = e^{10.93} p_{A_3t}^{0.68} d_{A_3t}^{0.20} d_{A_6t}^{0.10} d_{B_1t}^{0.20} d_{B_3t}^{0.44} d_{B_4t}^{0.58} d_{C_1t}^{-0.10} Temp_t^{0.07} r_t^{-0.08} f_t^{0.14} GDP_t^{-1.34} e^{e_{A_1t}}$$

The variable deletion process is carried out for the multiplicative regression and it takes four more iterations for the stepwise and forward regression, and eleven more iterations for the backward regression to remove all the problematic variables from the models. Following different regression paths, all the variable elimination methods arrive at the same model (with an adj. $R^2$ of 86.6%). The complete regression output is presented in Appendix B.13.

$$(79)\mathbf{K}\quad q_{A_1t}^{(Ms5)} = q_{A_1t}^{(Mb12)} = e^{6.38} d_{A_1t}^{1.62} Temp_t^{0.19} r_t^{-0.10} e^{e_{A_1t}}$$

Despite the satisfactory statistical results achieved, the overall performance of the multiplicative formulation is worse than that of the linear formulation. Therefore, among all the models described in the preceding discussion, Equation (76) provides the best statistical performance, and is selected as the best regression model to represent Brand A1's sales volume. The model includes two competition variables, which are the prices of the two mainstream brands sold by the other private producer: Brand B2's price and Brand B3's price. These two terms represent the switches of the price sensitive consumers among the Brands A1, B2 and B3.

We calculate the price elasticity of Brand A1 using the corresponding regression coefficient in Equation (76). Noting that average monthly sales volume is 250,427 hl and the average price per liter is 157.9 (‘000) TL for Brand A1 in the investigated period, price elasticity is found as -0.78.

$$(80)\ldots \quad e_{p_{A1}} = -1,240 * \frac{157.9}{250,427} = -0.78$$

Although Brand A1 holds almost 80% share in the market, its price elasticity is significantly larger than the market-level elasticity: -0.78 to -0.37. The explanation lays in the difference of the underlying mechanism for the brand-level and the market-level price elasticities. Following a price increase in a specific brand, its sales volume is expected to shrink. Price elasticity of a brand is related to the size of this shrinkage. A portion of the shrunk volume stays within the market, shifting to the competitors. The rest is totally lost or dead, leaving the market. Price elasticity of the market is related to the size of this lost sales volume. Therefore, if we assume that the above elasticities are estimated accurately, it can be interpreted that when Brand A1’s price is increased by 1.00%, 0.37% of its sales volume is consumed no more − assuming a single competition-free elasticity for all brands − and 0.41% shifts to the other brands in the market.

Distribution elasticity of Brand A1 is calculated as 1.41, implying a 1.41% increase in sales volume following 1% increase in distribution. Brand A1 is distributed almost three times more widely that the second most distributed brand. Assuming that distribution elasticity remains the same over the entire range of values, Brand A1 sales volume would reduce to 7% of its current level, if its distribution were limited to one third of the current level – thereby, equalizing its distribution to that of next most distributed brand. Although the previous exercise exaggerates the situation, it is clear that distribution is the most important source of strength for Brand A1.

Temperature elasticity is +0.16 for Brand A1 and it is lower than the market average of +0.21. This implies a seasonality impact of a lower magnitude; ratio of the high- to low-season sales volume is smaller. Foreign tourist elasticity is +0.13 for Brand A1, which is almost equal to the market average of +0.12.

The variable selection – deletion method is also carried out to obtain the best sales volume models for the other ten brands. Regression details for the other brands are skipped, as Brand A1's process is a good representation of the others. A summary of the regression results for the remaining ten brands is presented in Appendix C.

Before proceeding with the details of the price optimization, we note that model coefficients and elasticity estimates derived from these coefficients are not invariant over the entire range of determinant values. They can successfully represent the sales volume sensitivity, only if change in a determinant is within the observed range of values used while fitting the model. For example, if the price of a certain brand has never been 25% higher or lower than its current price level in a sufficient number of observations, then there is no conclusive data about the consumer behavior at that price level. Price elasticity of the brand at that price level cannot be estimated properly, as price elasticity is also a function of the price level itself. Assuming constant price elasticity or a constant model coefficient for the entire range of values will be misleading at least some of the time. As the price of a brand increases significantly, progressing towards an extreme expensiveness state, elasticity is expected to be larger, thus resulting in a larger volume loss for any further price increase. Consequently, model coefficients or elasticity estimates should not be used to extrapolate the sales volume sensitivity against changes occurring in the unobserved region. Price elasticity represents a common example and the same conclusions can be easily extended to the other affecting factors. The foregoing discussion stresses an important limitation on the power of statistical methods; decision makers are uninformed about the extreme scenarios most of the time, and any optimization exercise based on statistical findings is a correction move, rather than a absolute replacement.

## 4.4. Step 4: Determination of Optimal Prices

In the preceding section, we derive information on market and brand level demand sensitivity to different managerial initiatives and uncontrollable factors. In this section, we use this information to determine the stability of the market growth and to describe the optimal pricing practices.

### 4.4.1. Stability of Market Growth

We investigate the growth potential of the aggregate beer sales volume and comment on the maturity of the market. First, we repeat the monthly aggregate beer sales model:

$$(81)\mathbf{K}\quad q_{bt} = -124{,}168 - 778_1 p_{bt} + 134 p_{st} + 3{,}427 GDP_t + 4{,}957 Temp_t + 47 f_t - 2{,}682 r_t + e_t$$

Sales volumes for twelve consecutive months are aggregated to provide the annual beer sales model:

$$(82)\mathbf{K}\quad q_b = -1{,}490{,}016 - 9{,}335 p_b + 1{,}607 p_s + 59{,}490 Temp + 41{,}118 GDP + 47F - 77{,}775$$

The average annual value of beer price, raki price, temperature, and GDP is used in Equation (82). Coefficients of these four variables are equal to twelve times the corresponding coefficients in the monthly model. On the other hand, the annual total of foreign tourists and days coinciding with Ramadan are used in Equation (82). The coefficient of tourism variable remains the same, and the Ramadan variable becomes a constant as the number of days coinciding with Ramadan in any given year is 29 in total. The average ambient temperature is also constant at 13.5 $C^o$, neglecting year-to-year variation. Therefore, the annual sales model is simplified as:

$$(83)\mathbf{K}\quad q_b = -764{,}676 - 9{,}335 p_b + 1{,}607 p_s + 41{,}118 GDP + 47F$$

For the last twelve months, average beer price is 156.7 (‘000) TL/liter, average raki price is 680.5 (‘000) TL/liter, and average GDP is 112 (x$10^{15}$ TL). The total number of foreign tourists visiting Turkey is 11.685 Million. If these values are substituted into the above equation, annual beer sales volume is found as 4.018 Million hectoliters, which is just 0.06% more than the actual figure of 4.015 Million hectoliters.

If beer price and raki price are fixed at the last 12-months average, then the annual sales model is simplified as:

$(84)$ **K** $q_b = 4{,}018{,}140 + 41{,}118\Delta(GDP) + 47\Delta(F)$

$\Delta(GDP)$: Change in average GDP

$\Delta(F)$: Change in total number of foreign tourists

In the last decade, the average growth rate for GDP and number of foreign tourists has been realized as 3.6% and 8.0% per year, respectively. Assuming that the preceding growth rates are achieved, the aggregate beer sales volume can sustain a steady growth of 5%. Therefore, the 2% market growth realized in the investigated period is low compared to the underlying potential. This can be attributable to the economic crisis, adversely affecting consumer purchasing power, and some diplomatic and regional crises, adversely affecting tourism, experienced in that period. However, a fast growth of 15% a year, defined by per capita consumption increase in practice and by a trend variable in the market model, has past. Per capita consumption is fairly stable over the investigated period, and there is no trend variable in the formulated market model. Therefore, it can be interpreted that there is no motive for a potential beer drinker to consume more; beer offering has reached a stable level, both in terms of availability and product variety. Market growth is rather linked to environmental factors like GDP and tourism. Summarizing the foregoing discussion, Turkey beer market is characterized as a “slow growing, mature market”.

### 4.4.2. Optimal Market Level Prices

We check the optimality of the current pricing practice in the market. First, we recast Equation (83) into the appropriate form:

$(85)$ **K** $q_b = 5{,}480{,}825 - 9{,}335 p_b$

Equation (85) is the simplified demand curve for the Turkey beer market, and it is visualized in Figure 4.3.

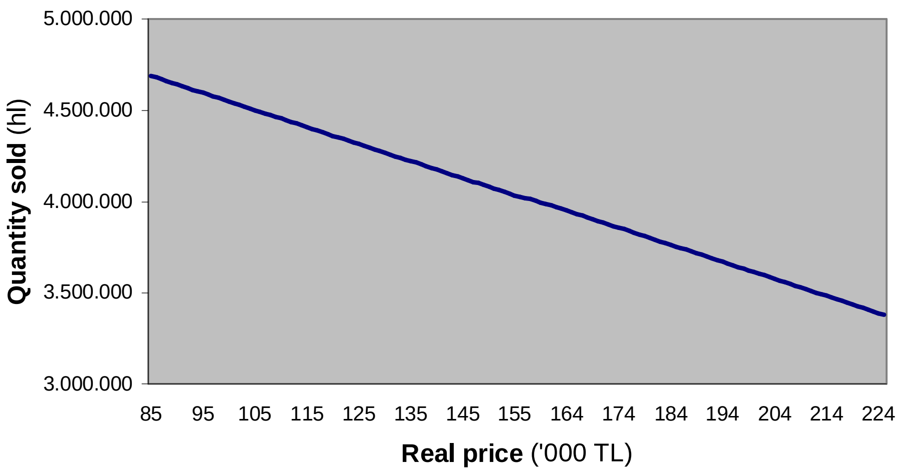



Figure 4.3: Beer demand curve

Based on this demand curve, the total industry revenue is written as:

$$(86)\mathbf{K} \quad R_b = 5{,}480{,}825 p_b - 9{,}335 p_b^2$$

Revenue maximizing price for the industry, price that makes first derivative of the revenue equation zero, is 293.6 (‘000) TL per liter and it is quite higher than the current level of 156.7 (‘000) TL per liter. In terms of revenue maximizing measure, the industry is clearly operating well below the optimal level. On the other hand, this does not necessarily mean that producers should increase average beer price by 136.9 (‘000) TL per liter to reach the optimal price level. Price elasticity is also a function of the price level; as the beer price increases, the demand curve would become steeper, per unit volume decrease would be larger than 9,335 and the revenue increment would be smaller than anticipated. Therefore, the revenue-maximizing point should be below the level identified by the current elasticity estimate. However, it is clear that average beer price should be increased to improve total industry revenue.

### 4.4.3. Optimal Brand Level Prices

We investigate alternative pricing schemes and their consequences on business results at brand level. However, we concentrate on identifying the optimal pricing practice only for Brand A1, which is the leading brand in any price adjustment. In our analysis, we derive optimal pricing under the “no competitor response” assumption, and then describe the impact of a possible competitor response on the optimal price derived.

Brand A1 dominates the market by 77% of total volume and 79% of total revenue owned. Prices of the other mainstream brands are determined in reference to the Brand A1, and that is why prices of these brands are highly correlated. Brand A1 and the price correlated brands hold 88% volume and 91% revenue share in total. We first repeat the best model fit for monthly Brand A1 sales:

$$(87)\,\mathbf{K}\quad q_{A_1t} = -126{,}930 - 1{,}240\,p_{A_1t} + 10{,}999\,d_{A_1t} + 158\,p_{B_2t} + 759\,p_{B_3t} + 3{,}042\,Temp_t + 39\,f_t - 2{,}205\,r_t + e_{A_1t}$$

The sales volume for twelve consecutive months is aggregated to formulate the annual Brand A1 sales:

$$(88)\,\mathbf{K}\quad q_{A_1} = -1{,}094{,}301 - 14{,}880\,p_{A_1} + 131{,}988\,d_{A_1} + 1896\,p_{B_2} + 9{,}108\,p_{B_3} + 39F$$

Average annual value of own price, own distribution, and competitors’ prices is used in Equation (88). Coefficients of these variables are equal to twelve times the corresponding coefficients in the monthly model. Annual total of foreign tourists is used in Equation (88), and therefore its coefficient remains the same. Temperature and Ramadan variable become constant as the model is annualized, and they are pooled with the original regression constant.

We also fix the tourism variable in the annual model. The total number of foreign tourists visiting Turkey in the last 12 months of the investigated period is 11.685 Million. If the tourism variable is pooled with the constant, revised model is given as:

$$(89)\,\mathbf{K}\quad q_{A_1} = -638{,}586 - 14{,}880\,p_{A_1} + 131{,}988\,d_{A_1} + 1896\,p_{B_2} + 9{,}108\,p_{B_3}$$

The annual model has the two primary variables, and moreover two competition variables. Own distribution is one of the controllable factors. In the last 12 months of the investigated period, Brand A1's distribution is 32.7; meaning that 32.7% of the retailers sell Brand A1, whereas total beer distribution is 34.2. In other words, 96% of the retailers selling beer already carry at least one SKU of Brand A1. Therefore, Brand A1 has limited room for improvement in respect of distribution. If Brand A1 fully closes its distribution gap, an extra of 198,000hl sales is attainable, which corresponds to 6% of the annual sales volume. However, the cost of expanding distribution to this level can be prohibitive, as it may require serving retailers with no economic significance – with low sales volume, located in a remote region – and breaking tying agreements. Expanding Brand A1's distribution also causes some level of cannibalization, which should also be deducted from the extra sales volume generated. In any case, feasibility of distribution improvement is not considered in the scope of this study, and the annual model is further simplified by pooling Brand A1's distribution with the regression constant:

$$(90)\ \mathbf{K}\quad q_{A_1} = 3{,}677{,}422 - 14{,}880 p_{A_1} + 1896 p_{B_2} + 9{,}108 p_{B_3}$$

Revenue for Brand A1 is formulated as:

$$(91)\ \mathbf{K}\quad R_{A_1} = 3{,}677{,}422 p_{A_1} - 14{,}880 p_{A_1}^2 + 1896 p_{A_1} p_{B_2} + 9{,}108 p_{A_1} p_{B_3}$$

To determine the revenue-maximizing price, we take the first derivative of the revenue formula, and set it to zero:

$$(92)\ \mathbf{K}\quad R'_{A_1} = 3{,}677{,}422 - 29{,}760 p_{A_1} + 1896 p_{B_2} + 9{,}108 p_{B_3} = 0$$

Therefore, revenue-maximizing price is computed as:

$$(93)\ \mathbf{K}\quad p_{A_1}^{R*} = \frac{3{,}677{,}422 + 1896 p_{B_2} + 9{,}108 p_{B_3}}{29{,}760}$$

If average prices for the competitor's brands $p_{B_2} = 154.8$ and $p_{B_3} = 167.2$ are substituted, the optimal price equation is further simplified as:

$$(94)\mathbf{K}\quad p_{A_1}^{R*} = 184.6 + \frac{1{,}896\Delta(p_{B_2}) + 9{,}108\Delta(p_{B_3})}{29{,}760}$$

Equation (94) clearly shows the game-theoretic characteristic of optimal pricing in a competitive setting. The optimal price for Brand A1 depends not only on its own sensitivity, but also on the competitor responses of the other brands. However, two important findings remain valid irrespective of the competitive reaction scenarios:

- Assuming the revenue maximization objective, Brand A1 is definitely charged below the optimal level, noting that average price for Brand A1 in the last 12 months of the investigated period is 159.4 and its price should be increased to strengthen revenue generation.
- Although Brand A1 makes almost 80% of the total market volume, its revenue-maximizing price, in case of no competitor response, is well below the revenue-maximizing price for the total market.

It can be easily proved that profit-maximizing price is equal to revenue-maximizing price plus a constant, if variable unit cost is assumed to be invariant. In case of a linear demand model, profit and revenue equations in general form is written as:

$$(95)\mathbf{K}\ p = (A - bp)(p - c) \qquad R = (A - bp)p$$

$A$: Sales model constant

$b$: Coefficient of own-price in the sales model

$c$: Per unit variable cost

Taking the first derivative of the preceding equations and setting it to zero, the optimal prices are calculated as:

$$(96)\mathbf{K}\ p^{p*} = \frac{A + bc}{2b} \qquad p^{R*} = \frac{A}{2b}$$

Therefore, the profit-maximizing price is equal to revenue-maximizing price plus half the variable unit cost:

$$(97) \ldots \quad p^{p^*} = p^{R^*} + \frac{c}{2}$$

If we reconsider Equation (94) and take the variable cost as 80 ('000 TL) per liter, assuming a market norm of 50% gross margin on the retail sales price, the profit-maximizing price for Brand A1 is given as:

$$(98) \ldots \quad p_{A_1}^{p^*} = 224.6 + \frac{1{,}896\Delta(p_{B_2}) + 9{,}108\Delta(p_{B_3})}{29{,}760}$$

Conclusions made for revenue-maximizing pricing are also valid for profit-maximizing pricing, and therefore are not repeated here. Figure 4.4 presents the relation between price and volume (black line), revenue (upper light line), and profit (lower light line).

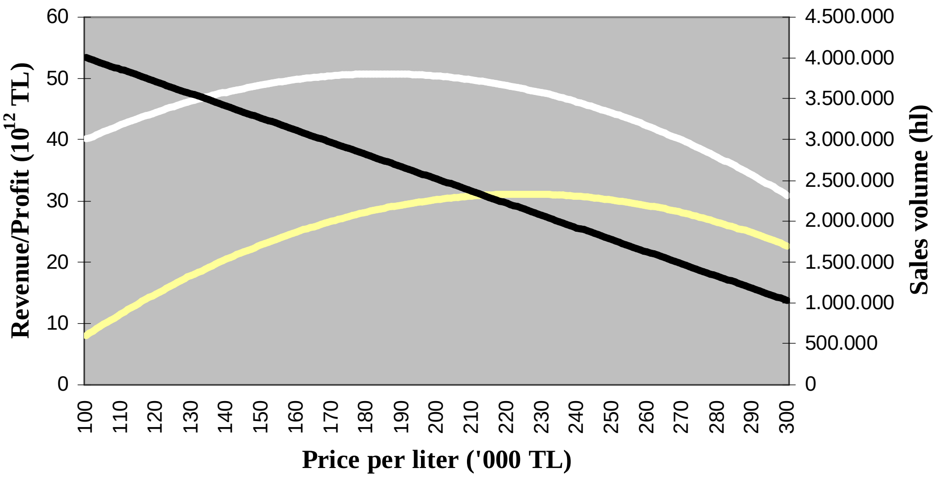



Figure 4.4: Relation between price and volume, revenue, and profit

We also determine the revenue maximizing price, assuming that competition follows the change in price of Brand A1: prices of both Brand B2 and Brand B3 are changed with the same percentage as Brand A1's, thereby keeping fixed price differentials $\Delta_1, \Delta_2$ with the price of Brand A1.

$$(99) \ldots \quad p_{B_2} = p_{A_1} * (1 + \Delta_1) \qquad p_{B_3} = p_{A_1} * (1 + \Delta_2)$$

Under this setting, the revenue for Brand A1 is formulated as:

$$(100)\ \mathbf{K}\quad R_{A_1} = 3{,}677{,}422 p_{A_1} - (3{,}876 - 1{,}896\Delta_1 - 9{,}108\Delta_2) p_{A_1}^2$$

The revenue-maximizing price is found as:

$$(101)\ \mathbf{K}\quad p_{A_1}^{R*} = \frac{1{,}838{,}711}{3{,}876 - 1{,}896\Delta_1 - 9{,}108\Delta_2}$$

In the investigated period, Brand B2's price is positioned 5% below, and Brand B3's price is positioned 5% above Brand A1's price. If Producer B keeps the same price differentials after Brand A1's price increases, then the optimal price for Brand A1 is calculated as 523 ('000 TL). However, the calculated optimal price is out of the justifiable range, compared to the current pricing of 159.4. This is a well-expected situation, as the linear model is used to extrapolate the sales volume. The data set used while fitting the sales model, does not include the prices beyond 176 ('000 TL) and, that is why the model is blind to any sales dynamics occurring in the "extreme" price region. Therefore, the model should not be used for estimating sales volume in case of more than the 10 - 15% price change. Nevertheless, Equation (101) clearly shows that the leading brand has more room in determining its price provided that competitors follow the price adjustments. Based on the foregoing conclusions, the best strategy for Brand A1 can be described as increasing its price in a gradual manner: increase the price by 10-15% first, and then keep prices level for a sufficient time to observe the competitor responses and to re-estimate the sales volume model, and then repeat the optimization exercise under the new setting.

Before concluding this section, we would like to discuss the impact of sales seasonality on pricing. The temperature and tourism variables drive the seasonality in sales, neglecting the slight seasonal variation in distribution. The model for monthly Brand A1 sales is recast to stress the price and seasonality variables only:

$$(102)\ \mathbf{K}\quad q_{A_1t} = 463{,}997 - 1{,}240 p_{A_1t} + 3{,}042\Delta Temp_t + 39\Delta f_t - 2{,}205 r_t + e_{A_1t}$$

The revenue-maximizing price is determined by taking the first derivative of the revenue formula and setting it equal to zero:

$$(103)\ \mathbf{K}\quad p_{A_1t}^{R*} = 186.7 + \frac{3{,}042\Delta Temp_t + 39\Delta f_t - 2{,}205 r_t}{2{,}480}$$

It is important to note that constant of Equation (94) differs slightly, 184.6 to 186.7, because it includes the annualized impact of Ramadan.

Temperature is 13.5°C and the number of tourists is around 975,000 for an average month in the last year of the investigated period. $\Delta Temp_t$, and $\Delta f_t$ refer to the deviations from these average values. For example, in the hottest month, temperature is 24.0C° and number of tourists is 1,777,000. The revenue-maximizing price is calculated as:

$$(104)\ \mathbf{K}\quad p_{A_1t}^{R*} = 186.7 + \frac{3{,}042*(24.0-13.5)+39*(1{,}777-975)}{2{,}480} = 212.2$$

However, when the temperature is 2.5°C and the number of tourists is 426,000 (i.e. the coldest month), revenue-maximizing price is 164.6. Therefore, the optimal price level for Brand A1 varies within a year in the [164.6 – 212.2] bracket, with an average at 186.7, excluding the Ramadan impact. Figure 4.5 demonstrates the optimal price (dark line) and the observed price (light line) for the last 12 months of the investigated period.

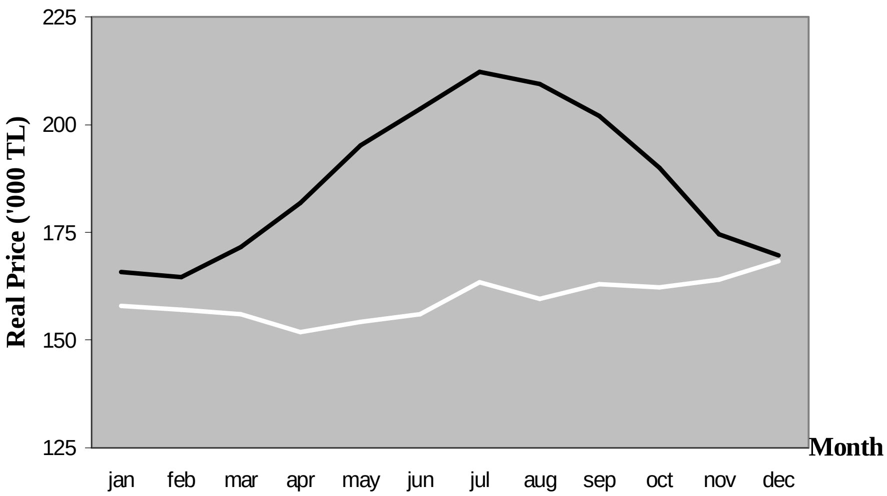



Figure 4.5: Optimal Seasonal Pricing

The seasonal pricing scheme implies higher prices in the summer, the high demand season, and lower prices in the winter, the low demand season. However, observed prices do not show the same seasonality effect. On the other hand, Ramadan also affects beer demand significantly and calls for a reduction in price level. Based on Equation (103), the optimal price should be decreased by 0.9 (‘000 TL) for each day coinciding with Ramadan. For example, if all 29 days of Ramadan coincides with the coldest month for the year, then optimal price for that month should be 138.8, instead of the 164.6 determined above.

# CHAPTER 5

# CONCLUSION

In this chapter, we collect together and summarize the main findings and conclusion of the study. We classify the principal findings under the categories of methodology and market demand structure. We start with methodological observations first.

**Methodology findings**

The econometric estimation of market demand is based on data derived from a sample of retailers aggregated at market level. The level of data aggregation is commensurate with the level of the decision, as we seek to describe an optimal pricing scheme for the market. However, aggregate market-level data lacks the microstructure of trade due to the inherent “averaging out” characteristic. For example, consider two brands which are sold at different prices in many retail points, but are located at price parity when averaged out for the whole market; it is not possible to distinguish the impact of price differentials between two brands if market-level data is used. Moreover, regional promotions and point-of-sales activities like in-store merchandising also affect the sales volume, but cannot be detectable in market-level data. Therefore, results based on aggregate data should only be generalized with the “averaging out” reservation.

The major limitation of the econometric approach is that the models are myopic. Observed data is used to construct the model, which is capable of forecasting the sales volume if and only if changes in the determinant are within the observed range of values. In other words, econometric models can interpolate, but cannot extrapolate. Therefore, consequences of the managerial actions that have never been observed historically should be sought by either using an experimental method like test market or a survey method like conjoint analysis.

Price is a rather complicated explanatory variable when modeling a market exposed to high inflation. Under such a setting, managers typically use pricing to cope with inflation, rather than to deal with competition. There are frequent price increases in the market, and these increases are in a way to match the inflation. This boosts the correlation among the prices in the market, and makes it more difficult to differentiate the impact of price change in one brand from the others, raising the multicollinearity problem.

**Market demand findings**

The *market level model* indicates that the beer sales volume is affected by both beer price and raki price. The price elasticity of beer is found to be in the inelastic range as -0.37. This result is in line with the a priori expectations and findings of the earlier studies: market level elasticities are in the inelastic range for almost all consumer goods, and consumers are less sensitive against the changes in the prices of addictive products compared to ordinary products. Low cross-price elasticity between beer and raki calls for a limited substitutability among the two alcoholic beverage categories.

Contrary to the common belief in the industry, beer distribution has no impact on beer demand in the observed range. Beer distribution should have impact in the outer range, such that if there is no distribution, there should be no sales. Therefore, it can be concluded that distribution has reached the non-contributing, saturated level in the beer market.

Temperature and tourism are identified as the drivers of the seasonality in beer demand. Moreover, Ramadan has serious adverse impact on beer sales. Reduced alcoholic beverage consumption in Ramadan decreases the annual beer consumption by 2% on average in the investigated period. However, the monthly effect can be even more severe; Ramadan coincides with winter months in the investigated period and reduces monthly sales volume by 35-40% in these months, provided that it fully coincides with the calendar month.

In the investigated period, the market achieved 2% annual growth rate. The model identifies tourism and GDP as the growth drivers. When the historical (i.e. last decades average) growth rates for these factors are assumed, it can be concluded that the beer market can grow at 5% per year. The low growth rate in the investigated period can be attributable to the economic, diplomatic, and regional crises experienced in that period. However, the lucrative growth era is over and per capita consumption is fairly stable over the investigated period. Therefore, it can be concluded that there is no motive for a potential beer drinker to consume more, and the market growth is rather linked to environmental factors like GDP, and tourism. Summarizing the foregoing discussion, Turkey beer market can be characterized as a “slow growing, mature market”.

The *brand level model* identifies beer distribution as the major determinant of the selective demand, unlike the market level model. Although extending the number of beer selling points does not increase beer sales volume, the more points one brand is present in, the more share it captures from the total beer demand.

The dominant brand in the market owns a price elasticity of -0.78. Prior studies determine brand-level price elasticities to be more than -1 in the elastic region. Brand A1 is a contradiction to the literature due to its overwhelming leading power in the marketplace. Nevertheless, although Brand A1 has almost 80% share in the market, its price elasticity is almost twice the market elasticity, noting that market-level price elasticity for beer is found as -0.37. Therefore, it can be concluded that even the presence of restricted competition decreases the flexibility in setting the prices.

Solution to the brand level price optimization problem is game-theoretic. However, it can be concluded that price leader is more flexible in determining price adjustments if the other players in the market tend to follow the pricing initiative of the leader. The pairwise correlation matrix for the brand-level model signals the existence of high correlation among the prices of mainstream brands. Therefore, it can be interpreted that two private beer producers synchronize the timing and magnitude of their price increases for their mainstream brands. This finding supports the existence of a “leader-follower model” in the marketplace, which is even stressed under the inflationary operating conditions.

Revenue and profit maximizing prices are within a certain differential, provided that variable cost is constant. With another perspective, revenue and profit maximizing prices are different, if not all costs are fixed. Nevertheless, prices are well below both the revenue and the profit maximizing level in the Turkish beer market. Three major factors drive the discrepancy between the optimal and observed beer prices in the investigated period:

- Dominant player was excessively market share and sales volume centric until recently it started to make investment abroad.
- Managers have long perceived pricing as a remedy to cope up with the high inflation, rather than to use it as a strategic tool in accomplishing firm objectives.
- Firms lacked the necessary resources to engage in demand and pricing analysis.

Beer has a seasonal demand: more beer is sold in the summer time. Moreover, it is not possible to stock beer for a long time, as it is perishable and in bulk. The seasonal demand structure of beer calls for a seasonal pricing scheme: a higher price in the high season.

**Further work**

There are several lines of research that can be followed in further work. One of these is to devise a method to support the analysis on quantitative market results. Research can be designed to identify the inherent brand switching dynamics and brand proximity as an input to the market modeling process. For example, only the proximate brands, sharing a common consumer base, can be used in the regression instead of the whole set of brands, or regression coefficients can be restrained by some pre-defined relations. Moreover, estimating regression parameters by some method that is less sensitive to multicollinearity than ordinary least squares and comparing these parameters with the ones estimated by the “variable deletion” method is another future research area.

In the price optimization work, results are derived by assuming no competitor response. The direction and magnitude of the model results make the preceding assumption a safe one, securing the robustness of the study findings. However, game-theoretic tools like reaction curves and probabilistic best moves can be used, and plausible scenarios can be derived to enrich the optimization work.

Market data used in the study is historic, and does not represent the current market structure. Currently, there are a couple of more brands and three price segments, with the addition of premium segments, in the market. Consumer reaction in the premium segment can be different than the other two, as premium consumers are expected to be less price conscious. Demand analysis can be renewed with a more recent set of data, to understand the implications of the emergence of premium segment. Nevertheless, it is important to note that Brand A1 manages to preserve its position in the market, and premium brands remain marginal. Therefore, most of the our model results remain valid.

Periodical renewal of the study would be helpful in understanding the development of beer price elasticity. It is widely claimed that price elasticity is strongly dependent on the purchasing power of the consumers. One supporting example to this claim can be the comparison of USA and Turkey: US consumers have 5-6 times more purchasing power compared to the Turkish consumers, and price elasticity of beer in US (-0.23) is significantly lower than the elasticity identified for Turkey (-0.37). Consumer purchasing power is changing fast with the developing economy of Turkey, and it is possible to plot the change in price elasticity against the change in purchasing power, if the study is periodically renewed. Moreover, economic crises, experienced three times in Turkey within the last decade, severely affect the household income, and cause a discontinuity in the purchasing power. The income effect on price elasticity can be clearly identified by comparing the results of a pre- and post-crisis study.

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# APPENDIX A.1

# SALES VOLUME DATA – LINEAR MODEL

Table A.1: Sales Volume Data – Linear Model

| Month | Q_Beer | Q_A1 | Q_A2 | Q_A3 | Q_A4 | Q_A5 | Q_A6 | Q_B1 | Q_B2 | Q_B3 | Q_B4 | Q_C1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 330,624 | 255,020 | 9,807 | 2,518 | 0 | 13,346 | 4,463 | 21,556 | 0 | 7,563 | 12,811 | 3,541 |
| 2 | 360,322 | 274,486 | 9,269 | 2,878 | 0 | 22,397 | 3,773 | 21,603 | 0 | 7,299 | 15,214 | 3,403 |
| 3 | 395,745 | 309,302 | 7,247 | 2,329 | 0 | 24,639 | 5,234 | 21,588 | 0 | 6,814 | 15,618 | 2,974 |
| 4 | 389,089 | 299,127 | 5,851 | 2,527 | 0 | 22,567 | 5,284 | 24,164 | 0 | 7,692 | 19,118 | 2,759 |
| 5 | 364,599 | 278,926 | 5,298 | 3,070 | 0 | 21,719 | 5,077 | 22,172 | 0 | 7,036 | 17,464 | 3,838 |
| 6 | 356,931 | 279,915 | 4,571 | 2,337 | 0 | 18,091 | 4,801 | 19,841 | 0 | 6,642 | 15,669 | 5,062 |
| 7 | 323,781 | 255,621 | 4,210 | 3,350 | 0 | 17,100 | 4,167 | 16,781 | 8 | 5,761 | 13,416 | 3,367 |
| 8 | 312,026 | 241,390 | 6,235 | 3,152 | 0 | 17,210 | 3,600 | 17,946 | 46 | 5,552 | 14,766 | 2,129 |
| 9 | 222,136 | 167,804 | 4,944 | 2,680 | 0 | 10,545 | 2,619 | 13,468 | 40 | 4,923 | 12,863 | 2,251 |
| 10 | 211,297 | 166,450 | 3,781 | 2,111 | 0 | 9,384 | 2,838 | 10,009 | 34 | 5,053 | 9,107 | 2,530 |
| 11 | 255,593 | 195,508 | 4,570 | 3,225 | 2,151 | 11,307 | 5,368 | 11,740 | 65 | 4,387 | 14,027 | 3,245 |
| 12 | 285,359 | 221,533 | 4,315 | 2,165 | 5,990 | 10,000 | 5,186 | 15,834 | 140 | 5,412 | 11,890 | 2,893 |
| 13 | 320,936 | 251,536 | 5,286 | 2,732 | 7,260 | 9,511 | 4,008 | 18,673 | 71 | 5,446 | 12,837 | 3,577 |
| 14 | 337,525 | 266,487 | 5,165 | 2,744 | 7,054 | 6,602 | 5,443 | 19,705 | 216 | 6,543 | 13,803 | 3,764 |
| 15 | 368,076 | 298,958 | 6,589 | 2,709 | 6,505 | 6,326 | 4,358 | 21,460 | 133 | 5,564 | 12,229 | 3,244 |
| 16 | 384,166 | 309,161 | 5,161 | 3,162 | 5,258 | 7,069 | 4,973 | 23,035 | 229 | 5,783 | 15,977 | 4,357 |
| 17 | 377,246 | 302,605 | 4,696 | 3,220 | 4,540 | 6,301 | 4,401 | 23,171 | 172 | 6,337 | 16,747 | 5,056 |
| 18 | 335,192 | 265,741 | 4,536 | 3,472 | 3,920 | 6,490 | 3,968 | 21,540 | 278 | 6,681 | 13,789 | 4,778 |
| 19 | 322,523 | 253,178 | 5,233 | 3,234 | 3,443 | 7,357 | 3,398 | 20,633 | 652 | 4,979 | 15,936 | 4,479 |
| 20 | 279,900 | 214,384 | 4,978 | 2,802 | 3,263 | 8,128 | 3,033 | 17,738 | 1,901 | 5,201 | 14,893 | 3,579 |
| 21 | 197,509 | 150,868 | 3,511 | 2,604 | 2,645 | 6,044 | 1,510 | 11,536 | 2,214 | 3,838 | 10,025 | 2,715 |
| 22 | 225,812 | 174,086 | 4,035 | 2,113 | 2,548 | 5,802 | 3,038 | 11,674 | 3,636 | 4,436 | 11,225 | 3,219 |
| 23 | 256,623 | 198,234 | 3,957 | 2,385 | 2,373 | 4,071 | 2,940 | 14,520 | 7,972 | 4,025 | 12,166 | 3,980 |
| 24 | 279,932 | 210,092 | 4,594 | 2,538 | 2,912 | 7,021 | 3,598 | 14,477 | 9,792 | 4,968 | 15,032 | 4,909 |
| 25 | 327,009 | 251,217 | 5,539 | 2,541 | 3,249 | 8,986 | 5,051 | 16,357 | 12,218 | 4,175 | 11,904 | 5,772 |
| 26 | 342,912 | 256,697 | 5,766 | 3,007 | 3,350 | 9,985 | 5,675 | 17,929 | 16,184 | 4,277 | 13,623 | 6,418 |
| 27 | 380,860 | 281,406 | 6,862 | 3,870 | 4,608 | 12,309 | 4,864 | 23,153 | 19,468 | 5,065 | 15,098 | 4,158 |
| 28 | 371,012 | 280,980 | 6,105 | 4,236 | 3,838 | 11,623 | 4,252 | 21,021 | 17,874 | 4,693 | 13,367 | 3,022 |
| 29 | 360,119 | 272,433 | 5,348 | 3,710 | 3,543 | 11,220 | 4,727 | 23,996 | 15,669 | 4,616 | 11,953 | 2,903 |
| 30 | 355,071 | 262,116 | 5,119 | 3,266 | 2,610 | 11,881 | 4,211 | 26,468 | 15,701 | 4,892 | 15,573 | 3,235 |
| 31 | 312,728 | 231,569 | 4,650 | 2,392 | 2,326 | 12,173 | 4,846 | 17,437 | 13,551 | 3,601 | 16,119 | 4,064 |
| 32 | 245,316 | 182,367 | 3,655 | 1,903 | 1,769 | 6,967 | 4,391 | 13,271 | 11,404 | 3,564 | 13,770 | 2,254 |
| 33 | 216,686 | 161,857 | 3,090 | 1,534 | 1,429 | 7,005 | 3,936 | 12,633 | 10,814 | 2,753 | 10,684 | 951 |
| 34 | 275,937 | 215,119 | 3,741 | 2,380 | 1,680 | 9,731 | 4,925 | 12,995 | 9,047 | 3,059 | 12,598 | 663 |
| 35 | 287,258 | 216,325 | 4,358 | 1,979 | 1,982 | 11,737 | 5,097 | 14,463 | 11,202 | 4,159 | 14,739 | 1,215 |
| 36 | 305,996 | 233,569 | 4,425 | 1,770 | 2,353 | 13,167 | 5,737 | 15,030 | 9,791 | 4,639 | 12,671 | 2,845 |
| 37 | 376,845 | 290,562 | 6,017 | 1,622 | 1,982 | 16,763 | 7,426 | 16,818 | 12,014 | 5,395 | 15,520 | 2,726 |
| 38 | 411,850 | 315,796 | 5,270 | 2,038 | 2,549 | 15,755 | 7,874 | 22,154 | 11,464 | 7,577 | 15,715 | 5,660 |

Table A.1 (continued)

| Month | Q_Beer | Q_A1 | Q_A2 | Q_A3 | Q_A4 | Q_A5 | Q_A6 | Q_B1 | Q_B2 | Q_B3 | Q_B4 | Q_C1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 39 | 434,339 | 335,923 | 5,079 | 2,241 | 2,293 | 18,586 | 6,746 | 23,707 | 11,528 | 6,743 | 15,879 | 5,426 |
| 40 | 444,725 | 342,755 | 5,432 | 2,367 | 2,030 | 18,727 | 6,722 | 26,462 | 11,609 | 5,934 | 15,008 | 6,712 |
| 41 | 422,480 | 324,823 | 4,910 | 2,091 | 2,101 | 13,981 | 5,850 | 29,214 | 10,629 | 7,271 | 13,899 | 6,130 |
| 42 | 374,407 | 288,058 | 5,020 | 1,550 | 2,521 | 10,565 | 4,344 | 26,921 | 8,718 | 7,429 | 11,818 | 5,678 |
| 43 | 337,220 | 258,132 | 4,698 | 1,529 | 2,028 | 10,524 | 3,485 | 24,442 | 6,872 | 6,682 | 12,358 | 4,822 |
| 44 | 188,522 | 137,740 | 3,143 | 1,363 | 1,829 | 6,756 | 2,044 | 15,800 | 5,333 | 4,109 | 7,046 | 2,339 |
| 45 | 278,822 | 207,000 | 5,163 | 1,557 | 2,321 | 10,062 | 1,896 | 22,096 | 6,826 | 7,881 | 9,600 | 2,722 |
| 46 | 309,536 | 239,807 | 5,641 | 1,720 | 2,473 | 8,516 | 2,007 | 19,313 | 6,763 | 7,026 | 9,919 | 3,991 |
| 47 | 315,732 | 246,023 | 6,566 | 1,922 | 2,179 | 9,565 | 2,072 | 18,462 | 5,596 | 5,977 | 10,564 | 4,111 |
| 48 | 338,627 | 265,506 | 6,844 | 2,042 | 2,272 | 9,937 | 2,066 | 19,443 | 5,837 | 6,689 | 10,793 | 5,061 |
| 49 | 389,526 | 307,516 | 6,506 | 1,685 | 1,797 | 10,676 | 1,536 | 23,373 | 6,651 | 7,179 | 14,047 | 6,213 |
| 50 | 406,665 | 318,401 | 7,254 | 2,286 | 2,281 | 11,568 | 1,731 | 23,170 | 9,312 | 8,231 | 13,072 | 7,157 |
| 51 | 433,994 | 340,742 | 7,756 | 2,169 | 1,966 | 13,927 | 1,038 | 22,969 | 9,510 | 9,384 | 14,768 | 6,952 |
| 52 | 437,804 | 335,852 | 5,834 | 1,821 | 1,516 | 16,090 | 944 | 31,911 | 8,162 | 8,364 | 15,368 | 7,505 |
| 53 | 411,278 | 314,880 | 6,003 | 1,699 | 1,702 | 17,904 | 1,106 | 28,758 | 6,645 | 8,467 | 14,543 | 5,036 |
| 54 | 375,691 | 284,656 | 5,782 | 1,438 | 1,692 | 16,855 | 720 | 26,062 | 6,038 | 8,554 | 13,137 | 6,833 |
| 55 | 270,252 | 203,574 | 4,872 | 1,018 | 1,572 | 10,541 | 313 | 18,839 | 3,892 | 5,747 | 12,110 | 4,779 |
| 56 | 187,012 | 143,333 | 3,597 | 945 | 966 | 6,818 | 46 | 10,772 | 2,675 | 4,690 | 8,117 | 2,909 |
| 57 | 257,647 | 196,429 | 4,460 | 1,287 | 1,270 | 8,804 | 38 | 14,648 | 5,208 | 5,731 | 12,028 | 4,547 |
| 58 | 257,740 | 196,141 | 5,571 | 1,357 | 1,218 | 10,363 | 18 | 14,969 | 3,153 | 5,601 | 11,457 | 4,697 |
| 59 | 281,993 | 213,810 | 6,571 | 1,521 | 2,055 | 12,780 | 10 | 16,423 | 2,422 | 6,098 | 11,139 | 5,156 |
| 60 | 306,055 | 232,085 | 6,326 | 1,411 | 1,368 | 14,857 | 61 | 18,211 | 2,302 | 7,630 | 13,547 | 4,448 |
| **Avg** | **325,377** | **250,427** | **5,347** | **2,322** | **2,310** | **11,779** | **3,581** | **19,409** | **5,995** | **5,864** | **13,336** | **4,079** |
| **Max** | 444,725 | 342,755 | 9,807 | 4,236 | 7,260 | 24,639 | 7,874 | 31,911 | 19,468 | 9,384 | 19,118 | 7,505 |
| **Min** | 187,012 | 137,740 | 3,090 | 945 | 0 | 4,071 | 10 | 10,009 | 0 | 2,753 | 7,046 | 663 |

# APPENDIX A.2

# PRICE DATA – LINEAR MODEL

Table A.2: Price Data – Linear Model

| Month | p_Beer | p_A1 | p_A2 | p_A3 | p_A4 | p_A5 | p_A6 | p_B1 | p_B2 | p_B3 | p_B4 | p_C1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 134.4 | 136.9 | 158.5 | 149.5 | - | 98.1 | 113.6 | 138.3 | - | 158.8 | 103.7 | 81.5 |
| 2 | 136.1 | 139.7 | 151.3 | 158.1 | - | 97.0 | 115.4 | 141.1 | - | 162.1 | 114.9 | 79.8 |
| 3 | 144.3 | 148.5 | 171.6 | 151.7 | - | 97.5 | 120.5 | 150.7 | - | 171.1 | 120.8 | 82.3 |
| 4 | 149.9 | 154.1 | 179.7 | 164.4 | - | 102.9 | 117.8 | 156.7 | - | 179.0 | 127.5 | 82.0 |
| 5 | 157.4 | 162.4 | 191.9 | 171.4 | - | 110.8 | 128.0 | 165.5 | - | 187.7 | 124.9 | 88.3 |
| 6 | 160.2 | 165.9 | 192.4 | 173.1 | - | 108.1 | 125.5 | 166.1 | - | 188.1 | 123.4 | 86.8 |
| 7 | 155.5 | 159.8 | 191.2 | 175.8 | - | 109.8 | 137.7 | 162.4 | 217.5 | 186.4 | 118.2 | 78.9 |
| 8 | 157.1 | 160.8 | 188.9 | 174.7 | - | 113.0 | 137.8 | 164.5 | 112.8 | 190.8 | 124.3 | 87.4 |
| 9 | 163.0 | 167.0 | 193.1 | 178.4 | - | 116.6 | 131.4 | 174.0 | 101.2 | 190.3 | 134.8 | 73.8 |
| 10 | 159.4 | 163.1 | 188.2 | 173.1 | - | 117.6 | 137.0 | 163.9 | 110.4 | 188.1 | 131.4 | 72.9 |
| 11 | 162.1 | 167.5 | 182.9 | 170.9 | 175.2 | 122.8 | 129.8 | 165.3 | 116.9 | 180.4 | 134.4 | 73.8 |
| 12 | 168.5 | 171.9 | 193.0 | 178.0 | 181.3 | 127.4 | 139.5 | 175.6 | 145.4 | 190.5 | 141.3 | 62.0 |
| 13 | 165.8 | 167.9 | 191.6 | 179.8 | 182.1 | 130.3 | 145.7 | 173.7 | 124.5 | 194.3 | 137.6 | 65.1 |
| 14 | 167.6 | 169.4 | 186.2 | 186.4 | 183.4 | 133.7 | 146.7 | 173.0 | 127.9 | 190.7 | 143.8 | 82.1 |
| 15 | 171.0 | 172.1 | 192.0 | 188.4 | 189.9 | 132.5 | 149.1 | 177.8 | 143.6 | 198.3 | 145.1 | 80.1 |
| 16 | 172.9 | 175.6 | 187.9 | 188.8 | 191.6 | 129.3 | 147.3 | 178.7 | 128.2 | 197.5 | 143.5 | 76.2 |
| 17 | 171.5 | 174.8 | 180.1 | 189.4 | 188.8 | 127.7 | 135.6 | 179.1 | 139.6 | 202.3 | 132.3 | 80.7 |
| 18 | 166.8 | 169.7 | 182.3 | 184.8 | 183.7 | 123.1 | 130.8 | 178.7 | 124.2 | 193.1 | 128.3 | 75.9 |
| 19 | 160.6 | 163.3 | 178.3 | 175.6 | 177.0 | 127.1 | 134.0 | 174.5 | 153.2 | 185.9 | 125.4 | 73.0 |
| 20 | 155.4 | 158.7 | 177.8 | 172.3 | 175.2 | 126.5 | 129.1 | 161.2 | 151.3 | 171.5 | 120.7 | 73.4 |
| 21 | 150.3 | 152.1 | 169.1 | 165.4 | 168.3 | 129.9 | 126.1 | 157.6 | 151.6 | 170.2 | 130.2 | 67.1 |
| 22 | 149.1 | 151.7 | 172.2 | 165.5 | 169.3 | 121.8 | 118.2 | 156.3 | 150.5 | 171.5 | 122.8 | 65.0 |
| 23 | 157.9 | 160.7 | 184.6 | 175.5 | 177.8 | 123.4 | 127.1 | 169.3 | 157.8 | 182.4 | 123.9 | 65.0 |
| 24 | 155.0 | 158.4 | 176.1 | 172.6 | 176.8 | 138.5 | 127.2 | 165.0 | 155.7 | 178.4 | 122.1 | 61.2 |
| 25 | 151.1 | 153.1 | 170.8 | 164.8 | 174.4 | 141.0 | 124.1 | 165.3 | 153.0 | 173.0 | 121.7 | 66.5 |
| 26 | 151.9 | 154.7 | 173.5 | 171.1 | 174.9 | 135.3 | 129.3 | 157.6 | 150.7 | 170.3 | 127.9 | 67.5 |
| 27 | 157.4 | 160.3 | 177.2 | 173.2 | 181.7 | 133.0 | 128.4 | 163.1 | 154.0 | 179.9 | 122.7 | 74.2 |
| 28 | 154.8 | 156.8 | 176.4 | 173.0 | 174.5 | 129.8 | 132.9 | 162.2 | 151.7 | 172.4 | 126.2 | 72.4 |
| 29 | 151.7 | 153.9 | 173.2 | 169.2 | 173.0 | 126.8 | 121.6 | 158.4 | 145.9 | 167.8 | 117.7 | 82.6 |
| 30 | 144.0 | 147.1 | 159.8 | 161.8 | 168.0 | 121.2 | 118.1 | 148.9 | 140.6 | 160.8 | 108.4 | 77.1 |
| 31 | 145.5 | 149.7 | 165.5 | 165.7 | 170.6 | 120.6 | 115.0 | 157.1 | 142.0 | 162.6 | 106.3 | 73.5 |
| 32 | 145.1 | 149.4 | 165.7 | 161.3 | 168.5 | 113.1 | 110.8 | 155.5 | 141.3 | 164.1 | 104.8 | 74.4 |
| 33 | 155.6 | 160.1 | 174.2 | 174.2 | 183.3 | 122.2 | 115.5 | 164.5 | 152.7 | 175.6 | 104.8 | 102.4 |
| 34 | 155.1 | 158.6 | 173.2 | 175.3 | 177.1 | 121.5 | 128.3 | 165.4 | 152.4 | 171.3 | 110.0 | 112.5 |
| 35 | 153.6 | 157.5 | 169.1 | 173.9 | 170.5 | 124.4 | 131.5 | 157.9 | 149.8 | 165.3 | 117.8 | 107.1 |
| 36 | 150.2 | 153.0 | 167.8 | 169.4 | 169.1 | 125.8 | 134.9 | 154.4 | 148.4 | 165.0 | 119.5 | 105.8 |

Table A.2 (continued)

| Month | p_Beer | p_A1 | p_A2 | p_A3 | p_A4 | p_A5 | p_A6 | p_B1 | p_B2 | p_B3 | p_B4 | p_C1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 37 | 155.8 | 158.7 | 172.0 | 169.6 | 173.2 | 128.3 | 145.0 | 164.8 | 150.7 | 166.7 | 125.0 | 104.7 |
| 38 | 161.7 | 164.7 | 183.1 | 181.6 | 188.9 | 129.3 | 151.5 | 168.5 | 162.2 | 180.4 | 127.8 | 102.4 |
| 39 | 159.4 | 162.8 | 177.9 | 178.9 | 179.7 | 125.6 | 132.3 | 166.6 | 159.7 | 179.0 | 127.9 | 98.2 |
| 40 | 155.1 | 157.5 | 175.8 | 174.9 | 177.1 | 127.3 | 142.0 | 158.9 | 155.8 | 174.7 | 127.6 | 95.3 |
| 41 | 151.2 | 152.4 | 169.1 | 168.5 | 174.8 | 123.3 | 140.3 | 158.1 | 150.6 | 171.4 | 124.8 | 96.0 |
| 42 | 152.0 | 153.7 | 169.6 | 169.8 | 169.2 | 120.0 | 139.2 | 155.3 | 146.6 | 166.2 | 121.7 | 90.0 |
| 43 | 146.7 | 148.8 | 164.4 | 168.6 | 164.4 | 114.7 | 133.8 | 146.1 | 143.7 | 159.3 | 118.2 | 89.0 |
| 44 | 145.2 | 145.9 | 162.8 | 160.4 | 163.7 | 118.3 | 132.1 | 155.6 | 141.4 | 152.1 | 117.1 | 90.0 |
| 45 | 142.5 | 143.9 | 159.4 | 158.4 | 158.6 | 113.9 | 131.9 | 141.5 | 140.1 | 155.7 | 111.7 | 86.1 |
| 46 | 144.9 | 146.0 | 161.5 | 162.8 | 157.9 | 112.2 | 129.7 | 146.3 | 144.2 | 154.4 | 111.6 | 85.3 |
| 47 | 146.6 | 147.7 | 159.6 | 158.0 | 163.4 | 115.5 | 136.8 | 147.0 | 147.1 | 156.5 | 110.6 | 90.8 |
| 48 | 149.7 | 151.8 | 164.0 | 156.9 | 165.4 | 117.0 | 133.4 | 150.5 | 142.6 | 162.9 | 106.1 | 93.6 |
| 49 | 152.1 | 154.3 | 170.6 | 170.4 | 176.6 | 117.6 | 131.4 | 153.4 | 152.7 | 170.2 | 105.1 | 94.8 |
| 50 | 153.8 | 156.0 | 175.8 | 174.1 | 179.3 | 114.6 | 129.3 | 157.2 | 148.3 | 172.4 | 108.4 | 98.3 |
| 51 | 160.9 | 163.4 | 187.1 | 185.2 | 189.6 | 117.7 | 136.5 | 163.1 | 158.2 | 173.9 | 111.9 | 99.7 |
| 52 | 157.2 | 159.7 | 181.3 | 183.1 | 188.0 | 116.8 | 140.5 | 155.4 | 158.0 | 169.5 | 111.1 | 103.8 |
| 53 | 159.8 | 162.9 | 181.0 | 181.8 | 193.4 | 112.2 | 148.6 | 161.2 | 154.5 | 170.5 | 109.8 | 102.8 |
| 54 | 158.7 | 162.2 | 179.4 | 184.3 | 189.3 | 111.3 | 157.9 | 159.3 | 157.5 | 170.2 | 108.7 | 102.2 |
| 55 | 160.7 | 164.0 | 178.7 | 190.6 | 181.9 | 117.0 | 150.5 | 164.5 | 156.5 | 173.1 | 107.6 | 106.2 |
| 56 | 165.0 | 168.2 | 184.0 | 185.6 | 194.0 | 119.2 | 147.2 | 166.6 | 167.6 | 168.9 | 107.2 | 112.3 |
| 57 | 155.4 | 157.9 | 178.6 | 192.3 | 181.7 | 115.1 | 136.7 | 153.6 | 149.9 | 161.0 | 110.4 | 107.3 |
| 58 | 154.1 | 157.0 | 175.4 | 185.3 | 180.6 | 116.4 | 148.4 | 143.0 | 149.4 | 163.7 | 113.1 | 107.6 |
| 59 | 153.1 | 155.9 | 170.4 | 156.6 | 159.2 | 117.9 | 158.6 | 142.6 | 151.0 | 157.7 | 113.5 | 106.2 |
| 60 | 149.5 | 151.8 | 167.3 | 163.1 | 167.7 | 113.5 | 134.9 | 145.0 | 154.3 | 155.5 | 113.6 | 105.3 |
| **Average** | **155.0** | **157.9** | **175.9** | **172.6** | **176.5** | **120.2** | **133.5** | **160.1** | **147.0** | **173.7** | **120.2** | **86.6** |
| **Max** | 172.9 | 175.6 | 193.1 | 192.3 | 194.0 | 141.0 | 158.6 | 179.1 | 217.5 | 202.3 | 145.1 | 112.5 |
| **Min** | 134.4 | 136.9 | 151.3 | 149.5 | 157.9 | 97.0 | 110.8 | 138.3 | 101.2 | 152.1 | 103.7 | 61.2 |

# APPENDIX A.3

# DISTRIBUTION DATA – LINEAR MODEL

Table A.3: Distribution Data – Linear Model

| Month | d_Beer | d_A1 | d_A2 | d_A3 | d_A4 | d_A5 | d_A6 | d_B1 | d_B2 | d_B3 | d_B4 | d_C1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 35.0 | 31.7 | 14.3 | 7.8 | 0.0 | 11.2 | 7.4 | 10.6 | 0.0 | 9.0 | 10.5 | 2.4 |
| 2 | 35.2 | 31.8 | 12.9 | 6.7 | 0.0 | 10.8 | 6.5 | 10.2 | 0.0 | 8.4 | 11.4 | 2.8 |
| 3 | 35.7 | 32.4 | 11.2 | 6.2 | 0.0 | 11.2 | 7.9 | 9.9 | 0.0 | 8.8 | 11.1 | 2.0 |
| 4 | 37.6 | 33.7 | 10.0 | 7.4 | 0.0 | 11.6 | 7.7 | 10.4 | 0.0 | 8.5 | 10.8 | 1.9 |
| 5 | 36.7 | 32.9 | 10.4 | 8.5 | 0.0 | 10.8 | 8.1 | 9.6 | 0.0 | 8.6 | 10.6 | 2.1 |
| 6 | 35.5 | 32.0 | 9.8 | 8.5 | 0.0 | 10.0 | 7.0 | 9.2 | 0.0 | 8.8 | 10.7 | 1.7 |
| 7 | 35.2 | 32.0 | 9.3 | 9.2 | 0.0 | 9.4 | 6.7 | 8.4 | 0.0 | 7.8 | 9.7 | 1.2 |
| 8 | 35.5 | 32.6 | 10.4 | 9.6 | 0.0 | 9.1 | 5.9 | 8.5 | 0.0 | 7.9 | 10.5 | 1.1 |
| 9 | 35.4 | 32.9 | 10.4 | 8.9 | 0.0 | 8.3 | 5.7 | 7.6 | 0.0 | 8.1 | 10.4 | 1.1 |
| 10 | 33.6 | 31.2 | 9.6 | 8.0 | 0.0 | 8.1 | 6.6 | 6.6 | 0.0 | 7.3 | 9.4 | 1.2 |
| 11 | 33.9 | 31.4 | 9.5 | 8.6 | 7.6 | 7.7 | 7.1 | 7.3 | 0.0 | 7.2 | 9.3 | 1.7 |
| 12 | 34.5 | 31.3 | 9.7 | 7.9 | 12.8 | 7.8 | 7.1 | 7.9 | 0.3 | 7.9 | 10.2 | 2.0 |
| 13 | 34.0 | 31.2 | 9.2 | 7.3 | 13.4 | 7.8 | 6.5 | 9.3 | 0.4 | 8.5 | 10.0 | 1.7 |
| 14 | 34.0 | 31.7 | 9.8 | 7.5 | 13.3 | 7.0 | 6.5 | 10.3 | 0.5 | 8.8 | 9.8 | 1.9 |
| 15 | 34.4 | 32.1 | 10.2 | 7.5 | 12.8 | 6.8 | 5.7 | 10.4 | 0.8 | 7.9 | 10.2 | 1.3 |
| 16 | 35.0 | 33.2 | 10.0 | 8.9 | 11.2 | 6.9 | 6.2 | 9.8 | 0.7 | 8.6 | 10.4 | 2.0 |
| 17 | 34.2 | 32.2 | 9.3 | 9.9 | 10.8 | 6.0 | 5.8 | 9.8 | 0.7 | 8.0 | 10.9 | 1.8 |
| 18 | 34.1 | 31.9 | 9.7 | 9.7 | 10.1 | 6.3 | 5.2 | 10.8 | 0.7 | 8.5 | 10.0 | 1.8 |
| 19 | 34.4 | 31.8 | 10.3 | 10.3 | 10.8 | 6.5 | 5.6 | 11.2 | 1.2 | 8.6 | 9.9 | 2.1 |
| 20 | 32.7 | 30.3 | 10.1 | 9.6 | 10.1 | 5.5 | 5.1 | 10.4 | 2.5 | 8.8 | 9.5 | 1.8 |
| 21 | 32.2 | 30.0 | 9.9 | 9.6 | 9.8 | 5.6 | 5.1 | 9.5 | 3.4 | 8.1 | 8.5 | 1.4 |
| 22 | 32.5 | 29.8 | 9.5 | 9.8 | 9.0 | 5.6 | 5.4 | 9.6 | 5.4 | 8.5 | 9.4 | 1.8 |
| 23 | 32.6 | 29.9 | 9.2 | 9.0 | 9.6 | 5.7 | 5.7 | 9.7 | 8.3 | 8.4 | 9.8 | 2.3 |
| 24 | 32.1 | 30.1 | 9.5 | 8.7 | 10.4 | 7.5 | 6.3 | 9.0 | 9.4 | 8.2 | 9.7 | 1.9 |
| 25 | 32.7 | 30.6 | 11.5 | 9.4 | 11.9 | 8.9 | 7.8 | 9.5 | 9.9 | 8.0 | 9.6 | 2.2 |
| 26 | 32.4 | 30.5 | 11.4 | 10.5 | 11.3 | 9.7 | 7.8 | 10.2 | 11.1 | 8.0 | 9.6 | 1.8 |
| 27 | 32.3 | 30.2 | 11.2 | 10.6 | 11.9 | 10.3 | 7.4 | 10.2 | 11.3 | 7.9 | 9.7 | 1.5 |
| 28 | 33.0 | 31.1 | 13.0 | 11.1 | 11.9 | 9.0 | 7.5 | 9.5 | 11.8 | 7.7 | 9.2 | 1.5 |
| 29 | 33.5 | 31.2 | 12.8 | 10.4 | 11.5 | 9.2 | 7.6 | 9.8 | 11.9 | 7.6 | 9.3 | 1.5 |
| 30 | 33.2 | 31.3 | 13.4 | 9.9 | 11.7 | 9.4 | 7.2 | 9.7 | 11.9 | 7.6 | 10.0 | 1.8 |
| 31 | 32.7 | 30.3 | 11.8 | 9.8 | 11.1 | 9.4 | 6.3 | 9.9 | 11.4 | 6.8 | 11.1 | 1.7 |
| 32 | 33.1 | 31.0 | 11.3 | 9.8 | 10.2 | 8.5 | 7.0 | 10.0 | 11.4 | 6.8 | 11.8 | 1.6 |
| 33 | 32.9 | 31.1 | 10.9 | 9.0 | 9.7 | 7.4 | 6.6 | 9.6 | 11.4 | 6.1 | 10.7 | 1.4 |
| 34 | 33.9 | 31.9 | 10.5 | 8.8 | 9.4 | 9.3 | 7.9 | 9.7 | 11.2 | 6.4 | 10.6 | 1.4 |
| 35 | 34.5 | 32.6 | 12.1 | 9.4 | 9.3 | 11.3 | 10.1 | 9.5 | 10.7 | 7.4 | 11.7 | 2.8 |
| 36 | 34.3 | 32.3 | 13.5 | 9.8 | 9.6 | 12.3 | 10.1 | 8.9 | 10.7 | 7.2 | 11.5 | 3.9 |
| 37 | 34.8 | 32.5 | 14.0 | 10.6 | 10.9 | 14.4 | 10.1 | 9.7 | 12.5 | 7.3 | 12.4 | 4.5 |
| 38 | 35.2 | 32.5 | 14.5 | 11.1 | 11.8 | 15.5 | 9.7 | 10.9 | 12.3 | 7.8 | 12.6 | 5.3 |

Table A.3 (continued)

| Month | d_Beer | d_A1 | d_A2 | d_A3 | d_A4 | d_A5 | d_A6 | d_B1 | d_B2 | d_B3 | d_B4 | d_C1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 39 | 35.6 | 33.2 | 14.2 | 11.8 | 11.3 | 16.1 | 9.2 | 11.3 | 11.5 | 8.2 | 12.1 | 6.0 |
| 40 | 36.6 | 34.1 | 13.9 | 12.2 | 10.7 | 15.8 | 8.8 | 11.7 | 11.4 | 9.0 | 12.0 | 5.7 |
| 41 | 36.3 | 33.8 | 14.3 | 11.6 | 11.7 | 15.5 | 8.5 | 12.2 | 11.6 | 10.4 | 11.4 | 5.4 |
| 42 | 35.2 | 32.6 | 13.2 | 11.7 | 12.5 | 14.0 | 8.1 | 12.6 | 11.0 | 10.4 | 11.1 | 5.1 |
| 43 | 35.8 | 33.4 | 13.3 | 11.9 | 13.5 | 14.6 | 8.3 | 13.2 | 10.2 | 10.1 | 11.5 | 4.8 |
| 44 | 35.2 | 33.0 | 13.0 | 11.2 | 12.2 | 14.6 | 8.2 | 12.1 | 9.9 | 8.9 | 10.5 | 3.8 |
| 45 | 35.3 | 33.1 | 13.8 | 11.9 | 12.4 | 15.0 | 7.8 | 12.0 | 10.4 | 9.0 | 11.4 | 4.0 |
| 46 | 34.7 | 32.7 | 13.6 | 11.2 | 12.2 | 15.2 | 7.5 | 11.8 | 9.8 | 9.6 | 11.6 | 4.0 |
| 47 | 34.6 | 32.7 | 14.8 | 11.4 | 12.2 | 15.7 | 7.0 | 11.3 | 10.3 | 9.4 | 10.7 | 4.2 |
| 48 | 34.9 | 33.0 | 15.2 | 11.0 | 12.2 | 15.7 | 7.7 | 11.0 | 10.8 | 9.9 | 10.1 | 4.6 |
| 49 | 35.7 | 34.0 | 16.1 | 12.4 | 12.2 | 16.3 | 6.4 | 10.9 | 11.9 | 10.3 | 10.7 | 5.3 |
| 50 | 35.0 | 33.4 | 15.2 | 11.9 | 11.3 | 16.2 | 5.5 | 10.8 | 12.4 | 10.4 | 11.4 | 5.0 |
| 51 | 35.2 | 33.4 | 14.9 | 11.0 | 10.9 | 16.0 | 4.0 | 11.6 | 13.6 | 10.4 | 11.8 | 4.8 |
| 52 | 35.8 | 34.2 | 14.1 | 10.4 | 10.4 | 15.8 | 3.4 | 11.8 | 13.3 | 10.8 | 11.4 | 4.9 |
| 53 | 34.7 | 33.0 | 14.4 | 10.3 | 9.5 | 15.0 | 2.6 | 12.8 | 11.6 | 11.5 | 10.7 | 4.2 |
| 54 | 34.0 | 32.5 | 14.9 | 9.5 | 9.0 | 15.5 | 2.0 | 12.0 | 11.4 | 10.6 | 10.2 | 5.0 |
| 55 | 32.6 | 31.2 | 13.8 | 9.3 | 8.5 | 13.4 | 0.7 | 11.6 | 10.8 | 9.5 | 10.4 | 5.0 |
| 56 | 33.7 | 31.8 | 12.8 | 9.3 | 8.9 | 13.0 | 0.5 | 11.4 | 9.2 | 9.1 | 10.5 | 4.6 |
| 57 | 32.9 | 31.6 | 13.0 | 8.8 | 9.5 | 13.6 | 0.7 | 10.9 | 10.0 | 10.4 | 11.0 | 5.4 |
| 58 | 33.1 | 32.0 | 12.9 | 9.5 | 9.4 | 14.7 | 0.6 | 10.6 | 9.9 | 10.8 | 11.3 | 5.6 |
| 59 | 33.4 | 32.5 | 13.8 | 9.7 | 9.7 | 16.3 | 0.5 | 11.4 | 8.7 | 11.4 | 12.0 | 5.6 |
| 60 | 34.1 | 32.6 | 15.6 | 10.0 | 9.4 | 15.7 | 0.6 | 12.0 | 8.8 | 12.2 | 12.4 | 4.7 |
| **Average** | **34.3** | **32.1** | **12.1** | **9.7** | **9.1** | **11.2** | **6.2** | **10.3** | **7.2** | **8.7** | **10.6** | **3.1** |
| **Max** | 37.6 | 34.2 | 16.1 | 12.4 | 13.5 | 16.3 | 10.1 | 13.2 | 13.6 | 12.2 | 12.6 | 6.0 |
| **Min** | 32.1 | 29.8 | 9.2 | 6.2 | 0.0 | 5.5 | 0.5 | 6.6 | 0.0 | 6.1 | 8.5 | 1.1 |

# APPENDIX A.4

# ENVIRONMENTAL FACTORS – LINEAR MODEL

Table A.4: Environmental Factors – Linear Model

| Month | p_raki ('000 TL) | GDP ($10^{12}$ TL) | Temp ($C^0$) | Tourist ('000) | Ramadan (days) |
|---|---|---|---|---|---|
| 1 | 539 | 108.2 | 17.0 | 1,003 | 0 |
| 2 | 539 | 108.2 | 22.0 | 1,048 | 0 |
| 3 | 627 | 110.6 | 24.0 | 1,209 | 0 |
| 4 | 627 | 110.6 | 24.0 | 1,428 | 0 |
| 5 | 627 | 110.6 | 20.0 | 1,299 | 0 |
| 6 | 647 | 112.6 | 15.0 | 949 | 0 |
| 7 | 647 | 112.6 | 9.5 | 540 | 0 |
| 8 | 647 | 112.6 | 7.0 | 419 | 1 |
| 9 | 548 | 114.6 | 5.0 | 346 | 28 |
| 10 | 548 | 114.6 | 2.5 | 372 | 0 |
| 11 | 548 | 114.6 | 5.0 | 477 | 0 |
| 12 | 504 | 115.5 | 11.0 | 642 | 0 |
| 13 | 504 | 115.5 | 17.0 | 986 | 0 |
| 14 | 504 | 115.5 | 22.0 | 1,063 | 0 |
| 15 | 525 | 116.5 | 24.0 | 1,288 | 0 |
| 16 | 525 | 116.5 | 24.0 | 1,460 | 0 |
| 17 | 525 | 116.5 | 20.0 | 1,209 | 0 |
| 18 | 520 | 116.1 | 15.0 | 1,035 | 0 |
| 19 | 520 | 116.1 | 9.5 | 503 | 0 |
| 20 | 520 | 116.1 | 7.0 | 371 | 12 |
| 21 | 462 | 114.2 | 5.0 | 359 | 17 |
| 22 | 462 | 114.2 | 2.5 | 372 | 0 |
| 23 | 462 | 114.2 | 5.0 | 409 | 0 |
| 24 | 450 | 113.6 | 11.0 | 427 | 0 |
| 25 | 450 | 113.6 | 17.0 | 691 | 0 |
| 26 | 450 | 113.6 | 22.0 | 785 | 0 |
| 27 | 543 | 111.2 | 24.0 | 932 | 0 |
| 28 | 543 | 111.2 | 24.0 | 1,079 | 0 |
| 29 | 543 | 111.2 | 20.0 | 876 | 0 |
| 30 | 600 | 110.6 | 15.0 | 801 | 0 |
| 31 | 600 | 110.6 | 9.5 | 436 | 0 |
| 32 | 600 | 110.6 | 7.0 | 321 | 23 |
| 33 | 766 | 111.9 | 5.0 | 334 | 6 |
| 34 | 766 | 111.9 | 2.5 | 354 | 0 |
| 35 | 766 | 111.9 | 5.0 | 435 | 0 |
| 36 | 714 | 113.7 | 11.0 | 721 | 0 |
| 37 | 714 | 113.7 | 17.0 | 986 | 0 |

Table A.4 (continued)

| Month | p_raki ('000 TL) | GDP ($10^{12}$ TL) | Temp ($C^0$) | Tourist ('000) | Ramadan (days) |
|---|---|---|---|---|---|
| 38 | 714 | 113.7 | 22.0 | 1,079 | 0 |
| 39 | 674 | 116.5 | 24.0 | 1,526 | 0 |
| 40 | 674 | 116.5 | 24.0 | 1,419 | 0 |
| 41 | 674 | 116.5 | 20.0 | 1,369 | 0 |
| 42 | 656 | 118.8 | 15.0 | 1,178 | 0 |
| 43 | 656 | 118.8 | 9.5 | 602 | 3 |
| 44 | 656 | 118.8 | 7.0 | 424 | 26 |
| 45 | 640 | 118.6 | 5.0 | 359 | 0 |
| 46 | 640 | 118.6 | 2.5 | 405 | 0 |
| 47 | 640 | 118.6 | 5.0 | 547 | 0 |
| 48 | 612 | 115.8 | 11.0 | 885 | 0 |
| 49 | 612 | 115.8 | 17.0 | 1,232 | 0 |
| 50 | 612 | 115.8 | 22.0 | 1,388 | 0 |
| 51 | 687 | 112.9 | 24.0 | 1,777 | 0 |
| 52 | 687 | 112.9 | 24.0 | 1,601 | 0 |
| 53 | 687 | 112.9 | 20.0 | 1,440 | 0 |
| 54 | 720 | 109.9 | 15.0 | 1,066 | 0 |
| 55 | 720 | 109.9 | 9.5 | 521 | 14 |
| 56 | 720 | 109.9 | 7.0 | 398 | 15 |
| 57 | 684 | 110.4 | 5.0 | 307 | 0 |
| 58 | 684 | 110.4 | 2.5 | 426 | 0 |
| 59 | 684 | 110.4 | 5.0 | 676 | 0 |
| 60 | 669 | 112.6 | 11.0 | 853 | 0 |
| **Average** | **608** | **113.7** | **13.5** | **824** | **2.4** |
| **Max** | 766 | 118.8 | 24.0 | 1,777 | 28 |
| **Min** | 450 | 108.2 | 2.5 | 307 | 0 |

# APPENDIX A.5

## SALES VOLUME DATA – MULTIPLICATIVE MODEL

Table A.5: Sales Volume Data – Multiplicative Model

| Month | Q_Beer | Q_A1 | Q_A2 | Q_A3 | Q_A4 | Q_A5 | Q_A6 | Q_B1 | Q_B2 | Q_B3 | Q_B4 | Q_C1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 12.7 | 12.4 | 9.2 | 7.8 | 0.0 | 9.5 | 8.4 | 10.0 | 0.0 | 8.9 | 9.5 | 8.2 |
| 2 | 12.8 | 12.5 | 9.1 | 8.0 | 0.0 | 10.0 | 8.2 | 10.0 | 0.0 | 8.9 | 9.6 | 8.1 |
| 3 | 12.9 | 12.6 | 8.9 | 7.8 | 0.0 | 10.1 | 8.6 | 10.0 | 0.0 | 8.8 | 9.7 | 8.0 |
| 4 | 12.9 | 12.6 | 8.7 | 7.8 | 0.0 | 10.0 | 8.6 | 10.1 | 0.0 | 8.9 | 9.9 | 7.9 |
| 5 | 12.8 | 12.5 | 8.6 | 8.0 | 0.0 | 10.0 | 8.5 | 10.0 | 0.0 | 8.9 | 9.8 | 8.3 |
| 6 | 12.8 | 12.5 | 8.4 | 7.8 | 0.0 | 9.8 | 8.5 | 9.9 | 0.0 | 8.8 | 9.7 | 8.5 |
| 7 | 12.7 | 12.5 | 8.3 | 8.1 | 0.0 | 9.7 | 8.3 | 9.7 | 2.2 | 8.7 | 9.5 | 8.1 |
| 8 | 12.7 | 12.4 | 8.7 | 8.1 | 0.0 | 9.8 | 8.2 | 9.8 | 3.9 | 8.6 | 9.6 | 7.7 |
| 9 | 12.3 | 12.0 | 8.5 | 7.9 | 0.0 | 9.3 | 7.9 | 9.5 | 3.7 | 8.5 | 9.5 | 7.7 |
| 10 | 12.3 | 12.0 | 8.2 | 7.7 | 0.0 | 9.1 | 8.0 | 9.2 | 3.6 | 8.5 | 9.1 | 7.8 |
| 11 | 12.5 | 12.2 | 8.4 | 8.1 | 7.7 | 9.3 | 8.6 | 9.4 | 4.2 | 8.4 | 9.5 | 8.1 |
| 12 | 12.6 | 12.3 | 8.4 | 7.7 | 8.7 | 9.2 | 8.6 | 9.7 | 5.0 | 8.6 | 9.4 | 8.0 |
| 13 | 12.7 | 12.4 | 8.6 | 7.9 | 8.9 | 9.2 | 8.3 | 9.8 | 4.3 | 8.6 | 9.5 | 8.2 |
| 14 | 12.7 | 12.5 | 8.5 | 7.9 | 8.9 | 8.8 | 8.6 | 9.9 | 5.4 | 8.8 | 9.5 | 8.2 |
| 15 | 12.8 | 12.6 | 8.8 | 7.9 | 8.8 | 8.8 | 8.4 | 10.0 | 4.9 | 8.6 | 9.4 | 8.1 |
| 16 | 12.9 | 12.6 | 8.5 | 8.1 | 8.6 | 8.9 | 8.5 | 10.0 | 5.4 | 8.7 | 9.7 | 8.4 |
| 17 | 12.8 | 12.6 | 8.5 | 8.1 | 8.4 | 8.7 | 8.4 | 10.1 | 5.2 | 8.8 | 9.7 | 8.5 |
| 18 | 12.7 | 12.5 | 8.4 | 8.2 | 8.3 | 8.8 | 8.3 | 10.0 | 5.6 | 8.8 | 9.5 | 8.5 |
| 19 | 12.7 | 12.4 | 8.6 | 8.1 | 8.1 | 8.9 | 8.1 | 9.9 | 6.5 | 8.5 | 9.7 | 8.4 |
| 20 | 12.5 | 12.3 | 8.5 | 7.9 | 8.1 | 9.0 | 8.0 | 9.8 | 7.6 | 8.6 | 9.6 | 8.2 |
| 21 | 12.2 | 11.9 | 8.2 | 7.9 | 7.9 | 8.7 | 7.3 | 9.4 | 7.7 | 8.3 | 9.2 | 7.9 |
| 22 | 12.3 | 12.1 | 8.3 | 7.7 | 7.8 | 8.7 | 8.0 | 9.4 | 8.2 | 8.4 | 9.3 | 8.1 |
| 23 | 12.5 | 12.2 | 8.3 | 7.8 | 7.8 | 8.3 | 8.0 | 9.6 | 9.0 | 8.3 | 9.4 | 8.3 |
| 24 | 12.5 | 12.3 | 8.4 | 7.8 | 8.0 | 8.9 | 8.2 | 9.6 | 9.2 | 8.5 | 9.6 | 8.5 |
| 25 | 12.7 | 12.4 | 8.6 | 7.8 | 8.1 | 9.1 | 8.5 | 9.7 | 9.4 | 8.3 | 9.4 | 8.7 |
| 26 | 12.7 | 12.5 | 8.7 | 8.0 | 8.1 | 9.2 | 8.6 | 9.8 | 9.7 | 8.4 | 9.5 | 8.8 |
| 27 | 12.9 | 12.5 | 8.8 | 8.3 | 8.4 | 9.4 | 8.5 | 10.0 | 9.9 | 8.5 | 9.6 | 8.3 |
| 28 | 12.8 | 12.5 | 8.7 | 8.4 | 8.3 | 9.4 | 8.4 | 10.0 | 9.8 | 8.5 | 9.5 | 8.0 |
| 29 | 12.8 | 12.5 | 8.6 | 8.2 | 8.2 | 9.3 | 8.5 | 10.1 | 9.7 | 8.4 | 9.4 | 8.0 |
| 30 | 12.8 | 12.5 | 8.5 | 8.1 | 7.9 | 9.4 | 8.3 | 10.2 | 9.7 | 8.5 | 9.7 | 8.1 |
| 31 | 12.7 | 12.4 | 8.4 | 7.8 | 7.8 | 9.4 | 8.5 | 9.8 | 9.5 | 8.2 | 9.7 | 8.3 |
| 32 | 12.4 | 12.1 | 8.2 | 7.6 | 7.5 | 8.8 | 8.4 | 9.5 | 9.3 | 8.2 | 9.5 | 7.7 |
| 33 | 12.3 | 12.0 | 8.0 | 7.3 | 7.3 | 8.9 | 8.3 | 9.4 | 9.3 | 7.9 | 9.3 | 6.9 |
| 34 | 12.5 | 12.3 | 8.2 | 7.8 | 7.4 | 9.2 | 8.5 | 9.5 | 9.1 | 8.0 | 9.4 | 6.5 |
| 35 | 12.6 | 12.3 | 8.4 | 7.6 | 7.6 | 9.4 | 8.5 | 9.6 | 9.3 | 8.3 | 9.6 | 7.1 |
| 36 | 12.6 | 12.4 | 8.4 | 7.5 | 7.8 | 9.5 | 8.7 | 9.6 | 9.2 | 8.4 | 9.4 | 8.0 |
| 37 | 12.8 | 12.6 | 8.7 | 7.4 | 7.6 | 9.7 | 8.9 | 9.7 | 9.4 | 8.6 | 9.6 | 7.9 |
| 38 | 12.9 | 12.7 | 8.6 | 7.6 | 7.8 | 9.7 | 9.0 | 10.0 | 9.3 | 8.9 | 9.7 | 8.6 |

Table A.5 (continued)

| Month | Q_Beer | Q_A1 | Q_A2 | Q_A3 | Q_A4 | Q_A5 | Q_A6 | Q_B1 | Q_B2 | Q_B3 | Q_B4 | Q_C1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 39 | 13.0 | 12.7 | 8.5 | 7.7 | 7.7 | 9.8 | 8.8 | 10.1 | 9.4 | 8.8 | 9.7 | 8.6 |
| 40 | 13.0 | 12.7 | 8.6 | 7.8 | 7.6 | 9.8 | 8.8 | 10.2 | 9.4 | 8.7 | 9.6 | 8.8 |
| 41 | 13.0 | 12.7 | 8.5 | 7.6 | 7.7 | 9.5 | 8.7 | 10.3 | 9.3 | 8.9 | 9.5 | 8.7 |
| 42 | 12.8 | 12.6 | 8.5 | 7.3 | 7.8 | 9.3 | 8.4 | 10.2 | 9.1 | 8.9 | 9.4 | 8.6 |
| 43 | 12.7 | 12.5 | 8.5 | 7.3 | 7.6 | 9.3 | 8.2 | 10.1 | 8.8 | 8.8 | 9.4 | 8.5 |
| 44 | 12.1 | 11.8 | 8.1 | 7.2 | 7.5 | 8.8 | 7.6 | 9.7 | 8.6 | 8.3 | 8.9 | 7.8 |
| 45 | 12.5 | 12.2 | 8.5 | 7.4 | 7.8 | 9.2 | 7.5 | 10.0 | 8.8 | 9.0 | 9.2 | 7.9 |
| 46 | 12.6 | 12.4 | 8.6 | 7.5 | 7.8 | 9.0 | 7.6 | 9.9 | 8.8 | 8.9 | 9.2 | 8.3 |
| 47 | 12.7 | 12.4 | 8.8 | 7.6 | 7.7 | 9.2 | 7.6 | 9.8 | 8.6 | 8.7 | 9.3 | 8.3 |
| 48 | 12.7 | 12.5 | 8.8 | 7.6 | 7.7 | 9.2 | 7.6 | 9.9 | 8.7 | 8.8 | 9.3 | 8.5 |
| 49 | 12.9 | 12.6 | 8.8 | 7.4 | 7.5 | 9.3 | 7.3 | 10.1 | 8.8 | 8.9 | 9.6 | 8.7 |
| 50 | 12.9 | 12.7 | 8.9 | 7.7 | 7.7 | 9.4 | 7.5 | 10.1 | 9.1 | 9.0 | 9.5 | 8.9 |
| 51 | 13.0 | 12.7 | 9.0 | 7.7 | 7.6 | 9.5 | 6.9 | 10.0 | 9.2 | 9.1 | 9.6 | 8.8 |
| 52 | 13.0 | 12.7 | 8.7 | 7.5 | 7.3 | 9.7 | 6.9 | 10.4 | 9.0 | 9.0 | 9.6 | 8.9 |
| 53 | 12.9 | 12.7 | 8.7 | 7.4 | 7.4 | 9.8 | 7.0 | 10.3 | 8.8 | 9.0 | 9.6 | 8.5 |
| 54 | 12.8 | 12.6 | 8.7 | 7.3 | 7.4 | 9.7 | 6.6 | 10.2 | 8.7 | 9.1 | 9.5 | 8.8 |
| 55 | 12.5 | 12.2 | 8.5 | 6.9 | 7.4 | 9.3 | 5.7 | 9.8 | 8.3 | 8.7 | 9.4 | 8.5 |
| 56 | 12.1 | 11.9 | 8.2 | 6.9 | 6.9 | 8.8 | 3.8 | 9.3 | 7.9 | 8.5 | 9.0 | 8.0 |
| 57 | 12.5 | 12.2 | 8.4 | 7.2 | 7.1 | 9.1 | 3.6 | 9.6 | 8.6 | 8.7 | 9.4 | 8.4 |
| 58 | 12.5 | 12.2 | 8.6 | 7.2 | 7.1 | 9.2 | 2.9 | 9.6 | 8.1 | 8.6 | 9.3 | 8.5 |
| 59 | 12.5 | 12.3 | 8.8 | 7.3 | 7.6 | 9.5 | 2.3 | 9.7 | 7.8 | 8.7 | 9.3 | 8.5 |
| 60 | 12.6 | 12.4 | 8.8 | 7.3 | 7.2 | 9.6 | 4.1 | 9.8 | 7.7 | 8.9 | 9.5 | 8.4 |
| **Avg** | **12.7** | **12.4** | **8.6** | **7.7** | **6.5** | **9.3** | **7.7** | **9.8** | **7.1** | **8.6** | **9.5** | **8.2** |
| **Max** | 13.0 | 12.7 | 9.2 | 8.4 | 8.9 | 10.1 | 9.0 | 10.4 | 9.9 | 9.1 | 9.9 | 8.9 |
| **Min** | 12.1 | 11.8 | 8.0 | 6.9 | 0.0 | 8.3 | 2.3 | 9.2 | 0.0 | 7.9 | 8.9 | 6.5 |

# APPENDIX A.6

# PRICE DATA – MULTIPLICATIVE MODEL

Table A.6: Price Data – Multiplicative Model

| Month | p_Beer | p_A1 | p_A2 | p_A3 | p_A4 | p_A5 | p_A6 | p_B1 | p_B2 | p_B3 | p_B4 | p_C1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 4.9 | 4.9 | 5.1 | 5.0 | - | 4.6 | 4.7 | 4.9 | - | 5.1 | 4.6 | 4.4 |
| 2 | 4.9 | 4.9 | 5.0 | 5.1 | - | 4.6 | 4.7 | 4.9 | - | 5.1 | 4.7 | 4.4 |
| 3 | 5.0 | 5.0 | 5.1 | 5.0 | - | 4.6 | 4.8 | 5.0 | - | 5.1 | 4.8 | 4.4 |
| 4 | 5.0 | 5.0 | 5.2 | 5.1 | - | 4.6 | 4.8 | 5.1 | - | 5.2 | 4.8 | 4.4 |
| 5 | 5.1 | 5.1 | 5.3 | 5.1 | - | 4.7 | 4.9 | 5.1 | - | 5.2 | 4.8 | 4.5 |
| 6 | 5.1 | 5.1 | 5.3 | 5.2 | - | 4.7 | 4.8 | 5.1 | - | 5.2 | 4.8 | 4.5 |
| 7 | 5.0 | 5.1 | 5.3 | 5.2 | - | 4.7 | 4.9 | 5.1 | 5.4 | 5.2 | 4.8 | 4.4 |
| 8 | 5.1 | 5.1 | 5.2 | 5.2 | - | 4.7 | 4.9 | 5.1 | 4.7 | 5.3 | 4.8 | 4.5 |
| 9 | 5.1 | 5.1 | 5.3 | 5.2 | - | 4.8 | 4.9 | 5.2 | 4.6 | 5.2 | 4.9 | 4.3 |
| 10 | 5.1 | 5.1 | 5.2 | 5.2 | - | 4.8 | 4.9 | 5.1 | 4.7 | 5.2 | 4.9 | 4.3 |
| 11 | 5.1 | 5.1 | 5.2 | 5.1 | 5.2 | 4.8 | 4.9 | 5.1 | 4.8 | 5.2 | 4.9 | 4.3 |
| 12 | 5.1 | 5.1 | 5.3 | 5.2 | 5.2 | 4.8 | 4.9 | 5.2 | 5.0 | 5.2 | 5.0 | 4.1 |
| 13 | 5.1 | 5.1 | 5.3 | 5.2 | 5.2 | 4.9 | 5.0 | 5.2 | 4.8 | 5.3 | 4.9 | 4.2 |
| 14 | 5.1 | 5.1 | 5.2 | 5.2 | 5.2 | 4.9 | 5.0 | 5.2 | 4.9 | 5.3 | 5.0 | 4.4 |
| 15 | 5.1 | 5.1 | 5.3 | 5.2 | 5.2 | 4.9 | 5.0 | 5.2 | 5.0 | 5.3 | 5.0 | 4.4 |
| 16 | 5.2 | 5.2 | 5.2 | 5.2 | 5.3 | 4.9 | 5.0 | 5.2 | 4.9 | 5.3 | 5.0 | 4.3 |
| 17 | 5.1 | 5.2 | 5.2 | 5.2 | 5.2 | 4.8 | 4.9 | 5.2 | 4.9 | 5.3 | 4.9 | 4.4 |
| 18 | 5.1 | 5.1 | 5.2 | 5.2 | 5.2 | 4.8 | 4.9 | 5.2 | 4.8 | 5.3 | 4.9 | 4.3 |
| 19 | 5.1 | 5.1 | 5.2 | 5.2 | 5.2 | 4.8 | 4.9 | 5.2 | 5.0 | 5.2 | 4.8 | 4.3 |
| 20 | 5.0 | 5.1 | 5.2 | 5.1 | 5.2 | 4.8 | 4.9 | 5.1 | 5.0 | 5.1 | 4.8 | 4.3 |
| 21 | 5.0 | 5.0 | 5.1 | 5.1 | 5.1 | 4.9 | 4.8 | 5.1 | 5.0 | 5.1 | 4.9 | 4.2 |
| 22 | 5.0 | 5.0 | 5.1 | 5.1 | 5.1 | 4.8 | 4.8 | 5.1 | 5.0 | 5.1 | 4.8 | 4.2 |
| 23 | 5.1 | 5.1 | 5.2 | 5.2 | 5.2 | 4.8 | 4.8 | 5.1 | 5.1 | 5.2 | 4.8 | 4.2 |
| 24 | 5.0 | 5.1 | 5.2 | 5.2 | 5.2 | 4.9 | 4.8 | 5.1 | 5.0 | 5.2 | 4.8 | 4.1 |
| 25 | 5.0 | 5.0 | 5.1 | 5.1 | 5.2 | 4.9 | 4.8 | 5.1 | 5.0 | 5.2 | 4.8 | 4.2 |
| 26 | 5.0 | 5.0 | 5.2 | 5.1 | 5.2 | 4.9 | 4.9 | 5.1 | 5.0 | 5.1 | 4.9 | 4.2 |
| 27 | 5.1 | 5.1 | 5.2 | 5.2 | 5.2 | 4.9 | 4.9 | 5.1 | 5.0 | 5.2 | 4.8 | 4.3 |
| 28 | 5.0 | 5.1 | 5.2 | 5.2 | 5.2 | 4.9 | 4.9 | 5.1 | 5.0 | 5.1 | 4.8 | 4.3 |
| 29 | 5.0 | 5.0 | 5.2 | 5.1 | 5.2 | 4.8 | 4.8 | 5.1 | 5.0 | 5.1 | 4.8 | 4.4 |
| 30 | 5.0 | 5.0 | 5.1 | 5.1 | 5.1 | 4.8 | 4.8 | 5.0 | 4.9 | 5.1 | 4.7 | 4.3 |
| 31 | 5.0 | 5.0 | 5.1 | 5.1 | 5.1 | 4.8 | 4.7 | 5.1 | 5.0 | 5.1 | 4.7 | 4.3 |
| 32 | 5.0 | 5.0 | 5.1 | 5.1 | 5.1 | 4.7 | 4.7 | 5.0 | 5.0 | 5.1 | 4.7 | 4.3 |
| 33 | 5.0 | 5.1 | 5.2 | 5.2 | 5.2 | 4.8 | 4.7 | 5.1 | 5.0 | 5.2 | 4.7 | 4.6 |
| 34 | 5.0 | 5.1 | 5.2 | 5.2 | 5.2 | 4.8 | 4.9 | 5.1 | 5.0 | 5.1 | 4.7 | 4.7 |
| 35 | 5.0 | 5.1 | 5.1 | 5.2 | 5.1 | 4.8 | 4.9 | 5.1 | 5.0 | 5.1 | 4.8 | 4.7 |
| 36 | 5.0 | 5.0 | 5.1 | 5.1 | 5.1 | 4.8 | 4.9 | 5.0 | 5.0 | 5.1 | 4.8 | 4.7 |
| 37 | 5.0 | 5.1 | 5.1 | 5.1 | 5.2 | 4.9 | 5.0 | 5.1 | 5.0 | 5.1 | 4.8 | 4.7 |
| 38 | 5.1 | 5.1 | 5.2 | 5.2 | 5.2 | 4.9 | 5.0 | 5.1 | 5.1 | 5.2 | 4.9 | 4.6 |

Table A.6 (continued)

| Month | p_Beer | p_A1 | p_A2 | p_A3 | p_A4 | p_A5 | p_A6 | p_B1 | p_B2 | p_B3 | p_B4 | p_C1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 39 | 5.1 | 5.1 | 5.2 | 5.2 | 5.2 | 4.8 | 4.9 | 5.1 | 5.1 | 5.2 | 4.9 | 4.6 |
| 40 | 5.0 | 5.1 | 5.2 | 5.2 | 5.2 | 4.8 | 5.0 | 5.1 | 5.0 | 5.2 | 4.8 | 4.6 |
| 41 | 5.0 | 5.0 | 5.1 | 5.1 | 5.2 | 4.8 | 4.9 | 5.1 | 5.0 | 5.1 | 4.8 | 4.6 |
| 42 | 5.0 | 5.0 | 5.1 | 5.1 | 5.1 | 4.8 | 4.9 | 5.0 | 5.0 | 5.1 | 4.8 | 4.5 |
| 43 | 5.0 | 5.0 | 5.1 | 5.1 | 5.1 | 4.7 | 4.9 | 5.0 | 5.0 | 5.1 | 4.8 | 4.5 |
| 44 | 5.0 | 5.0 | 5.1 | 5.1 | 5.1 | 4.8 | 4.9 | 5.0 | 5.0 | 5.0 | 4.8 | 4.5 |
| 45 | 5.0 | 5.0 | 5.1 | 5.1 | 5.1 | 4.7 | 4.9 | 5.0 | 4.9 | 5.0 | 4.7 | 4.5 |
| 46 | 5.0 | 5.0 | 5.1 | 5.1 | 5.1 | 4.7 | 4.9 | 5.0 | 5.0 | 5.0 | 4.7 | 4.4 |
| 47 | 5.0 | 5.0 | 5.1 | 5.1 | 5.1 | 4.7 | 4.9 | 5.0 | 5.0 | 5.1 | 4.7 | 4.5 |
| 48 | 5.0 | 5.0 | 5.1 | 5.1 | 5.1 | 4.8 | 4.9 | 5.0 | 5.0 | 5.1 | 4.7 | 4.5 |
| 49 | 5.0 | 5.0 | 5.1 | 5.1 | 5.2 | 4.8 | 4.9 | 5.0 | 5.0 | 5.1 | 4.7 | 4.6 |
| 50 | 5.0 | 5.0 | 5.2 | 5.2 | 5.2 | 4.7 | 4.9 | 5.1 | 5.0 | 5.1 | 4.7 | 4.6 |
| 51 | 5.1 | 5.1 | 5.2 | 5.2 | 5.2 | 4.8 | 4.9 | 5.1 | 5.1 | 5.2 | 4.7 | 4.6 |
| 52 | 5.1 | 5.1 | 5.2 | 5.2 | 5.2 | 4.8 | 4.9 | 5.0 | 5.1 | 5.1 | 4.7 | 4.6 |
| 53 | 5.1 | 5.1 | 5.2 | 5.2 | 5.3 | 4.7 | 5.0 | 5.1 | 5.0 | 5.1 | 4.7 | 4.6 |
| 54 | 5.1 | 5.1 | 5.2 | 5.2 | 5.2 | 4.7 | 5.1 | 5.1 | 5.1 | 5.1 | 4.7 | 4.6 |
| 55 | 5.1 | 5.1 | 5.2 | 5.2 | 5.2 | 4.8 | 5.0 | 5.1 | 5.1 | 5.2 | 4.7 | 4.7 |
| 56 | 5.1 | 5.1 | 5.2 | 5.2 | 5.3 | 4.8 | 5.0 | 5.1 | 5.1 | 5.1 | 4.7 | 4.7 |
| 57 | 5.0 | 5.1 | 5.2 | 5.3 | 5.2 | 4.7 | 4.9 | 5.0 | 5.0 | 5.1 | 4.7 | 4.7 |
| 58 | 5.0 | 5.1 | 5.2 | 5.2 | 5.2 | 4.8 | 5.0 | 5.0 | 5.0 | 5.1 | 4.7 | 4.7 |
| 59 | 5.0 | 5.0 | 5.1 | 5.1 | 5.1 | 4.8 | 5.1 | 5.0 | 5.0 | 5.1 | 4.7 | 4.7 |
| 60 | 5.0 | 5.0 | 5.1 | 5.1 | 5.1 | 4.7 | 4.9 | 5.0 | 5.0 | 5.0 | 4.7 | 4.7 |
| **Average** | **5.0** | **5.1** | **5.2** | **5.1** | **5.2** | **4.8** | **4.9** | **5.1** | **5.0** | **5.2** | **4.8** | **4.4** |
| **Max** | 5.2 | 5.2 | 5.3 | 5.3 | 5.3 | 4.9 | 5.1 | 5.2 | 5.4 | 5.3 | 5.0 | 4.7 |
| **Min** | 4.9 | 4.9 | 5.0 | 5.0 | 5.1 | 4.6 | 4.7 | 4.9 | 4.6 | 5.0 | 4.6 | 4.1 |

# APPENDIX A.7

# DISTRIBUTION DATA – MULTIPLICATIVE MODEL

Table A.7: Distribution Data – Multiplicative Model

| Month | d_Beer | d_A1 | d_A2 | d_A3 | d_A4 | d_A5 | d_A6 | d_B1 | d_B2 | d_B3 | d_B4 | d_C1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 3.6 | 3.5 | 2.7 | 2.1 | 0.0 | 2.4 | 2.1 | 2.4 | 0.0 | 2.2 | 2.3 | 0.9 |
| 2 | 3.6 | 3.5 | 2.6 | 1.9 | 0.0 | 2.4 | 2.0 | 2.3 | 0.0 | 2.1 | 2.4 | 1.0 |
| 3 | 3.6 | 3.5 | 2.4 | 1.8 | 0.0 | 2.4 | 2.2 | 2.3 | 0.0 | 2.2 | 2.4 | 0.7 |
| 4 | 3.6 | 3.5 | 2.3 | 2.0 | 0.0 | 2.4 | 2.2 | 2.3 | 0.0 | 2.1 | 2.4 | 0.6 |
| 5 | 3.6 | 3.5 | 2.3 | 2.1 | 0.0 | 2.4 | 2.2 | 2.3 | 0.0 | 2.2 | 2.4 | 0.7 |
| 6 | 3.6 | 3.5 | 2.3 | 2.1 | 0.0 | 2.3 | 2.1 | 2.2 | 0.0 | 2.2 | 2.4 | 0.5 |
| 7 | 3.6 | 3.5 | 2.2 | 2.2 | 0.0 | 2.2 | 2.0 | 2.1 | 0.0 | 2.1 | 2.3 | 0.1 |
| 8 | 3.6 | 3.5 | 2.3 | 2.3 | 0.0 | 2.2 | 1.9 | 2.1 | 0.0 | 2.1 | 2.4 | 0.1 |
| 9 | 3.6 | 3.5 | 2.3 | 2.2 | 0.0 | 2.1 | 1.9 | 2.0 | 0.0 | 2.1 | 2.3 | 0.1 |
| 10 | 3.5 | 3.4 | 2.3 | 2.1 | 0.0 | 2.1 | 2.0 | 1.9 | 0.0 | 2.0 | 2.2 | 0.2 |
| 11 | 3.5 | 3.4 | 2.3 | 2.1 | 2.2 | 2.0 | 2.1 | 2.0 | 0.0 | 2.0 | 2.2 | 0.5 |
| 12 | 3.5 | 3.4 | 2.3 | 2.1 | 2.6 | 2.1 | 2.1 | 2.1 | 0.3 | 2.1 | 2.3 | 0.7 |
| 13 | 3.5 | 3.4 | 2.2 | 2.0 | 2.7 | 2.1 | 2.0 | 2.2 | 0.4 | 2.1 | 2.3 | 0.5 |
| 14 | 3.5 | 3.5 | 2.3 | 2.0 | 2.7 | 1.9 | 2.0 | 2.3 | 0.4 | 2.2 | 2.3 | 0.6 |
| 15 | 3.5 | 3.5 | 2.3 | 2.0 | 2.6 | 1.9 | 1.9 | 2.3 | 0.6 | 2.1 | 2.3 | 0.3 |
| 16 | 3.6 | 3.5 | 2.3 | 2.2 | 2.5 | 1.9 | 2.0 | 2.3 | 0.5 | 2.1 | 2.3 | 0.7 |
| 17 | 3.5 | 3.5 | 2.2 | 2.3 | 2.5 | 1.8 | 1.9 | 2.3 | 0.5 | 2.1 | 2.4 | 0.6 |
| 18 | 3.5 | 3.5 | 2.3 | 2.3 | 2.4 | 1.8 | 1.8 | 2.4 | 0.5 | 2.1 | 2.3 | 0.6 |
| 19 | 3.5 | 3.5 | 2.3 | 2.3 | 2.5 | 1.9 | 1.9 | 2.4 | 0.8 | 2.2 | 2.3 | 0.7 |
| 20 | 3.5 | 3.4 | 2.3 | 2.3 | 2.4 | 1.7 | 1.8 | 2.3 | 1.3 | 2.2 | 2.3 | 0.6 |
| 21 | 3.5 | 3.4 | 2.3 | 2.3 | 2.4 | 1.7 | 1.8 | 2.3 | 1.5 | 2.1 | 2.1 | 0.3 |
| 22 | 3.5 | 3.4 | 2.2 | 2.3 | 2.3 | 1.7 | 1.9 | 2.3 | 1.9 | 2.1 | 2.2 | 0.6 |
| 23 | 3.5 | 3.4 | 2.2 | 2.2 | 2.4 | 1.7 | 1.9 | 2.3 | 2.2 | 2.1 | 2.3 | 0.9 |
| 24 | 3.5 | 3.4 | 2.3 | 2.2 | 2.4 | 2.0 | 2.0 | 2.2 | 2.3 | 2.1 | 2.3 | 0.6 |
| 25 | 3.5 | 3.4 | 2.4 | 2.2 | 2.6 | 2.2 | 2.2 | 2.2 | 2.4 | 2.1 | 2.3 | 0.8 |
| 26 | 3.5 | 3.4 | 2.4 | 2.4 | 2.5 | 2.3 | 2.2 | 2.3 | 2.5 | 2.1 | 2.3 | 0.6 |
| 27 | 3.5 | 3.4 | 2.4 | 2.4 | 2.6 | 2.3 | 2.1 | 2.3 | 2.5 | 2.1 | 2.3 | 0.4 |
| 28 | 3.5 | 3.4 | 2.6 | 2.4 | 2.6 | 2.2 | 2.1 | 2.3 | 2.5 | 2.0 | 2.2 | 0.4 |
| 29 | 3.5 | 3.4 | 2.5 | 2.3 | 2.5 | 2.2 | 2.1 | 2.3 | 2.6 | 2.0 | 2.2 | 0.4 |
| 30 | 3.5 | 3.4 | 2.6 | 2.3 | 2.5 | 2.2 | 2.1 | 2.3 | 2.6 | 2.0 | 2.3 | 0.6 |
| 31 | 3.5 | 3.4 | 2.5 | 2.3 | 2.5 | 2.2 | 2.0 | 2.3 | 2.5 | 1.9 | 2.4 | 0.6 |
| 32 | 3.5 | 3.4 | 2.4 | 2.3 | 2.4 | 2.1 | 2.1 | 2.3 | 2.5 | 1.9 | 2.5 | 0.5 |
| 33 | 3.5 | 3.4 | 2.4 | 2.2 | 2.4 | 2.0 | 2.0 | 2.3 | 2.5 | 1.8 | 2.4 | 0.3 |
| 34 | 3.5 | 3.5 | 2.4 | 2.2 | 2.3 | 2.2 | 2.2 | 2.3 | 2.5 | 1.9 | 2.4 | 0.3 |
| 35 | 3.5 | 3.5 | 2.5 | 2.2 | 2.3 | 2.4 | 2.4 | 2.3 | 2.5 | 2.0 | 2.5 | 1.0 |
| 36 | 3.5 | 3.5 | 2.6 | 2.3 | 2.4 | 2.5 | 2.4 | 2.2 | 2.5 | 2.0 | 2.4 | 1.4 |
| 37 | 3.5 | 3.5 | 2.6 | 2.4 | 2.5 | 2.7 | 2.4 | 2.3 | 2.6 | 2.0 | 2.5 | 1.5 |
| 38 | 3.6 | 3.5 | 2.7 | 2.4 | 2.5 | 2.7 | 2.4 | 2.4 | 2.6 | 2.1 | 2.5 | 1.7 |

Table A.7 (continued)

| Month | d_Beer | d_A1 | d_A2 | d_A3 | d_A4 | d_A5 | d_A6 | d_B1 | d_B2 | d_B3 | d_B4 | d_C1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 39 | 3.6 | 3.5 | 2.7 | 2.5 | 2.5 | 2.8 | 2.3 | 2.4 | 2.5 | 2.1 | 2.5 | 1.8 |
| 40 | 3.6 | 3.5 | 2.6 | 2.5 | 2.5 | 2.8 | 2.3 | 2.5 | 2.5 | 2.2 | 2.5 | 1.7 |
| 41 | 3.6 | 3.5 | 2.7 | 2.4 | 2.5 | 2.7 | 2.2 | 2.5 | 2.5 | 2.3 | 2.4 | 1.7 |
| 42 | 3.6 | 3.5 | 2.6 | 2.5 | 2.6 | 2.6 | 2.2 | 2.5 | 2.5 | 2.3 | 2.4 | 1.6 |
| 43 | 3.6 | 3.5 | 2.6 | 2.5 | 2.7 | 2.7 | 2.2 | 2.6 | 2.4 | 2.3 | 2.4 | 1.6 |
| 44 | 3.6 | 3.5 | 2.6 | 2.4 | 2.6 | 2.7 | 2.2 | 2.5 | 2.4 | 2.2 | 2.3 | 1.3 |
| 45 | 3.6 | 3.5 | 2.6 | 2.5 | 2.6 | 2.7 | 2.2 | 2.5 | 2.4 | 2.2 | 2.4 | 1.4 |
| 46 | 3.5 | 3.5 | 2.6 | 2.4 | 2.6 | 2.7 | 2.1 | 2.5 | 2.4 | 2.3 | 2.4 | 1.4 |
| 47 | 3.5 | 3.5 | 2.7 | 2.4 | 2.6 | 2.8 | 2.1 | 2.4 | 2.4 | 2.2 | 2.4 | 1.4 |
| 48 | 3.6 | 3.5 | 2.7 | 2.4 | 2.6 | 2.8 | 2.2 | 2.4 | 2.5 | 2.3 | 2.3 | 1.5 |
| 49 | 3.6 | 3.5 | 2.8 | 2.5 | 2.6 | 2.8 | 2.0 | 2.4 | 2.6 | 2.3 | 2.4 | 1.7 |
| 50 | 3.6 | 3.5 | 2.7 | 2.5 | 2.5 | 2.8 | 1.9 | 2.4 | 2.6 | 2.3 | 2.4 | 1.6 |
| 51 | 3.6 | 3.5 | 2.7 | 2.4 | 2.5 | 2.8 | 1.6 | 2.5 | 2.7 | 2.3 | 2.5 | 1.6 |
| 52 | 3.6 | 3.5 | 2.6 | 2.3 | 2.4 | 2.8 | 1.5 | 2.5 | 2.7 | 2.4 | 2.4 | 1.6 |
| 53 | 3.5 | 3.5 | 2.7 | 2.3 | 2.3 | 2.7 | 1.3 | 2.5 | 2.5 | 2.4 | 2.4 | 1.4 |
| 54 | 3.5 | 3.5 | 2.7 | 2.3 | 2.3 | 2.7 | 1.1 | 2.5 | 2.5 | 2.4 | 2.3 | 1.6 |
| 55 | 3.5 | 3.4 | 2.6 | 2.2 | 2.3 | 2.6 | 0.6 | 2.5 | 2.5 | 2.2 | 2.3 | 1.6 |
| 56 | 3.5 | 3.5 | 2.5 | 2.2 | 2.3 | 2.6 | 0.4 | 2.4 | 2.3 | 2.2 | 2.4 | 1.5 |
| 57 | 3.5 | 3.5 | 2.6 | 2.2 | 2.4 | 2.6 | 0.5 | 2.4 | 2.4 | 2.3 | 2.4 | 1.7 |
| 58 | 3.5 | 3.5 | 2.6 | 2.2 | 2.3 | 2.7 | 0.5 | 2.4 | 2.4 | 2.4 | 2.4 | 1.7 |
| 59 | 3.5 | 3.5 | 2.6 | 2.3 | 2.4 | 2.8 | 0.4 | 2.4 | 2.3 | 2.4 | 2.5 | 1.7 |
| 60 | 3.5 | 3.5 | 2.7 | 2.3 | 2.3 | 2.8 | 0.5 | 2.5 | 2.3 | 2.5 | 2.5 | 1.5 |
| **Average** | **3.5** | **3.5** | **2.5** | **2.3** | **2.1** | **2.4** | **1.9** | **2.3** | **1.7** | **2.2** | **2.4** | **1.0** |
| **Max** | 3.6 | 3.5 | 2.8 | 2.5 | 2.7 | 2.8 | 2.4 | 2.6 | 2.7 | 2.5 | 2.5 | 1.8 |
| **Min** | 3.5 | 3.4 | 2.2 | 1.8 | 0.0 | 1.7 | 0.4 | 1.9 | 0.0 | 1.8 | 2.1 | 0.1 |

# APPENDIX A.8

## ENVIRONMENTAL FACTORS – MULTIPLICATIVE MODEL

Table A.8: Environmental Factors – Multiplicative Model

| Month | p_raki ('000 TL) | GDP ($10^{12}$ TL) | Temp ($C^0$) | Tourist ('000) | Ramadan (days) |
|---|---|---|---|---|---|
| 1 | 6.3 | 4.7 | 2.8 | 6.9 | 0.0 |
| 2 | 6.3 | 4.7 | 3.1 | 7.0 | 0.0 |
| 3 | 6.4 | 4.7 | 3.2 | 7.1 | 0.0 |
| 4 | 6.4 | 4.7 | 3.2 | 7.3 | 0.0 |
| 5 | 6.4 | 4.7 | 3.0 | 7.2 | 0.0 |
| 6 | 6.5 | 4.7 | 2.7 | 6.9 | 0.0 |
| 7 | 6.5 | 4.7 | 2.3 | 6.3 | 0.0 |
| 8 | 6.5 | 4.7 | 1.9 | 6.0 | 0.7 |
| 9 | 6.3 | 4.7 | 1.6 | 5.8 | 3.4 |
| 10 | 6.3 | 4.7 | 0.9 | 5.9 | 0.0 |
| 11 | 6.3 | 4.7 | 1.6 | 6.2 | 0.0 |
| 12 | 6.2 | 4.7 | 2.4 | 6.5 | 0.0 |
| 13 | 6.2 | 4.7 | 2.8 | 6.9 | 0.0 |
| 14 | 6.2 | 4.7 | 3.1 | 7.0 | 0.0 |
| 15 | 6.3 | 4.8 | 3.2 | 7.2 | 0.0 |
| 16 | 6.3 | 4.8 | 3.2 | 7.3 | 0.0 |
| 17 | 6.3 | 4.8 | 3.0 | 7.1 | 0.0 |
| 18 | 6.3 | 4.8 | 2.7 | 6.9 | 0.0 |
| 19 | 6.3 | 4.8 | 2.3 | 6.2 | 0.0 |
| 20 | 6.3 | 4.8 | 1.9 | 5.9 | 2.6 |
| 21 | 6.1 | 4.7 | 1.6 | 5.9 | 2.9 |
| 22 | 6.1 | 4.7 | 0.9 | 5.9 | 0.0 |
| 23 | 6.1 | 4.7 | 1.6 | 6.0 | 0.0 |
| 24 | 6.1 | 4.7 | 2.4 | 6.1 | 0.0 |
| 25 | 6.1 | 4.7 | 2.8 | 6.5 | 0.0 |
| 26 | 6.1 | 4.7 | 3.1 | 6.7 | 0.0 |
| 27 | 6.3 | 4.7 | 3.2 | 6.8 | 0.0 |
| 28 | 6.3 | 4.7 | 3.2 | 7.0 | 0.0 |
| 29 | 6.3 | 4.7 | 3.0 | 6.8 | 0.0 |
| 30 | 6.4 | 4.7 | 2.7 | 6.7 | 0.0 |
| 31 | 6.4 | 4.7 | 2.3 | 6.1 | 0.0 |
| 32 | 6.4 | 4.7 | 1.9 | 5.8 | 3.2 |
| 33 | 6.6 | 4.7 | 1.6 | 5.8 | 1.9 |
| 34 | 6.6 | 4.7 | 0.9 | 5.9 | 0.0 |
| 35 | 6.6 | 4.7 | 1.6 | 6.1 | 0.0 |
| 36 | 6.6 | 4.7 | 2.4 | 6.6 | 0.0 |
| 37 | 6.6 | 4.7 | 2.8 | 6.9 | 0.0 |

Table A.8 (continued)

| Month | p_raki ('000 TL) | GDP ($10^{12}$ TL) | Temp (C0) | Tourist ('000) | Ramadan (days) |
|---|---|---|---|---|---|
| 38 | 6.6 | 4.7 | 3.1 | 7.0 | 0.0 |
| 39 | 6.5 | 4.8 | 3.2 | 7.3 | 0.0 |
| 40 | 6.5 | 4.8 | 3.2 | 7.3 | 0.0 |
| 41 | 6.5 | 4.8 | 3.0 | 7.2 | 0.0 |
| 42 | 6.5 | 4.8 | 2.7 | 7.1 | 0.0 |
| 43 | 6.5 | 4.8 | 2.3 | 6.4 | 1.4 |
| 44 | 6.5 | 4.8 | 1.9 | 6.0 | 3.3 |
| 45 | 6.5 | 4.8 | 1.6 | 5.9 | 0.0 |
| 46 | 6.5 | 4.8 | 0.9 | 6.0 | 0.0 |
| 47 | 6.5 | 4.8 | 1.6 | 6.3 | 0.0 |
| 48 | 6.4 | 4.8 | 2.4 | 6.8 | 0.0 |
| 49 | 6.4 | 4.8 | 2.8 | 7.1 | 0.0 |
| 50 | 6.4 | 4.8 | 3.1 | 7.2 | 0.0 |
| 51 | 6.5 | 4.7 | 3.2 | 7.5 | 0.0 |
| 52 | 6.5 | 4.7 | 3.2 | 7.4 | 0.0 |
| 53 | 6.5 | 4.7 | 3.0 | 7.3 | 0.0 |
| 54 | 6.6 | 4.7 | 2.7 | 7.0 | 0.0 |
| 55 | 6.6 | 4.7 | 2.3 | 6.3 | 2.7 |
| 56 | 6.6 | 4.7 | 1.9 | 6.0 | 2.8 |
| 57 | 6.5 | 4.7 | 1.6 | 5.7 | 0.0 |
| 58 | 6.5 | 4.7 | 0.9 | 6.1 | 0.0 |
| 59 | 6.5 | 4.7 | 1.6 | 6.5 | 0.0 |
| 60 | 6.5 | 4.7 | 2.4 | 6.7 | 0.0 |
| **Average** | **6.4** | **4.7** | **2.4** | **6.6** | **0.4** |
| **Max** | 6.6 | 4.8 | 3.2 | 7.5 | 3.4 |
| **Min** | 6.1 | 4.7 | 0.9 | 5.7 | 0.0 |

# APPENDIX A.9

## CORRELATION BETWEEN MARKET-LEVEL MODEL VARIABLES

Table A.9: Proximity Matrix – Market-Level Model

| | **d_Beer** | **p_Beer** | **Temp** | **GDP** | **Ramadan** | **Tourist** | **p_raki** | **Trend** |
|---|---|---|---|---|---|---|---|---|
| **d_Beer** | | -0.041 | 0.385 | 0.258 | -0.134 | 0.563 | 0.369 | -0.106 |
| **p_Beer** | -0.041 | | 0.185 | 0.152 | -0.038 | 0.217 | -0.108 | -0.113 |
| **Temp** | 0.385 | 0.185 | | -0.091 | -0.341 | **0.900** | -0.116 | -0.163 |
| **GDP** | 0.258 | 0.152 | -0.091 | | 0.035 | 0.017 | -0.150 | 0.088 |
| **Ramadan** | -0.134 | -0.038 | -0.341 | 0.035 | | -0.399 | 0.006 | 0.037 |
| **Tourist** | 0.563 | 0.217 | **0.900** | 0.017 | -0.399 | | 0.079 | 0.011 |
| **p_raki** | 0.369 | -0.108 | -0.116 | -0.150 | 0.006 | 0.079 | | 0.579 |
| **Trend** | -0.106 | -0.113 | -0.163 | 0.088 | 0.037 | 0.011 | 0.579 | |

# APPENDIX A.10

# CORRELATION BETWEEN BRAND-LEVEL MODEL VARIABLES

Table A.10: Proximity Matrix – Brand-Level Model

| | d_A1 | d_A2 | d_A3 | d_A4 | d_A5 | d_A6 | d_B1 |
|---|---|---|---|---|---|---|---|
| **d_A1** | | 0.681 | 0.549 | 0.223 | 0.751 | 0.072 | 0.607 |
| **d_A2** | 0.681 | | 0.695 | 0.079 | 0.931 | -0.092 | 0.637 |
| **d_A3** | 0.549 | 0.695 | | 0.247 | 0.649 | 0.295 | 0.585 |
| **d_A4** | 0.223 | 0.079 | 0.247 | | 0.083 | 0.489 | 0.170 |
| **d_A5** | 0.751 | 0.931 | 0.649 | 0.083 | | -0.108 | 0.684 |
| **d_A6** | 0.072 | -0.092 | 0.295 | 0.489 | -0.108 | | -0.269 |
| **d_B1** | 0.607 | 0.637 | 0.585 | 0.170 | 0.684 | -0.269 | |
| **d_B2** | 0.286 | 0.744 | 0.605 | -0.045 | 0.682 | 0.089 | 0.402 |
| **d_B3** | 0.523 | 0.573 | 0.316 | -0.007 | 0.637 | -0.596 | 0.722 |
| **d_B4** | 0.653 | 0.597 | 0.410 | 0.018 | 0.696 | 0.051 | 0.452 |
| **d_C1** | 0.715 | 0.818 | 0.559 | -0.038 | 0.916 | -0.235 | 0.685 |
| **GDP** | 0.383 | -0.007 | 0.390 | 0.561 | 0.081 | 0.489 | 0.256 |
| **p_A1** | -0.036 | -0.446 | -0.551 | -0.129 | -0.373 | -0.211 | -0.287 |
| **p_A2** | -0.108 | -0.425 | -0.558 | -0.083 | -0.344 | -0.262 | -0.270 |
| **p_A3** | 0.058 | -0.219 | -0.405 | -0.192 | -0.155 | -0.364 | -0.015 |
| **p_A4** | 0.042 | -0.177 | -0.362 | -0.183 | -0.160 | -0.317 | -0.060 |
| **p_A5** | -0.454 | -0.575 | -0.350 | 0.243 | -0.586 | 0.413 | -0.565 |
| **p_A6** | 0.447 | 0.270 | -0.110 | 0.006 | 0.406 | -0.366 | 0.364 |
| **p_B1** | -0.230 | -0.617 | -0.502 | 0.035 | -0.602 | 0.122 | -0.405 |
| **p_B2** | 0.045 | 0.428 | 0.315 | -0.245 | 0.383 | -0.211 | 0.331 |
| **p_B3** | -0.173 | -0.626 | -0.488 | 0.107 | -0.593 | 0.066 | -0.406 |
| **p_B4** | -0.154 | -0.597 | -0.390 | 0.303 | -0.514 | 0.304 | -0.393 |
| **p_C1** | 0.620 | 0.684 | 0.261 | -0.314 | 0.727 | -0.265 | 0.490 |
| **p_raki** | 0.583 | 0.658 | 0.300 | -0.265 | 0.705 | -0.102 | 0.459 |
| **Ramadan** | -0.186 | -0.093 | -0.030 | -0.167 | -0.101 | -0.129 | 0.092 |
| **Temp** | 0.313 | 0.179 | 0.198 | 0.414 | 0.112 | 0.205 | 0.114 |
| **Tourist** | 0.592 | 0.356 | 0.300 | 0.300 | 0.330 | 0.075 | 0.294 |
| **Trend** | 0.537 | 0.854 | 0.486 | -0.208 | 0.880 | -0.446 | 0.696 |

Table A.10 (continued)

| | d_B2 | d_B3 | d_B4 | d_C1 | GDP | p_A1 | p_A2 |
|---|---|---|---|---|---|---|---|
| **d_A1** | 0.286 | 0.523 | 0.653 | 0.715 | 0.383 | -0.036 | -0.108 |
| **d_A2** | 0.744 | 0.573 | 0.597 | 0.818 | -0.007 | -0.446 | -0.425 |
| **d_A3** | 0.605 | 0.316 | 0.410 | 0.559 | 0.390 | -0.551 | -0.558 |
| **d_A4** | -0.045 | -0.007 | 0.018 | -0.038 | 0.561 | -0.129 | -0.083 |
| **d_A5** | 0.682 | 0.637 | 0.696 | 0.916 | 0.081 | -0.373 | -0.344 |
| **d_A6** | 0.089 | -0.596 | 0.051 | -0.235 | 0.489 | -0.211 | -0.262 |
| **d_B1** | 0.402 | 0.722 | 0.452 | 0.685 | 0.256 | -0.287 | -0.270 |
| **d_B2** | | 0.175 | 0.457 | 0.517 | -0.264 | -0.592 | -0.507 |
| **d_B3** | 0.175 | | 0.293 | 0.710 | 0.098 | -0.118 | -0.037 |
| **d_B4** | 0.457 | 0.293 | | 0.687 | 0.071 | -0.155 | -0.208 |
| **d_C1** | 0.517 | 0.710 | 0.687 | | 0.088 | -0.204 | -0.178 |
| **GDP** | -0.264 | 0.098 | 0.071 | 0.088 | | -0.141 | -0.186 |
| **p_A1** | -0.592 | -0.118 | -0.155 | -0.204 | -0.141 | | 0.917 |
| **p_A2** | -0.507 | -0.037 | -0.208 | -0.178 | -0.186 | 0.917 | |
| **p_A3** | -0.281 | 0.062 | -0.031 | 0.035 | -0.263 | 0.815 | 0.809 |
| **p_A4** | -0.199 | 0.012 | -0.088 | -0.039 | -0.312 | 0.827 | 0.835 |
| **p_A5** | -0.365 | -0.545 | -0.434 | -0.541 | 0.016 | 0.368 | 0.365 |
| **p_A6** | -0.124 | 0.518 | 0.270 | 0.525 | -0.034 | 0.469 | 0.442 |
| **p_B1** | -0.589 | -0.436 | -0.326 | -0.476 | 0.015 | 0.850 | 0.785 |
| **p_B2** | 0.606 | 0.215 | 0.253 | 0.421 | -0.332 | -0.163 | -0.056 |
| **p_B3** | -0.678 | -0.306 | -0.323 | -0.442 | 0.065 | 0.875 | 0.814 |
| **p_B4** | -0.725 | -0.276 | -0.292 | -0.389 | 0.316 | 0.589 | 0.575 |
| **p_C1** | 0.527 | 0.395 | 0.663 | 0.721 | -0.240 | -0.059 | -0.136 |
| **p_raki** | 0.591 | 0.235 | 0.711 | 0.647 | -0.207 | -0.168 | -0.244 |
| **Ramadan** | -0.006 | -0.131 | -0.114 | -0.087 | -0.051 | -0.178 | -0.172 |
| **Temp** | 0.076 | 0.068 | 0.062 | 0.065 | 0.051 | 0.387 | 0.415 |
| **Tourist** | 0.102 | 0.333 | 0.259 | 0.322 | 0.151 | 0.369 | 0.378 |
| **Trend** | 0.708 | 0.685 | 0.585 | 0.838 | -0.200 | -0.408 | -0.374 |

Table A.10 (continued)

| | p_A3 | p_A4 | p_A5 | p_A6 | p_B1 | p_B2 | p_B3 |
|---|---|---|---|---|---|---|---|
| **d_A1** | 0.058 | 0.042 | -0.454 | 0.447 | -0.230 | 0.045 | -0.173 |
| **d_A2** | -0.219 | -0.177 | -0.575 | 0.270 | -0.617 | 0.428 | -0.626 |
| **d_A3** | -0.405 | -0.362 | -0.350 | -0.110 | -0.502 | 0.315 | -0.488 |
| **d_A4** | -0.192 | -0.183 | 0.243 | 0.006 | 0.035 | -0.245 | 0.107 |
| **d_A5** | -0.155 | -0.160 | -0.586 | 0.406 | -0.602 | 0.383 | -0.593 |
| **d_A6** | -0.364 | -0.317 | 0.413 | -0.366 | 0.122 | -0.211 | 0.066 |
| **d_B1** | -0.015 | -0.060 | -0.565 | 0.364 | -0.405 | 0.331 | -0.406 |
| **d_B2** | -0.281 | -0.199 | -0.365 | -0.124 | -0.589 | 0.606 | -0.678 |
| **d_B3** | 0.062 | 0.012 | -0.545 | 0.518 | -0.436 | 0.215 | -0.306 |
| **d_B4** | -0.031 | -0.088 | -0.434 | 0.270 | -0.326 | 0.253 | -0.323 |
| **d_C1** | 0.035 | -0.039 | -0.541 | 0.525 | -0.476 | 0.421 | -0.442 |
| **GDP** | -0.263 | -0.312 | 0.016 | -0.034 | 0.015 | -0.332 | 0.065 |
| **p_A1** | 0.815 | 0.827 | 0.368 | 0.469 | 0.850 | -0.163 | 0.875 |
| **p_A2** | 0.809 | 0.835 | 0.365 | 0.442 | 0.785 | -0.056 | 0.814 |
| **p_A3** | | 0.889 | 0.149 | 0.475 | 0.634 | 0.055 | 0.646 |
| **p_A4** | 0.889 | | 0.213 | 0.401 | 0.696 | 0.152 | 0.684 |
| **p_A5** | 0.149 | 0.213 | | -0.075 | 0.592 | -0.082 | 0.584 |
| **p_A6** | 0.475 | 0.401 | -0.075 | | 0.134 | 0.112 | 0.193 |
| **p_B1** | 0.634 | 0.696 | 0.592 | 0.134 | | -0.193 | 0.916 |
| **p_B2** | 0.055 | 0.152 | -0.082 | 0.112 | -0.193 | | -0.293 |
| **p_B3** | 0.646 | 0.684 | 0.584 | 0.193 | 0.916 | -0.293 | |
| **p_B4** | 0.320 | 0.262 | 0.705 | 0.244 | 0.656 | -0.420 | 0.737 |
| **p_C1** | 0.183 | 0.127 | -0.543 | 0.446 | -0.343 | 0.406 | -0.403 |
| **p_raki** | 0.059 | 0.015 | -0.596 | 0.312 | -0.379 | 0.362 | -0.478 |
| **Ramadan** | -0.134 | -0.117 | -0.159 | -0.174 | -0.048 | 0.071 | -0.230 |
| **Temp** | 0.374 | 0.514 | 0.393 | 0.260 | 0.405 | 0.039 | 0.467 |
| **Tourist** | 0.362 | 0.484 | 0.082 | 0.395 | 0.272 | 0.039 | 0.373 |
| **Trend** | -0.091 | -0.123 | -0.727 | 0.321 | -0.676 | 0.519 | -0.697 |

Table A.10 (continued)

| | p_B4 | p_C1 | p_raki | Ramadan | Temp | Tourist | Trend |
|---|---|---|---|---|---|---|---|
| **d_A1** | -0.154 | 0.620 | 0.583 | -0.186 | 0.313 | 0.592 | 0.537 |
| **d_A2** | -0.597 | 0.684 | 0.658 | -0.093 | 0.179 | 0.356 | 0.854 |
| **d_A3** | -0.390 | 0.261 | 0.300 | -0.030 | 0.198 | 0.300 | 0.486 |
| **d_A4** | 0.303 | -0.314 | -0.265 | -0.167 | 0.414 | 0.300 | -0.208 |
| **d_A5** | -0.514 | 0.727 | 0.705 | -0.101 | 0.112 | 0.330 | 0.880 |
| **d_A6** | 0.304 | -0.265 | -0.102 | -0.129 | 0.205 | 0.075 | -0.446 |
| **d_B1** | -0.393 | 0.490 | 0.459 | 0.092 | 0.114 | 0.294 | 0.696 |
| **d_B2** | -0.725 | 0.527 | 0.591 | -0.006 | 0.076 | 0.102 | 0.708 |
| **d_B3** | -0.276 | 0.395 | 0.235 | -0.131 | 0.068 | 0.333 | 0.685 |
| **d_B4** | -0.292 | 0.663 | 0.711 | -0.114 | 0.062 | 0.259 | 0.585 |
| **d_C1** | -0.389 | 0.721 | 0.647 | -0.087 | 0.065 | 0.322 | 0.838 |
| **GDP** | 0.316 | -0.240 | -0.207 | -0.051 | 0.051 | 0.151 | -0.200 |
| **p_A1** | 0.589 | -0.059 | -0.168 | -0.178 | 0.387 | 0.369 | -0.408 |
| **p_A2** | 0.575 | -0.136 | -0.244 | -0.172 | 0.415 | 0.378 | -0.374 |
| **p_A3** | 0.320 | 0.183 | 0.059 | -0.134 | 0.374 | 0.362 | -0.091 |
| **p_A4** | 0.262 | 0.127 | 0.015 | -0.117 | 0.514 | 0.484 | -0.123 |
| **p_A5** | 0.705 | -0.543 | -0.596 | -0.159 | 0.393 | 0.082 | -0.727 |
| **p_A6** | 0.244 | 0.446 | 0.312 | -0.174 | 0.260 | 0.395 | 0.321 |
| **p_B1** | 0.656 | -0.343 | -0.379 | -0.048 | 0.405 | 0.272 | -0.676 |
| **p_B2** | -0.420 | 0.406 | 0.362 | 0.071 | 0.039 | 0.039 | 0.519 |
| **p_B3** | 0.737 | -0.403 | -0.478 | -0.230 | 0.467 | 0.373 | -0.697 |
| **p_B4** | | -0.513 | -0.568 | -0.205 | 0.386 | 0.256 | -0.750 |
| **p_C1** | -0.513 | | 0.928 | -0.010 | -0.055 | 0.173 | 0.796 |
| **p_raki** | -0.568 | 0.928 | | 0.058 | -0.145 | 0.071 | 0.740 |
| **Ramadan** | -0.205 | -0.010 | 0.058 | | -0.323 | -0.392 | 0.068 |
| **Temp** | 0.386 | -0.055 | -0.145 | -0.323 | | 0.889 | -0.139 |
| **Tourist** | 0.256 | 0.173 | 0.071 | -0.392 | 0.889 | | 0.083 |
| **Trend** | -0.750 | 0.796 | 0.740 | 0.068 | -0.139 | 0.083 | |

# APPENDIX B.1

# REGRESSION OUTPUT: LINEAR MARKET-LEVEL MODEL FULL SET OF VARIABLES

**Variables Entered/Removed(b)**

| Model | Variables Entered | Variables Removed | Method |
|---|---|---|---|
| 1 | TREND, TOURIST, GDP, P_BEER, RAMADAN, P_RAKI, D_BEER, TEMP(a) | . | Enter |

a All requested variables entered.

b Dependent Variable: Q_BEER

**Model Summary(b)**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate | Change Statistics | | | | | Durbin-Watson |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | R Square Change | F Change | df1 | df2 | Sig. F Change | |
| 1 | .952(a) | .906 | .891 | 22144.9162 | .906 | 61.174 | 8 | 51 | .000 | 1.582 |

a Predictors: (Constant), TREND, TOURIST, GDP, P_BEER, RAMADAN, P_RAKI, D_BEER, TEMP

b Dependent Variable: Q_BEER

**ANOVA(b)**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 239994683621.162 | 8 | 29999335452.645 | 61.174 | .000(a) |
| | Residual | 25010263006.438 | 51 | 490397313.852 | | |
| | Total | 265004946627.600 | 59 | | | |

a Predictors: (Constant), TREND, TOURIST, GDP, P_BEER, RAMADAN, P_RAKI, D_BEER, TEMP

b Dependent Variable: Q_BEER

| Coefficients(a) | | | | | | |
|---|---|---|---|---|---|---|
| | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
| Model | | B | Std. Error | Beta | | |
| 1 | (Constant) | -175665.891 | 159390.030 | | -1.102 | .276 |
| | D_BEER | 3895.863 | 4846.786 | .074 | .804 | .425 |
| | P_BEER | -630.625 | 412.604 | -.076 | -1.528 | .133 |
| | TEMP | 5226.442 | 1088.736 | .592 | 4.800 | .000 |
| | GDP | 2712.795 | 1411.641 | .114 | 1.922 | .060 |
| | RAMADAN | -2767.855 | 494.377 | -.271 | -5.599 | .000 |
| | TOURIST | 35.014 | 24.286 | .215 | 1.442 | .155 |
| | P_RAKI | 94.445 | 62.450 | .125 | 1.512 | .137 |
| | TREND | 210.051 | 300.301 | .055 | .699 | .487 |

a Dependent Variable: Q_BEER

| Residuals Statistics(a) | | | | | |
|---|---|---|---|---|---|
| | Minimum | Maximum | Mean | Std. Deviation | N |
| Predicted Value | 185820.4219 | 430973.7188 | 325376.8000 | 63778.5740 | 60 |
| Residual | -54867.0469 | 41812.8555 | 6.354E-11 | 20588.8990 | 60 |
| Std. Predicted Value | -2.188 | 1.656 | .000 | 1.000 | 60 |
| Std. Residual | -2.478 | 1.888 | .000 | .930 | 60 |

a Dependent Variable: Q_BEER

# APPENDIX B.2

## REGRESSION OUTPUT: LINEAR MARKET-LEVEL MODEL STEPWISE REGRESSION

| Variables Entered/Removed(a) | | | |
|---|---|---|---|
| **Model** | **Variables Entered** | **Variables Removed** | **Method** |
| **1** | TOURIST | . | Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100). |
| **2** | RAMADAN | . | Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100). |
| **3** | TEMP | . | Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100). |
| **4** | P_RAKI | . | Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100). |
| **5** | GDP | . | Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100). |
| **6** | P_BEER | . | Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100). |
| a Dependent Variable: Q_BEER | | | |

| Model Summary(g) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Change Statistics | | | | | |
| **Model** | **R** | **R Square** | **Adjusted R Square** | **Std. Error of the Estimate** | **R Square Change** | **F Change** | **df1** | **df2** | **Sig. F Change** | **Durbin-Watson** |
| **1** | .893(a) | .797 | .793 | 30486.1268 | .797 | 227.134 | 1 | 58 | .000 | |
| **2** | .919(b) | .845 | .840 | 26804.8258 | .049 | 18.025 | 1 | 57 | .000 | |
| **3** | .929(c) | .864 | .856 | 25399.0329 | .018 | 7.484 | 1 | 56 | .008 | |
| **4** | .939(d) | .881 | .872 | 23940.0055 | .017 | 8.034 | 1 | 55 | .006 | |
| **5** | .947(e) | .896 | .887 | 22562.2289 | .015 | 7.922 | 1 | 54 | .007 | |
| **6** | .951(f) | .904 | .894 | 21867.1096 | .008 | 4.488 | 1 | 53 | .039 | 1.657 |

| |
|---|
| a Predictors: (Constant), TOURIST |
| b Predictors: (Constant), TOURIST, RAMADAN |
| c Predictors: (Constant), TOURIST, RAMADAN, TEMP |
| d Predictors: (Constant), TOURIST, RAMADAN, TEMP, P_RAKI |
| e Predictors: (Constant), TOURIST, RAMADAN, TEMP, P_RAKI, GDP |
| f Predictors: (Constant), TOURIST, RAMADAN, TEMP, P_RAKI, GDP, P_BEER |
| g Dependent Variable: Q_BEER |

**ANOVA(g)**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | **Regression** | 211099518849.016 | 1 | 211099518849.016 | 227.134 | .000(a) |
| | **Residual** | 53905427778.584 | 58 | 929403927.217 | | |
| | **Total** | 265004946627.600 | 59 | | | |
| 2 | **Regression** | 224050521369.016 | 2 | 112025260684.508 | 155.916 | .000(b) |
| | **Residual** | 40954425258.584 | 57 | 718498688.747 | | |
| | **Total** | 265004946627.600 | 59 | | | |
| 3 | **Regression** | 228878737762.608 | 3 | 76292912587.536 | 118.263 | .000(c) |
| | **Residual** | 36126208864.992 | 56 | 645110872.589 | | |
| | **Total** | 265004946627.600 | 59 | | | |
| 4 | **Regression** | 233483134137.790 | 4 | 58370783534.448 | 101.847 | .000(d) |
| | **Residual** | 31521812489.810 | 55 | 573123863.451 | | |
| | **Total** | 265004946627.600 | 59 | | | |
| 5 | **Regression** | 237516021176.563 | 5 | 47503204235.313 | 93.317 | .000(e) |
| | **Residual** | 27488925451.037 | 54 | 509054175.019 | | |
| | **Total** | 265004946627.600 | 59 | | | |
| 6 | **Regression** | 239661911169.200 | 6 | 39943651861.533 | 83.534 | .000(f) |
| | **Residual** | 25343035458.400 | 53 | 478170480.347 | | |
| | **Total** | 265004946627.600 | 59 | | | |

a Predictors: (Constant), TOURIST

b Predictors: (Constant), TOURIST, RAMADAN

c Predictors: (Constant), TOURIST, RAMADAN, TEMP

d Predictors: (Constant), TOURIST, RAMADAN, TEMP, P_RAKI

| |
|---|
| e Predictors: (Constant), TOURIST, RAMADAN, TEMP, P_RAKI, GDP |
| f Predictors: (Constant), TOURIST, RAMADAN, TEMP, P_RAKI, GDP, P_BEER |
| g Dependent Variable: Q_BEER |

**Coefficients(a)**

| Model | | Unstandardized Coefficients B | Unstandardized Coefficients Std. Error | Standardized Coefficients Beta | t | Sig. |
|---|---|---|---|---|---|---|
| 1 | (Constant) | 205322.856 | 8885.139 | | 23.109 | .000 |
| | TOURIST | 145.688 | 9.667 | .893 | 15.071 | .000 |
| 2 | (Constant) | 224200.521 | 8988.965 | | 24.942 | .000 |
| | TOURIST | 130.002 | 9.268 | .796 | 14.027 | .000 |
| | RAMADAN | -2462.848 | 580.095 | -.241 | -4.246 | .000 |
| 3 | (Constant) | 225278.403 | 8526.642 | | 26.421 | .000 |
| | TOURIST | 84.033 | 18.960 | .515 | 4.432 | .000 |
| | RAMADAN | -2529.178 | 550.206 | -.248 | -4.597 | .000 |
| | TEMP | 2738.028 | 1000.833 | .310 | 2.736 | .008 |
| 4 | (Constant) | 160316.975 | 24287.156 | | 6.601 | .000 |
| | TOURIST | 60.096 | 19.765 | .368 | 3.040 | .004 |
| | RAMADAN | -2628.041 | 519.771 | -.257 | -5.056 | .000 |
| | TEMP | 4024.666 | 1046.876 | .456 | 3.844 | .000 |
| | P_RAKI | 111.099 | 39.197 | .147 | 2.834 | .006 |
| 5 | (Constant) | -218999.752 | 136694.674 | | -1.602 | .115 |
| | TOURIST | 41.117 | 19.811 | .252 | 2.075 | .043 |
| | RAMADAN | -2740.185 | 491.475 | -.268 | -5.575 | .000 |
| | TEMP | 5066.813 | 1053.814 | .574 | 4.808 | .000 |
| | P_RAKI | 143.578 | 38.701 | .190 | 3.710 | .000 |
| | GDP | 3177.695 | 1128.980 | .134 | 2.815 | .007 |
| 6 | (Constant) | -124168.025 | 139841.846 | | -.888 | .379 |
| | TOURIST | 46.775 | 19.385 | .287 | 2.413 | .019 |
| | RAMADAN | -2681.891 | 477.128 | -.262 | -5.621 | .000 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | **TEMP** | 4957.457 | 1022.651 | .561 | 4.848 | .000 |
| | **P_RAKI** | 133.868 | 37.788 | .177 | 3.543 | .001 |
| | **GDP** | 3426.522 | 1100.484 | .144 | 3.114 | .003 |
| | **P_BEER** | -777.867 | 367.192 | -.094 | -2.118 | .039 |
| a Dependent Variable: Q_BEER | | | | | | |

| **Excluded Variables(g)** | | | | | | |
|---|---|---|---|---|---|---|
| **Model** | | **Beta In** | **t** | **Sig.** | **Partial Correlation** | **Collinearity Statistics** |
| | | | | | | **Tolerance** |
| **1** | **D_BEER** | .043(a) | .591 | .557 | .078 | .683 |
| | **P_BEER** | -.114(a) | -1.926 | .059 | -.247 | .953 |
| | **TEMP** | .287(a) | 2.180 | .033 | .277 | .190 |
| | **GDP** | .033(a) | .550 | .584 | .073 | 1.000 |
| | **RAMADAN** | -.241(a) | -4.246 | .000 | -.490 | .841 |
| | **P_RAKI** | .051(a) | .860 | .394 | .113 | .994 |
| | **TREND** | .024(a) | .403 | .688 | .053 | 1.000 |
| **2** | **D_BEER** | .075(b) | 1.193 | .238 | .157 | .673 |
| | **P_BEER** | -.102(b) | -1.964 | .055 | -.254 | .950 |
| | **TEMP** | .310(b) | 2.736 | .008 | .343 | .190 |
| | **GDP** | .043(b) | .820 | .416 | .109 | .998 |
| | **P_RAKI** | .060(b) | 1.161 | .251 | .153 | .992 |
| | **TREND** | .034(b) | .651 | .517 | .087 | .998 |
| **3** | **D_BEER** | .150(c) | 2.445 | .018 | .313 | .593 |
| | **P_BEER** | -.099(c) | -2.002 | .050 | -.261 | .950 |
| | **GDP** | .081(c) | 1.613 | .113 | .212 | .937 |
| | **P_RAKI** | .147(c) | 2.834 | .006 | .357 | .805 |
| | **TREND** | .105(c) | 1.994 | .051 | .260 | .839 |
| **4** | **D_BEER** | .110(d) | 1.784 | .080 | .236 | .545 |
| | **P_BEER** | -.079(d) | -1.667 | .101 | -.221 | .926 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | **GDP** | .134(d) | 2.815 | .007 | .358 | .854 |
| | **TREND** | .045(d) | .764 | .448 | .103 | .636 |
| **5** | **D_BEER** | .059(e) | .934 | .354 | .127 | .479 |
| | **P_BEER** | -.094(e) | -2.118 | .039 | -.279 | .915 |
| | **TREND** | .021(e) | .367 | .715 | .050 | .620 |
| **6** | **D_BEER** | .028(f) | .437 | .664 | .061 | .448 |
| | **TREND** | .010(f) | .181 | .857 | .025 | .615 |

a Predictors in the Model: (Constant), TOURIST

b Predictors in the Model: (Constant), TOURIST, RAMADAN

c Predictors in the Model: (Constant), TOURIST, RAMADAN, TEMP

d Predictors in the Model: (Constant), TOURIST, RAMADAN, TEMP, P_RAKI

e Predictors in the Model: (Constant), TOURIST, RAMADAN, TEMP, P_RAKI, GDP

f Predictors in the Model: (Constant), TOURIST, RAMADAN, TEMP, P_RAKI, GDP, P_BEER

g Dependent Variable: Q_BEER

**Residuals Statistics(a)**

| | Minimum | Maximum | Mean | Std. Deviation | N |
|---|---|---|---|---|---|
| **Predicted Value** | 182327.8125 | 431936.0938 | 325376.8000 | 63734.3415 | 60 |
| **Residual** | -54742.8125 | 39808.1836 | -1.6492E-11 | 20725.4185 | 60 |
| **Std. Predicted Value** | -2.244 | 1.672 | .000 | 1.000 | 60 |
| **Std. Residual** | -2.503 | 1.820 | .000 | .948 | 60 |

a Dependent Variable: Q_BEER

# APPENDIX B.3

# REGRESSION OUTPUT: LINEAR BRAND-LEVEL MODEL FULL SET OF VARIABLES

**Variables Entered/Removed(b)**

| Model | Variables Entered | Variables Removed | Method |
|---|---|---|---|
| 1 | TREND, TOURIST, P_A5, GDP, RAMADAN, P_A3, D_B4, P_A6, D_A6, D_B1, D_A3, P_B2, P_A2, P_C1, D_A1, D_C1, P_B1, P_B4, P_A4, D_A2, D_B3, TEMP, P_RAKI, P_B3, D_A4, P_A1, D_A5, D_B2(a) | , | Enter |

a All requested variables entered.

b Dependent Variable: Q_A1

**Model Summary(b)**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate | Durbin-Watson |
|---|---|---|---|---|---|
| 1 | ,976(a) | ,953 | ,910 | 16031,8623 | 1,994 |

a Predictors: (Constant), TREND, TOURIST, P_A5, GDP, RAMADAN, P_A3, D_B4, P_A6, D_A6, D_B1, D_A3, P_B2, P_A2, P_C1, D_A1, D_C1, P_B1, P_B4, P_A4, D_A2, D_B3, TEMP, P_RAKI, P_B3, D_A4, P_A1, D_A5, D_B2

b Dependent Variable: Q_A1

**ANOVA(b)**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 160025287331,860 | 28 | 5715188833,281 | 22,236 | ,000(a) |
| | Residual | 7967638831,790 | 31 | 257020607,477 | | |
| | Total | 167992926163,650 | 59 | | | |

a Predictors: (Constant), TREND, TOURIST, P_A5, GDP, RAMADAN, P_A3, D_B4, P_A6, D_A6, D_B1, D_A3, P_B2, P_A2, P_C1, D_A1, D_C1, P_B1, P_B4, P_A4, D_A2, D_B3, TEMP, P_RAKI, P_B3, D_A4, P_A1, D_A5, D_B2

b Dependent Variable: Q_A1

| Coefficients(a) | | | | | | |
|---|---|---|---|---|---|---|
| | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
| Model | | B | Std. Error | Beta | | |
| 1 | (Constant) | -318679,477 | 260436,525 | | -1,224 | ,230 |
| | D_A1 | 4254,650 | 5563,546 | ,090 | ,765 | ,450 |
| | D_B1 | -1927,398 | 5441,755 | -,049 | -,354 | ,726 |
| | D_A5 | 325,846 | 3937,136 | ,022 | ,083 | ,935 |
| | D_B4 | 7901,588 | 4381,635 | ,136 | 1,803 | ,081 |
| | D_C1 | -579,096 | 5604,872 | -,017 | -,103 | ,918 |
| | D_A6 | -1432,451 | 4470,044 | -,067 | -,320 | ,751 |
| | D_A2 | 983,371 | 4182,791 | ,038 | ,235 | ,816 |
| | D_B3 | 11450,290 | 6173,803 | ,283 | 1,855 | ,073 |
| | D_A3 | 7151,570 | 4123,121 | ,192 | 1,735 | ,093 |
| | D_A4 | 1088,547 | 3032,426 | ,087 | ,359 | ,722 |
| | D_B2 | 3514,505 | 2831,345 | ,336 | 1,241 | ,224 |
| | P_A1 | 519,916 | 1648,476 | ,081 | ,315 | ,755 |
| | P_B1 | 574,756 | 975,280 | ,109 | ,589 | ,560 |
| | P_A5 | -554,679 | 817,007 | -,098 | -,679 | ,502 |
| | P_B4 | -860,001 | 655,922 | -,173 | -1,311 | ,199 |
| | P_C1 | -223,395 | 679,897 | -,061 | -,329 | ,745 |
| | P_A6 | 594,604 | 547,073 | ,122 | 1,087 | ,285 |
| | P_A2 | -781,688 | 809,440 | -,148 | -,966 | ,342 |
| | P_B3 | 75,638 | 922,743 | ,017 | ,082 | ,935 |
| | P_A3 | 308,454 | 594,490 | ,058 | ,519 | ,608 |
| | P_A4 | 19,286 | 209,586 | ,024 | ,092 | ,927 |
| | P_B2 | 107,413 | 121,494 | ,095 | ,884 | ,383 |
| | TEMP | 3052,034 | 1353,855 | ,434 | 2,254 | ,031 |
| | GDP | 1095,660 | 2127,544 | ,058 | ,515 | ,610 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | **RAMADAN** | -2108,107 | 463,573 | -,259 | -4,548 | ,000 |
| | **TOURIST** | 25,655 | 24,115 | ,197 | 1,064 | ,296 |
| | **P_RAKI** | 84,851 | 108,565 | ,141 | ,782 | ,440 |
| | **TREND** | -2767,306 | 1581,657 | -,906 | -1,750 | ,090 |
| a Dependent Variable: Q_A1 | | | | | | |

**Residuals Statistics(a)**

| | Minimum | Maximum | Mean | Std. Deviation | N |
|---|---|---|---|---|---|
| **Predicted Value** | 136765,7656 | 343626,2188 | 250426,8500 | 52079,6794 | 60 |
| **Residual** | -29555,1426 | 26771,5801 | -1,8481E-10 | 11620,8746 | 60 |
| **Std. Predicted Value** | -2,182 | 1,790 | ,000 | 1,000 | 60 |
| **Std. Residual** | -1,844 | 1,670 | ,000 | ,725 | 60 |
| a Dependent Variable: Q_A1 | | | | | |

# APPENDIX B.4

## REGRESSION OUTPUT: LINEAR BRAND-LEVEL MODEL 1st STEPWISE REGRESSION

| Variables Entered/Removed(a) | | | |
|---|---|---|---|
| **Model** | **Variables Entered** | **Variables Removed** | **Method** |
| **1** | TOURIST | . | Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100). |
| **2** | RAMADAN | . | Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100). |
| **3** | D_A3 | . | Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100). |
| **4** | TEMP | . | Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100). |
| **5** | D_A1 | . | Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100). |
| a Dependent Variable: Q_A1 | | | |

| Model Summary(f) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | **Change Statistics** | | | | | |
| **Model** | **R** | **R Square** | **Adjusted R Square** | **Std. Error of the Estimate** | **R Square Change** | **F Change** | **df1** | **df2** | **Sig. F Change** | **Durbin-Watson** |
| **1** | .903(a) | .815 | .812 | 23121.4704 | .815 | 256.239 | 1 | 58 | .000 | |
| **2** | .931(b) | .866 | .862 | 19837.1093 | .051 | 21.796 | 1 | 57 | .000 | |
| **3** | .941(c) | .886 | .880 | 18504.2489 | .019 | 9.507 | 1 | 56 | .003 | |
| **4** | .951(d) | .905 | .898 | 17038.8622 | .019 | 11.046 | 1 | 55 | .002 | |
| **5** | .957(e) | .917 | .909 | 16115.5098 | .012 | 7.483 | 1 | 54 | .008 | 1.712 |
| a Predictors: (Constant), TOURIST | | | | | | | | | | |
| b Predictors: (Constant), TOURIST, RAMADAN | | | | | | | | | | |

| |
|---|
| c Predictors: (Constant), TOURIST, RAMADAN, D_A3 |
| d Predictors: (Constant), TOURIST, RAMADAN, D_A3, TEMP |
| e Predictors: (Constant), TOURIST, RAMADAN, D_A3, TEMP, D_A1 |
| f Dependent Variable: Q_A1 |

**ANOVA(f)**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 136985987317.735 | 1 | 136985987317.735 | 256.239 | .000(a) |
| | Residual | 31006938845.915 | 58 | 534602393.895 | | |
| | Total | 167992926163.650 | 59 | | | |
| 2 | Regression | 145562804504.363 | 2 | 72781402252.182 | 184.954 | .000(b) |
| | Residual | 22430121659.287 | 57 | 393510906.303 | | |
| | Total | 167992926163.650 | 59 | | | |
| 3 | Regression | 148818121411.744 | 3 | 49606040470.581 | 144.874 | .000(c) |
| | Residual | 19174804751.906 | 56 | 342407227.713 | | |
| | Total | 167992926163.650 | 59 | | | |
| 4 | Regression | 152025170838.251 | 4 | 38006292709.563 | 130.910 | .000(d) |
| | Residual | 15967755325.399 | 55 | 290322824.098 | | |
| | Total | 167992926163.650 | 59 | | | |
| 5 | Regression | 153968604649.384 | 5 | 30793720929.877 | 118.570 | .000(e) |
| | Residual | 14024321514.266 | 54 | 259709657.672 | | |
| | Total | 167992926163.650 | 59 | | | |
| a Predictors: (Constant), TOURIST | | | | | | |
| b Predictors: (Constant), TOURIST, RAMADAN | | | | | | |
| c Predictors: (Constant), TOURIST, RAMADAN, D_A3 | | | | | | |
| d Predictors: (Constant), TOURIST, RAMADAN, D_A3, TEMP | | | | | | |
| e Predictors: (Constant), TOURIST, RAMADAN, D_A3, TEMP, D_A1 | | | | | | |
| f Dependent Variable: Q_A1 | | | | | | |

**Coefficients(a)**

| | Unstandardized Coefficients | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|

| Model | | B | Std. Error | Beta | | |
|---|---|---|---|---|---|---|
| 1 | (Constant) | 153716.961 | 6738.720 | | 22.811 | .000 |
| | TOURIST | 117.359 | 7.332 | .903 | 16.007 | .000 |
| 2 | (Constant) | 169079.383 | 6652.350 | | 25.416 | .000 |
| | TOURIST | 104.594 | 6.859 | .805 | 15.250 | .000 |
| | RAMADAN | -2004.237 | 429.303 | -.246 | -4.669 | .000 |
| 3 | (Constant) | 120535.770 | 16922.498 | | 7.123 | .000 |
| | TOURIST | 101.780 | 6.463 | .783 | 15.749 | .000 |
| | RAMADAN | -2081.816 | 401.248 | -.256 | -5.188 | .000 |
| | D_A3 | 5251.162 | 1703.061 | .141 | 3.083 | .003 |
| 4 | (Constant) | 110654.697 | 15863.447 | | 6.975 | .000 |
| | TOURIST | 62.764 | 13.161 | .483 | 4.769 | .000 |
| | RAMADAN | -2154.442 | 370.118 | -.265 | -5.821 | .000 |
| | D_A3 | 6417.417 | 1606.972 | .172 | 3.993 | .000 |
| | TEMP | 2286.684 | 688.009 | .325 | 3.324 | .002 |
| 5 | (Constant) | -118192.332 | 84992.218 | | -1.391 | .170 |
| | TOURIST | 31.777 | 16.830 | .245 | 1.888 | .064 |
| | RAMADAN | -2347.349 | 357.093 | -.289 | -6.573 | .000 |
| | D_A3 | 5114.909 | 1592.726 | .137 | 3.211 | .002 |
| | TEMP | 3372.314 | 762.196 | .480 | 4.424 | .000 |
| | D_A1 | 7889.363 | 2884.039 | .166 | 2.736 | .008 |

a Dependent Variable: Q_A1

**Excluded Variables(f)**

| Model | | Beta In | t | Sig. | Partial Correlation | Collinearity Statistics |
|---|---|---|---|---|---|---|
| | | | | | | Tolerance |
| 1 | D_A1 | .041(a) | .595 | .554 | .079 | .677 |
| | D_B1 | .035(a) | .582 | .563 | .077 | .888 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | **D_A5** | .052(a) | .861 | .393 | .113 | .883 |
| | **D_B4** | .080(a) | 1.365 | .177 | .178 | .914 |
| | **D_C1** | .020(a) | .329 | .743 | .044 | .910 |
| | **D_A6** | .145(a) | 2.688 | .009 | .335 | .986 |
| | **D_A2** | .057(a) | .957 | .343 | .126 | .896 |
| | **D_B3** | -.045(a) | -.744 | .460 | -.098 | .883 |
| | **D_A3** | .126(a) | 2.291 | .026 | .290 | .984 |
| | **D_A4** | .050(a) | .885 | .380 | .116 | .998 |
| | **D_B2** | .073(a) | 1.297 | .200 | .169 | .998 |
| | **P_A1** | -.061(a) | -1.061 | .293 | -.139 | .961 |
| | **P_B1** | -.034(a) | -.599 | .552 | -.079 | .982 |
| | **P_A5** | .028(a) | .485 | .630 | .064 | .996 |
| | **P_B4** | -.038(a) | -.654 | .516 | -.086 | .966 |
| | **P_C1** | -.010(a) | -.171 | .865 | -.023 | .969 |
| | **P_A6** | -.009(a) | -.150 | .881 | -.020 | .954 |
| | **P_A2** | -.065(a) | -1.134 | .262 | -.149 | .966 |
| | **P_B3** | -.014(a) | -.231 | .818 | -.031 | .941 |
| | **P_A3** | -.030(a) | -.526 | .601 | -.069 | .965 |
| | **P_A4** | .008(a) | .136 | .892 | .018 | 1.000 |
| | **P_B2** | .073(a) | 1.276 | .207 | .167 | .951 |
| | **TEMP** | .217(a) | 1.700 | .095 | .220 | .190 |
| | **GDP** | .067(a) | 1.185 | .241 | .155 | 1.000 |
| | **RAMADAN** | -.246(a) | -4.669 | .000 | -.526 | .841 |
| | **P_RAKI** | .029(a) | .517 | .607 | .068 | .994 |
| | **TREND** | -.004(a) | -.065 | .948 | -.009 | 1.000 |
| **2** | **D_A1** | .085(b) | 1.443 | .155 | .189 | .662 |
| | **D_B1** | .065(b) | 1.254 | .215 | .165 | .876 |
| | **D_A5** | .055(b) | 1.074 | .288 | .142 | .883 |
| | **D_B4** | .083(b) | 1.673 | .100 | .218 | .914 |
| | **D_C1** | .022(b) | .431 | .668 | .057 | .910 |
| | **D_A6** | .123(b) | 2.631 | .011 | .332 | .976 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | **D_A2** | .066(b) | 1.295 | .201 | .170 | .895 |
| | **D_B3** | -.042(b) | -.814 | .419 | -.108 | .883 |
| | **D_A3** | .141(b) | 3.083 | .003 | .381 | .980 |
| | **D_A4** | .036(b) | .743 | .461 | .099 | .994 |
| | **D_B2** | .071(b) | 1.487 | .143 | .195 | .998 |
| | **P_A1** | -.050(b) | -1.010 | .317 | -.134 | .959 |
| | **P_B1** | -.002(b) | -.043 | .966 | -.006 | .962 |
| | **P_A5** | .011(b) | .226 | .822 | .030 | .991 |
| | **P_B4** | -.039(b) | -.781 | .438 | -.104 | .966 |
| | **P_C1** | -.005(b) | -.095 | .925 | -.013 | .968 |
| | **P_A6** | -.014(b) | -.287 | .775 | -.038 | .953 |
| | **P_A2** | -.051(b) | -1.024 | .310 | -.136 | .962 |
| | **P_B3** | -.016(b) | -.315 | .754 | -.042 | .941 |
| | **P_A3** | -.018(b) | -.358 | .721 | -.048 | .962 |
| | **P_A4** | -.002(b) | -.040 | .968 | -.005 | .998 |
| | **P_B2** | .067(b) | 1.354 | .181 | .178 | .950 |
| | **TEMP** | .240(b) | 2.232 | .030 | .286 | .190 |
| | **GDP** | .077(b) | 1.611 | .113 | .210 | .998 |
| | **P_RAKI** | .039(b) | .799 | .428 | .106 | .992 |
| | **TREND** | .007(b) | .134 | .894 | .018 | .998 |
| **3** | **D_A1** | .026(c) | .437 | .664 | .059 | .574 |
| | **D_B1** | -.020(c) | -.357 | .723 | -.048 | .627 |
| | **D_A5** | -.039(c) | -.666 | .508 | -.089 | .612 |
| | **D_B4** | .045(c) | .922 | .361 | .123 | .839 |
| | **D_C1** | -.089(c) | -1.565 | .123 | -.206 | .620 |
| | **D_A6** | .105(c) | 2.364 | .022 | .304 | .956 |
| | **D_A2** | -.037(c) | -.620 | .538 | -.083 | .564 |
| | **D_B3** | -.090(c) | -1.832 | .072 | -.240 | .816 |
| | **D_A4** | -.061(c) | -1.118 | .268 | -.149 | .683 |
| | **D_B2** | -.054(c) | -.848 | .400 | -.114 | .500 |
| | **P_A1** | -.014(c) | -.299 | .766 | -.040 | .896 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | **P_B1** | .038(c) | .785 | .436 | .105 | .896 |
| | **P_A5** | -.020(c) | -.433 | .667 | -.058 | .944 |
| | **P_B4** | .012(c) | .245 | .807 | .033 | .849 |
| | **P_C1** | -.048(c) | -.997 | .323 | -.133 | .894 |
| | **P_A6** | -.032(c) | -.693 | .492 | -.093 | .939 |
| | **P_A2** | .002(c) | .045 | .964 | .006 | .831 |
| | **P_B3** | .058(c) | 1.125 | .265 | .150 | .761 |
| | **P_A3** | -.005(c) | -.116 | .908 | -.016 | .955 |
| | **P_A4** | -.090(c) | -1.785 | .080 | -.234 | .765 |
| | **P_B2** | -.033(c) | -.553 | .583 | -.074 | .596 |
| | **TEMP** | .325(c) | 3.324 | .002 | .409 | .181 |
| | **GDP** | .010(c) | .193 | .847 | .026 | .751 |
| | **P_RAKI** | .002(c) | .033 | .974 | .004 | .921 |
| | **TREND** | -.144(c) | -2.547 | .014 | -.325 | .579 |
| **4** | **D_A1** | .166(d) | 2.736 | .008 | .349 | .418 |
| | **D_B1** | .007(d) | .135 | .893 | .018 | .612 |
| | **D_A5** | .025(d) | .436 | .665 | .059 | .540 |
| | **D_B4** | .093(d) | 2.028 | .047 | .266 | .778 |
| | **D_C1** | -.019(d) | -.322 | .748 | -.044 | .513 |
| | **D_A6** | .064(d) | 1.427 | .159 | .191 | .844 |
| | **D_A2** | -.005(d) | -.088 | .930 | -.012 | .546 |
| | **D_B3** | -.023(d) | -.433 | .667 | -.059 | .635 |
| | **D_A4** | -.095(d) | -1.901 | .063 | -.250 | .660 |
| | **D_B2** | -.079(d) | -1.348 | .183 | -.180 | .492 |
| | **P_A1** | -.003(d) | -.061 | .952 | -.008 | .890 |
| | **P_B1** | .016(d) | .347 | .730 | .047 | .875 |
| | **P_A5** | -.098(d) | -2.140 | .037 | -.280 | .775 |
| | **P_B4** | -.019(d) | -.419 | .677 | -.057 | .813 |
| | **P_C1** | .015(d) | .303 | .763 | .041 | .743 |
| | **P_A6** | .003(d) | .073 | .942 | .010 | .881 |
| | **P_A2** | .015(d) | .327 | .745 | .044 | .825 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | **P_B3** | .043(d) | .892 | .376 | .121 | .753 |
| | **P_A3** | -.001(d) | -.012 | .990 | -.002 | .954 |
| | **P_A4** | -.102(d) | -2.221 | .031 | -.289 | .761 |
| | **P_B2** | -.039(d) | -.722 | .473 | -.098 | .596 |
| | **GDP** | .037(d) | .759 | .451 | .103 | .731 |
| | **P_RAKI** | .070(d) | 1.502 | .139 | .200 | .774 |
| | **TREND** | -.092(d) | -1.611 | .113 | -.214 | .510 |
| **5** | **D_B1** | -.011(e) | -.223 | .825 | -.031 | .601 |
| | **D_A5** | -.071(e) | -1.135 | .262 | -.154 | .393 |
| | **D_B4** | .044(e) | .871 | .388 | .119 | .596 |
| | **D_C1** | -.066(e) | -1.155 | .253 | -.157 | .473 |
| | **D_A6** | .041(e) | .930 | .357 | .127 | .805 |
| | **D_A2** | -.050(e) | -.902 | .371 | -.123 | .503 |
| | **D_B3** | -.035(e) | -.708 | .482 | -.097 | .630 |
| | **D_A4** | -.060(e) | -1.188 | .240 | -.161 | .598 |
| | **D_B2** | -.061(e) | -1.079 | .286 | -.147 | .484 |
| | **P_A1** | .014(e) | .319 | .751 | .044 | .873 |
| | **P_B1** | .043(e) | .993 | .325 | .135 | .833 |
| | **P_A5** | -.058(e) | -1.183 | .242 | -.160 | .646 |
| | **P_B4** | -.014(e) | -.318 | .752 | -.044 | .812 |
| | **P_C1** | -.048(e) | -.942 | .351 | -.128 | .606 |
| | **P_A6** | -.015(e) | -.351 | .727 | -.048 | .859 |
| | **P_A2** | .026(e) | .590 | .558 | .081 | .818 |
| | **P_B3** | .060(e) | 1.330 | .189 | .180 | .740 |
| | **P_A3** | .011(e) | .259 | .797 | .036 | .944 |
| | **P_A4** | -.063(e) | -1.296 | .201 | -.175 | .641 |
| | **P_B2** | .000(e) | .006 | .995 | .001 | .548 |
| | **GDP** | .020(e) | .421 | .675 | .058 | .716 |
| | **P_RAKI** | .012(e) | .232 | .817 | .032 | .581 |
| | **TREND** | -.097(e) | -1.805 | .077 | -.241 | .509 |
| a Predictors in the Model: (Constant), TOURIST | | | | | | |

| |
|---|
| b Predictors in the Model: (Constant), TOURIST, RAMADAN |
| c Predictors in the Model: (Constant), TOURIST, RAMADAN, D_A3 |
| d Predictors in the Model: (Constant), TOURIST, RAMADAN, D_A3, TEMP |
| e Predictors in the Model: (Constant), TOURIST, RAMADAN, D_A3, TEMP, D_A1 |
| f Dependent Variable: Q_A1 |

**Residuals Statistics(a)**

| | Minimum | Maximum | Mean | Std. Deviation | N |
|---|---|---|---|---|---|
| **Predicted Value** | 149021.1875 | 339264.5313 | 250426.8500 | 51084.6099 | 60 |
| **Residual** | -37968.4414 | 37198.0742 | -4.7051E-11 | 15417.5343 | 60 |
| **Std. Predicted Value** | -1.985 | 1.739 | .000 | 1.000 | 60 |
| **Std. Residual** | -2.356 | 2.308 | .000 | .957 | 60 |

a Dependent Variable: Q_A1

# APPENDIX B.5

## REGRESSION OUTPUT: LINEAR BRAND-LEVEL MODEL 2nd STEPWISE REGRESSION

**Variables Entered/Removed(a)**

| Model | Variables Entered | Variables Removed | Method |
|---|---|---|---|
| 1 | TOURIST | . | Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100). |
| 2 | RAMADAN | . | Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100). |
| 3 | D_A6 | . | Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100). |
| 4 | D_B1 | . | Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100). |
| 5 | TEMP | . | Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100). |
| 6 | D_A1 | . | Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100). |

a Dependent Variable: Q_A1

**Model Summary(g)**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate | Change Statistics | | | | | Durbin-Watson |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | R Square Change | F Change | df1 | df2 | Sig. F Change | |
| 1 | .903(a) | .815 | .812 | 23121.4704 | .815 | 256.239 | 1 | 58 | .000 | |
| 2 | .931(b) | .866 | .862 | 19837.1093 | .051 | 21.796 | 1 | 57 | .000 | |
| 3 | .939(c) | .881 | .875 | 18880.3199 | .015 | 6.924 | 1 | 56 | .011 | |
| 4 | .944(d) | .891 | .883 | 18231.5282 | .010 | 5.057 | 1 | 55 | .029 | |
| 5 | .948(e) | .899 | .890 | 17699.6526 | .008 | 4.355 | 1 | 54 | .042 | |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **6** | .953(f) | .909 | .899 | 16981.4773 | .010 | 5.664 | 1 | 53 | .021 | 1.526 |
| a Predictors: (Constant), TOURIST | | | | | | | | | | |
| b Predictors: (Constant), TOURIST, RAMADAN | | | | | | | | | | |
| c Predictors: (Constant), TOURIST, RAMADAN, D_A6 | | | | | | | | | | |
| d Predictors: (Constant), TOURIST, RAMADAN, D_A6, D_B1 | | | | | | | | | | |
| e Predictors: (Constant), TOURIST, RAMADAN, D_A6, D_B1, TEMP | | | | | | | | | | |
| f Predictors: (Constant), TOURIST, RAMADAN, D_A6, D_B1, TEMP, D_A1 | | | | | | | | | | |
| g Dependent Variable: Q_A1 | | | | | | | | | | |

**ANOVA(g)**

| **Model** | | **Sum of Squares** | **df** | **Mean Square** | **F** | **Sig.** |
|---|---|---|---|---|---|---|
| **1** | **Regression** | 136985987317.735 | 1 | 136985987317.735 | 256.239 | .000(a) |
| | **Residual** | 31006938845.915 | 58 | 534602393.895 | | |
| | **Total** | 167992926163.650 | 59 | | | |
| **2** | **Regression** | 145562804504.363 | 2 | 72781402252.182 | 184.954 | .000(b) |
| | **Residual** | 22430121659.287 | 57 | 393510906.303 | | |
| | **Total** | 167992926163.650 | 59 | | | |
| **3** | **Regression** | 148030803404.806 | 3 | 49343601134.935 | 138.424 | .000(c) |
| | **Residual** | 19962122758.844 | 56 | 356466477.836 | | |
| | **Total** | 167992926163.650 | 59 | | | |
| **4** | **Regression** | 149711552001.907 | 4 | 37427888000.477 | 112.603 | .000(d) |
| | **Residual** | 18281374161.743 | 55 | 332388621.123 | | |
| | **Total** | 167992926163.650 | 59 | | | |
| **5** | **Regression** | 151075930269.449 | 5 | 30215186053.890 | 96.449 | .000(e) |
| | **Residual** | 16916995894.201 | 54 | 313277701.744 | | |
| | **Total** | 167992926163.650 | 59 | | | |
| **6** | **Regression** | 152709285879.449 | 6 | 25451547646.575 | 88.260 | .000(f) |
| | **Residual** | 15283640284.201 | 53 | 288370571.400 | | |
| | **Total** | 167992926163.650 | 59 | | | |
| a Predictors: (Constant), TOURIST | | | | | | |
| b Predictors: (Constant), TOURIST, RAMADAN | | | | | | |
| c Predictors: (Constant), TOURIST, RAMADAN, D_A6 | | | | | | |

| |
|---|
| d Predictors: (Constant), TOURIST, RAMADAN, D_A6, D_B1 |
| e Predictors: (Constant), TOURIST, RAMADAN, D_A6, D_B1, TEMP |
| f Predictors: (Constant), TOURIST, RAMADAN, D_A6, D_B1, TEMP, D_A1 |
| g Dependent Variable: Q_A1 |

**Coefficients(a)**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | |
| 1 | (Constant) | 153716.961 | 6738.720 | | 22.811 | .000 |
| | TOURIST | 117.359 | 7.332 | .903 | 16.007 | .000 |
| 2 | (Constant) | 169079.383 | 6652.350 | | 25.416 | .000 |
| | TOURIST | 104.594 | 6.859 | .805 | 15.250 | .000 |
| | RAMADAN | -2004.237 | 429.303 | -.246 | -4.669 | .000 |
| 3 | (Constant) | 153278.975 | 8726.197 | | 17.565 | .000 |
| | TOURIST | 103.458 | 6.542 | .796 | 15.814 | .000 |
| | RAMADAN | -1891.652 | 410.831 | -.233 | -4.604 | .000 |
| | D_A6 | 2637.931 | 1002.537 | .123 | 2.631 | .011 |
| 4 | (Constant) | 108588.083 | 21586.775 | | 5.030 | .000 |
| | TOURIST | 97.609 | 6.832 | .751 | 14.288 | .000 |
| | RAMADAN | -1974.763 | 398.432 | -.243 | -4.956 | .000 |
| | D_A6 | 3300.725 | 1011.962 | .154 | 3.262 | .002 |
| | D_B1 | 4409.675 | 1961.003 | .112 | 2.249 | .029 |
| 5 | (Constant) | 105827.679 | 20998.717 | | 5.040 | .000 |
| | TOURIST | 70.926 | 14.404 | .546 | 4.924 | .000 |
| | RAMADAN | -2052.369 | 388.592 | -.252 | -5.282 | .000 |
| | D_A6 | 2778.584 | 1013.798 | .129 | 2.741 | .008 |
| | D_B1 | 5113.344 | 1933.423 | .130 | 2.645 | .011 |
| | TEMP | 1549.855 | 742.657 | .220 | 2.087 | .042 |
| 6 | (Constant) | -106880.824 | 91618.352 | | -1.167 | .249 |
| | TOURIST | 40.087 | 18.944 | .308 | 2.116 | .039 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | **RAMADAN** | -2256.959 | 382.607 | -.277 | -5.899 | .000 |
| | **D_A6** | 1917.837 | 1037.727 | .089 | 1.848 | .070 |
| | **D_B1** | 3487.131 | 1976.822 | .088 | 1.764 | .083 |
| | **TEMP** | 2755.844 | 874.338 | .392 | 3.152 | .003 |
| | **D_A1** | 7629.152 | 3205.615 | .161 | 2.380 | .021 |
| a Dependent Variable: Q_A1 | | | | | | |

**Excluded Variables(g)**

| **Model** | | **Beta In** | **t** | **Sig.** | **Partial Correlation** | **Collinearity Statistics** |
|---|---|---|---|---|---|---|
| | | | | | | **Tolerance** |
| **1** | **D_A1** | .041(a) | .595 | .554 | .079 | .677 |
| | **D_B1** | .035(a) | .582 | .563 | .077 | .888 |
| | **D_A5** | .052(a) | .861 | .393 | .113 | .883 |
| | **D_B4** | .080(a) | 1.365 | .177 | .178 | .914 |
| | **D_C1** | .020(a) | .329 | .743 | .044 | .910 |
| | **D_A6** | .145(a) | 2.688 | .009 | .335 | .986 |
| | **D_A2** | .057(a) | .957 | .343 | .126 | .896 |
| | **D_B3** | -.045(a) | -.744 | .460 | -.098 | .883 |
| | **D_A4** | .050(a) | .885 | .380 | .116 | .998 |
| | **D_B2** | .073(a) | 1.297 | .200 | .169 | .998 |
| | **P_A1** | -.061(a) | -1.061 | .293 | -.139 | .961 |
| | **P_B1** | -.034(a) | -.599 | .552 | -.079 | .982 |
| | **P_A5** | .028(a) | .485 | .630 | .064 | .996 |
| | **P_B4** | -.038(a) | -.654 | .516 | -.086 | .966 |
| | **P_C1** | -.010(a) | -.171 | .865 | -.023 | .969 |
| | **P_A6** | -.009(a) | -.150 | .881 | -.020 | .954 |
| | **P_A2** | -.065(a) | -1.134 | .262 | -.149 | .966 |
| | **P_B3** | -.014(a) | -.231 | .818 | -.031 | .941 |
| | **P_A3** | -.030(a) | -.526 | .601 | -.069 | .965 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | **P_A4** | .008(a) | .136 | .892 | .018 | 1.000 |
| | **P_B2** | .073(a) | 1.276 | .207 | .167 | .951 |
| | **TEMP** | .217(a) | 1.700 | .095 | .220 | .190 |
| | **GSYIH** | .067(a) | 1.185 | .241 | .155 | 1.000 |
| | **RAMADAN** | -.246(a) | -4.669 | .000 | -.526 | .841 |
| | **P_RAKI** | .029(a) | .517 | .607 | .068 | .994 |
| | **TREND** | -.004(a) | -.065 | .948 | -.009 | 1.000 |
| **2** | **D_A1** | .085(b) | 1.443 | .155 | .189 | .662 |
| | **D_B1** | .065(b) | 1.254 | .215 | .165 | .876 |
| | **D_A5** | .055(b) | 1.074 | .288 | .142 | .883 |
| | **D_B4** | .083(b) | 1.673 | .100 | .218 | .914 |
| | **D_C1** | .022(b) | .431 | .668 | .057 | .910 |
| | **D_A6** | .123(b) | 2.631 | .011 | .332 | .976 |
| | **D_A2** | .066(b) | 1.295 | .201 | .170 | .895 |
| | **D_B3** | -.042(b) | -.814 | .419 | -.108 | .883 |
| | **D_A4** | .036(b) | .743 | .461 | .099 | .994 |
| | **D_B2** | .071(b) | 1.487 | .143 | .195 | .998 |
| | **P_A1** | -.050(b) | -1.010 | .317 | -.134 | .959 |
| | **P_B1** | -.002(b) | -.043 | .966 | -.006 | .962 |
| | **P_A5** | .011(b) | .226 | .822 | .030 | .991 |
| | **P_B4** | -.039(b) | -.781 | .438 | -.104 | .966 |
| | **P_C1** | -.005(b) | -.095 | .925 | -.013 | .968 |
| | **P_A6** | -.014(b) | -.287 | .775 | -.038 | .953 |
| | **P_A2** | -.051(b) | -1.024 | .310 | -.136 | .962 |
| | **P_B3** | -.016(b) | -.315 | .754 | -.042 | .941 |
| | **P_A3** | -.018(b) | -.358 | .721 | -.048 | .962 |
| | **P_A4** | -.002(b) | -.040 | .968 | -.005 | .998 |
| | **P_B2** | .067(b) | 1.354 | .181 | .178 | .950 |
| | **TEMP** | .240(b) | 2.232 | .030 | .286 | .190 |
| | **GSYIH** | .077(b) | 1.611 | .113 | .210 | .998 |
| | **P_RAKI** | .039(b) | .799 | .428 | .106 | .992 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | **TREND** | .007(b) | .134 | .894 | .018 | .998 |
| 3 | **D_A1** | .079(c) | 1.397 | .168 | .185 | .660 |
| | **D_B1** | .112(c) | 2.249 | .029 | .290 | .801 |
| | **D_A5** | .078(c) | 1.584 | .119 | .209 | .861 |
| | **D_B4** | .081(c) | 1.713 | .092 | .225 | .914 |
| | **D_C1** | .066(c) | 1.316 | .194 | .175 | .828 |
| | **D_A2** | .088(c) | 1.827 | .073 | .239 | .872 |
| | **D_B3** | .078(c) | 1.199 | .236 | .160 | .493 |
| | **D_A4** | .035(c) | .756 | .453 | .101 | .994 |
| | **D_B2** | .074(c) | 1.625 | .110 | .214 | .997 |
| | **P_A1** | -.022(c) | -.446 | .658 | -.060 | .905 |
| | **P_B1** | -.012(c) | -.249 | .805 | -.033 | .956 |
| | **P_A5** | -.012(c) | -.253 | .801 | -.034 | .956 |
| | **P_B4** | -.077(c) | -1.606 | .114 | -.212 | .897 |
| | **P_C1** | .035(c) | .702 | .486 | .094 | .884 |
| | **P_A6** | .047(c) | .899 | .373 | .120 | .781 |
| | **P_A2** | -.026(c) | -.531 | .597 | -.071 | .920 |
| | **P_B3** | -.021(c) | -.448 | .656 | -.060 | .939 |
| | **P_A3** | .038(c) | .744 | .460 | .100 | .805 |
| | **P_A4** | .020(c) | .423 | .674 | .057 | .967 |
| | **P_B2** | .090(c) | 1.928 | .059 | .252 | .923 |
| | **TEMP** | .172(c) | 1.568 | .123 | .207 | .172 |
| | **GSYIH** | .037(c) | .740 | .462 | .099 | .859 |
| | **P_RAKI** | .052(c) | 1.120 | .267 | .149 | .982 |
| | **TREND** | .071(c) | 1.399 | .167 | .185 | .819 |
| 4 | **D_A1** | .037(d) | .629 | .532 | .085 | .566 |
| | **D_A5** | .019(d) | .304 | .763 | .041 | .538 |
| | **D_B4** | .044(d) | .860 | .394 | .116 | .745 |
| | **D_C1** | -.012(d) | -.178 | .860 | -.024 | .465 |
| | **D_A2** | .036(d) | .593 | .556 | .080 | .542 |
| | **D_B3** | -.025(d) | -.298 | .767 | -.041 | .284 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | **D_A4** | -.017(d) | -.337 | .737 | -.046 | .763 |
| | **D_B2** | .026(d) | .484 | .631 | .066 | .687 |
| | **P_A1** | .042(d) | .768 | .446 | .104 | .676 |
| | **P_B1** | .050(d) | .961 | .341 | .130 | .728 |
| | **P_A5** | .000(d) | -.007 | .994 | -.001 | .944 |
| | **P_B4** | -.033(d) | -.616 | .541 | -.084 | .682 |
| | **P_C1** | -.012(d) | -.234 | .816 | -.032 | .728 |
| | **P_A6** | .033(d) | .653 | .516 | .089 | .769 |
| | **P_A2** | .063(d) | 1.069 | .290 | .144 | .567 |
| | **P_B3** | .082(d) | 1.354 | .182 | .181 | .533 |
| | **P_A3** | .070(d) | 1.382 | .173 | .185 | .756 |
| | **P_A4** | -.025(d) | -.502 | .618 | -.068 | .811 |
| | **P_B2** | .068(d) | 1.433 | .158 | .191 | .862 |
| | **TEMP** | .220(d) | 2.087 | .042 | .273 | .167 |
| | **GSYIH** | -.001(d) | -.016 | .988 | -.002 | .755 |
| | **P_RAKI** | .016(d) | .321 | .750 | .044 | .838 |
| | **TREND** | -.010(d) | -.146 | .884 | -.020 | .432 |
| **5** | **D_A1** | .161(e) | 2.380 | .021 | .311 | .376 |
| | **D_A5** | .069(e) | 1.100 | .276 | .149 | .475 |
| | **D_B4** | .082(e) | 1.591 | .117 | .214 | .681 |
| | **D_C1** | .047(e) | .684 | .497 | .093 | .394 |
| | **D_A2** | .058(e) | .975 | .334 | .133 | .527 |
| | **D_B3** | .054(e) | .607 | .546 | .083 | .235 |
| | **D_A4** | -.031(e) | -.617 | .540 | -.084 | .751 |
| | **D_B2** | .022(e) | .421 | .675 | .058 | .686 |
| | **P_A1** | .046(e) | .870 | .388 | .119 | .675 |
| | **P_B1** | .038(e) | .745 | .459 | .102 | .718 |
| | **P_A5** | -.032(e) | -.675 | .503 | -.092 | .855 |
| | **P_B4** | -.049(e) | -.922 | .361 | -.126 | .670 |
| | **P_C1** | .029(e) | .530 | .598 | .073 | .636 |
| | **P_A6** | .049(e) | .987 | .328 | .134 | .753 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | **P_A2** | .069(e) | 1.202 | .235 | .163 | .566 |
| | **P_B3** | .072(e) | 1.216 | .229 | .165 | .529 |
| | **P_A3** | .062(e) | 1.249 | .217 | .169 | .751 |
| | **P_A4** | -.034(e) | -.703 | .485 | -.096 | .804 |
| | **P_B2** | .069(e) | 1.509 | .137 | .203 | .862 |
| | **GSYIH** | .044(e) | .818 | .417 | .112 | .650 |
| | **P_RAKI** | .064(e) | 1.262 | .212 | .171 | .709 |
| | **TREND** | .029(e) | .427 | .671 | .059 | .401 |
| **6** | **D_A5** | -.013(f) | -.177 | .860 | -.025 | .335 |
| | **D_B4** | .038(f) | .676 | .502 | .093 | .555 |
| | **D_C1** | -.005(f) | -.072 | .943 | -.010 | .351 |
| | **D_A2** | .019(f) | .315 | .754 | .044 | .480 |
| | **D_B3** | .002(f) | .020 | .984 | .003 | .219 |
| | **D_A4** | .003(f) | .051 | .960 | .007 | .687 |
| | **D_B2** | .031(f) | .624 | .535 | .086 | .682 |
| | **P_A1** | .043(f) | .851 | .398 | .117 | .675 |
| | **P_B1** | .057(f) | 1.152 | .254 | .158 | .702 |
| | **P_A5** | .001(f) | .020 | .984 | .003 | .776 |
| | **P_B4** | -.043(f) | -.856 | .396 | -.118 | .669 |
| | **P_C1** | -.038(f) | -.636 | .528 | -.088 | .495 |
| | **P_A6** | .018(f) | .361 | .720 | .050 | .692 |
| | **P_A2** | .056(f) | 1.018 | .313 | .140 | .560 |
| | **P_B3** | .076(f) | 1.345 | .184 | .183 | .528 |
| | **P_A3** | .054(f) | 1.127 | .265 | .154 | .747 |
| | **P_A4** | .004(f) | .074 | .941 | .010 | .712 |
| | **P_B2** | .080(f) | 1.814 | .075 | .244 | .855 |
| | **GSYIH** | .037(f) | .724 | .472 | .100 | .648 |
| | **P_RAKI** | .011(f) | .200 | .842 | .028 | .549 |
| | **TREND** | .007(f) | .098 | .923 | .014 | .392 |

a Predictors in the Model: (Constant), TOURIST

b Predictors in the Model: (Constant), TOURIST, RAMADAN

| |
|---|
| c Predictors in the Model: (Constant), TOURIST, RAMADAN, D_A6 |
| d Predictors in the Model: (Constant), TOURIST, RAMADAN, D_A6, D_B1 |
| e Predictors in the Model: (Constant), TOURIST, RAMADAN, D_A6, D_B1, TEMP |
| f Predictors in the Model: (Constant), TOURIST, RAMADAN, D_A6, D_B1, TEMP, D_A1 |
| g Dependent Variable: Q_A1 |

**Residuals Statistics(a)**

| | **Minimum** | **Maximum** | **Mean** | **Std. Deviation** | **N** |
|---|---|---|---|---|---|
| **Predicted Value** | 146006.6406 | 333973.5000 | 250426.8500 | 50875.2689 | 60 |
| **Residual** | -42668.6367 | 36974.6719 | -6.3543E-11 | 16094.8672 | 60 |
| **Std. Predicted Value** | -2.052 | 1.642 | .000 | 1.000 | 60 |
| **Std. Residual** | -2.513 | 2.177 | .000 | .948 | 60 |

a Dependent Variable: Q_A1

# APPENDIX B.6

## REGRESSION OUTPUT: LINEAR BRAND-LEVEL MODEL 3rd STEPWISE REGRESSION

**Variables Entered/Removed(a)**

| Model | Variables Entered | Variables Removed | Method |
|---|---|---|---|
| 1 | TOURIST | . | Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100). |
| 2 | RAMADAN | . | Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100). |
| 3 | D_A6 | . | Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100). |
| a Dependent Variable: Q_A1 | | | |

**Model Summary(d)**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate | Change Statistics | | | | | Durbin-Watson |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | R Square Change | F Change | df1 | df2 | Sig. F Change | |
| 1 | .903(a) | .815 | .812 | 23121.4704 | .815 | 256.239 | 1 | 58 | .000 | |
| 2 | .931(b) | .866 | .862 | 19837.1093 | .051 | 21.796 | 1 | 57 | .000 | |
| 3 | .939(c) | .881 | .875 | 18880.3199 | .015 | 6.924 | 1 | 56 | .011 | 1.606 |
| a Predictors: (Constant), TOURIST | | | | | | | | | | |
| b Predictors: (Constant), TOURIST, RAMADAN | | | | | | | | | | |
| c Predictors: (Constant), TOURIST, RAMADAN, D_A6 | | | | | | | | | | |
| d Dependent Variable: Q_A1 | | | | | | | | | | |

**ANOVA(d)**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 136985987317.735 | 1 | 136985987317.735 | 256.239 | .000(a) |

| | | | | | | |
|---|---|---|---|---|---|---|
| | **Residual** | 31006938845.915 | 58 | 534602393.895 | | |
| | **Total** | 167992926163.650 | 59 | | | |
| 2 | **Regression** | 145562804504.363 | 2 | 72781402252.182 | 184.954 | .000(b) |
| | **Residual** | 22430121659.287 | 57 | 393510906.303 | | |
| | **Total** | 167992926163.650 | 59 | | | |
| 3 | **Regression** | 148030803404.806 | 3 | 49343601134.935 | 138.424 | .000(c) |
| | **Residual** | 19962122758.844 | 56 | 356466477.836 | | |
| | **Total** | 167992926163.650 | 59 | | | |
| a Predictors: (Constant), TOURIST | | | | | | |
| b Predictors: (Constant), TOURIST, RAMADAN | | | | | | |
| c Predictors: (Constant), TOURIST, RAMADAN, D_A6 | | | | | | |
| d Dependent Variable: Q_A1 | | | | | | |

**Coefficients(a)**

| | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|---|
| **Model** | | **B** | **Std. Error** | **Beta** | | |
| 1 | **(Constant)** | 153716.961 | 6738.720 | | 22.811 | .000 |
| | **TOURIST** | 117.359 | 7.332 | .903 | 16.007 | .000 |
| 2 | **(Constant)** | 169079.383 | 6652.350 | | 25.416 | .000 |
| | **TOURIST** | 104.594 | 6.859 | .805 | 15.250 | .000 |
| | **RAMADAN** | -2004.237 | 429.303 | -.246 | -4.669 | .000 |
| 3 | **(Constant)** | 153278.975 | 8726.197 | | 17.565 | .000 |
| | **TOURIST** | 103.458 | 6.542 | .796 | 15.814 | .000 |
| | **RAMADAN** | -1891.652 | 410.831 | -.233 | -4.604 | .000 |
| | **D_A6** | 2637.931 | 1002.537 | .123 | 2.631 | .011 |
| a Dependent Variable: Q_A1 | | | | | | |

**Excluded Variables(d)**

| | | Beta In | t | Sig. | Partial Correlation | Collinearity Statistics |
|---|---|---|---|---|---|---|
| 1 | **D_A1** | .041(a) | .595 | .554 | .079 | .677 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | **D_A5** | .052(a) | .861 | .393 | .113 | .883 |
| | **D_B4** | .080(a) | 1.365 | .177 | .178 | .914 |
| | **D_C1** | .020(a) | .329 | .743 | .044 | .910 |
| | **D_A6** | .145(a) | 2.688 | .009 | .335 | .986 |
| | **D_A2** | .057(a) | .957 | .343 | .126 | .896 |
| | **D_B3** | -.045(a) | -.744 | .460 | -.098 | .883 |
| | **D_A4** | .050(a) | .885 | .380 | .116 | .998 |
| | **D_B2** | .073(a) | 1.297 | .200 | .169 | .998 |
| | **P_A1** | -.061(a) | -1.061 | .293 | -.139 | .961 |
| | **P_B1** | -.034(a) | -.599 | .552 | -.079 | .982 |
| | **P_A5** | .028(a) | .485 | .630 | .064 | .996 |
| | **P_B4** | -.038(a) | -.654 | .516 | -.086 | .966 |
| | **P_C1** | -.010(a) | -.171 | .865 | -.023 | .969 |
| | **P_A6** | -.009(a) | -.150 | .881 | -.020 | .954 |
| | **P_A2** | -.065(a) | -1.134 | .262 | -.149 | .966 |
| | **P_B3** | -.014(a) | -.231 | .818 | -.031 | .941 |
| | **P_A3** | -.030(a) | -.526 | .601 | -.069 | .965 |
| | **P_A4** | .008(a) | .136 | .892 | .018 | 1.000 |
| | **P_B2** | .073(a) | 1.276 | .207 | .167 | .951 |
| | **TEMP** | .217(a) | 1.700 | .095 | .220 | .190 |
| | **GDP** | .067(a) | 1.185 | .241 | .155 | 1.000 |
| | **RAMADAN** | -.246(a) | -4.669 | .000 | -.526 | .841 |
| | **P_RAKI** | .029(a) | .517 | .607 | .068 | .994 |
| | **TREND** | -.004(a) | -.065 | .948 | -.009 | 1.000 |
| **2** | **D_A1** | .085(b) | 1.443 | .155 | .189 | .662 |
| | **D_A5** | .055(b) | 1.074 | .288 | .142 | .883 |
| | **D_B4** | .083(b) | 1.673 | .100 | .218 | .914 |
| | **D_C1** | .022(b) | .431 | .668 | .057 | .910 |
| | **D_A6** | .123(b) | 2.631 | .011 | .332 | .976 |
| | **D_A2** | .066(b) | 1.295 | .201 | .170 | .895 |
| | **D_B3** | -.042(b) | -.814 | .419 | -.108 | .883 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | **D_A4** | .036(b) | .743 | .461 | .099 | .994 |
| | **D_B2** | .071(b) | 1.487 | .143 | .195 | .998 |
| | **P_A1** | -.050(b) | -1.010 | .317 | -.134 | .959 |
| | **P_B1** | -.002(b) | -.043 | .966 | -.006 | .962 |
| | **P_A5** | .011(b) | .226 | .822 | .030 | .991 |
| | **P_B4** | -.039(b) | -.781 | .438 | -.104 | .966 |
| | **P_C1** | -.005(b) | -.095 | .925 | -.013 | .968 |
| | **P_A6** | -.014(b) | -.287 | .775 | -.038 | .953 |
| | **P_A2** | -.051(b) | -1.024 | .310 | -.136 | .962 |
| | **P_B3** | -.016(b) | -.315 | .754 | -.042 | .941 |
| | **P_A3** | -.018(b) | -.358 | .721 | -.048 | .962 |
| | **P_A4** | -.002(b) | -.040 | .968 | -.005 | .998 |
| | **P_B2** | .067(b) | 1.354 | .181 | .178 | .950 |
| | **TEMP** | .240(b) | 2.232 | .030 | .286 | .190 |
| | **GDP** | .077(b) | 1.611 | .113 | .210 | .998 |
| | **P_RAKI** | .039(b) | .799 | .428 | .106 | .992 |
| | **TREND** | .007(b) | .134 | .894 | .018 | .998 |
| **3** | **D_A1** | .079(c) | 1.397 | .168 | .185 | .660 |
| | **D_A5** | .078(c) | 1.584 | .119 | .209 | .861 |
| | **D_B4** | .081(c) | 1.713 | .092 | .225 | .914 |
| | **D_C1** | .066(c) | 1.316 | .194 | .175 | .828 |
| | **D_A2** | .088(c) | 1.827 | .073 | .239 | .872 |
| | **D_B3** | .078(c) | 1.199 | .236 | .160 | .493 |
| | **D_A4** | .035(c) | .756 | .453 | .101 | .994 |
| | **D_B2** | .074(c) | 1.625 | .110 | .214 | .997 |
| | **P_A1** | -.022(c) | -.446 | .658 | -.060 | .905 |
| | **P_B1** | -.012(c) | -.249 | .805 | -.033 | .956 |
| | **P_A5** | -.012(c) | -.253 | .801 | -.034 | .956 |
| | **P_B4** | -.077(c) | -1.606 | .114 | -.212 | .897 |
| | **P_C1** | .035(c) | .702 | .486 | .094 | .884 |
| | **P_A6** | .047(c) | .899 | .373 | .120 | .781 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | **P_A2** | -.026(c) | -.531 | .597 | -.071 | .920 |
| | **P_B3** | -.021(c) | -.448 | .656 | -.060 | .939 |
| | **P_A3** | .038(c) | .744 | .460 | .100 | .805 |
| | **P_A4** | .020(c) | .423 | .674 | .057 | .967 |
| | **P_B2** | .090(c) | 1.928 | .059 | .252 | .923 |
| | **TEMP** | .172(c) | 1.568 | .123 | .207 | .172 |
| | **GDP** | .037(c) | .740 | .462 | .099 | .859 |
| | **P_RAKI** | .052(c) | 1.120 | .267 | .149 | .982 |
| | **TREND** | .071(c) | 1.399 | .167 | .185 | .819 |

a Predictors in the Model: (Constant), TOURIST

b Predictors in the Model: (Constant), TOURIST, RAMADAN

c Predictors in the Model: (Constant), TOURIST, RAMADAN, D_A6

d Dependent Variable: Q_A1

**Residuals Statistics(a)**

| | Minimum | Maximum | Mean | Std. Deviation | N |
|---|---|---|---|---|---|
| **Predicted Value** | 151145.2813 | 347674.9375 | 250426.8500 | 50089.8859 | 60 |
| **Residual** | -42725.5664 | 33087.4102 | 2.910E-12 | 18394.0497 | 60 |
| **Std. Predicted Value** | -1.982 | 1.941 | .000 | 1.000 | 60 |
| **Std. Residual** | -2.263 | 1.752 | .000 | .974 | 60 |

a Dependent Variable: Q_A1

# APPENDIX B.7

## REGRESSION OUTPUT: LINEAR BRAND-LEVEL MODEL
## 4th STEPWISE REGRESSION

| Variables Entered/Removed(a) | | | |
|---|---|---|---|
| **Model** | **Variables Entered** | **Variables Removed** | **Method** |
| **1** | TOURIST | . | Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100). |
| **2** | RAMADAN | . | Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100). |
| **3** | TEMP | . | Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100). |
| **4** | D_A1 | . | Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100). |
| a Dependent Variable: Q_A1 | | | |

| Model Summary(e) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | **Change Statistics** | | | | | |
| **Model** | **R** | **R Square** | **Adjusted R Square** | **Std. Error of the Estimate** | **R Square Change** | **F Change** | **df1** | **df2** | **Sig. F Change** | **Durbin-Watson** |
| **1** | .903(a) | .815 | .812 | 23121.4704 | .815 | 256.239 | 1 | 58 | .000 | |
| **2** | .931(b) | .866 | .862 | 19837.1093 | .051 | 21.796 | 1 | 57 | .000 | |
| **3** | .937(c) | .877 | .871 | 19178.5788 | .011 | 4.982 | 1 | 56 | .030 | |
| **4** | .949(d) | .901 | .893 | 17426.6053 | .023 | 12.826 | 1 | 55 | .001 | 1.449 |
| a Predictors: (Constant), TOURIST | | | | | | | | | | |
| b Predictors: (Constant), TOURIST, RAMADAN | | | | | | | | | | |
| c Predictors: (Constant), TOURIST, RAMADAN, TEMP | | | | | | | | | | |
| d Predictors: (Constant), TOURIST, RAMADAN, TEMP, D_A1 | | | | | | | | | | |
| e Dependent Variable: Q_A1 | | | | | | | | | | |

| ANOVA(e) | | | | | | |
|---|---|---|---|---|---|---|
| Model | | Sum of Squares | df | Mean Square | F | Sig. |
| 1 | Regression | 136985987317.735 | 1 | 136985987317.735 | 256.239 | .000(a) |
| | Residual | 31006938845.915 | 58 | 534602393.895 | | |
| | Total | 167992926163.650 | 59 | | | |
| 2 | Regression | 145562804504.363 | 2 | 72781402252.182 | 184.954 | .000(b) |
| | Residual | 22430121659.287 | 57 | 393510906.303 | | |
| | Total | 167992926163.650 | 59 | | | |
| 3 | Regression | 147395124585.292 | 3 | 49131708195.097 | 133.576 | .000(c) |
| | Residual | 20597801578.357 | 56 | 367817885.328 | | |
| | Total | 167992926163.650 | 59 | | | |
| 4 | Regression | 151290164650.185 | 4 | 37822541162.546 | 124.545 | .000(d) |
| | Residual | 16702761513.465 | 55 | 303686572.972 | | |
| | Total | 167992926163.650 | 59 | | | |
| a Predictors: (Constant), TOURIST | | | | | | |
| b Predictors: (Constant), TOURIST, RAMADAN | | | | | | |
| c Predictors: (Constant), TOURIST, RAMADAN, TEMP | | | | | | |
| d Predictors: (Constant), TOURIST, RAMADAN, TEMP, D_A1 | | | | | | |
| e Dependent Variable: Q_A1 | | | | | | |

| Coefficients(a) | | | | | | |
|---|---|---|---|---|---|---|
| | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
| Model | | B | Std. Error | Beta | | |
| 1 | (Constant) | 153716.961 | 6738.720 | | 22.811 | .000 |
| | TOURIST | 117.359 | 7.332 | .903 | 16.007 | .000 |
| 2 | (Constant) | 169079.383 | 6652.350 | | 25.416 | .000 |
| | TOURIST | 104.594 | 6.859 | .805 | 15.250 | .000 |
| | RAMADAN | -2004.237 | 429.303 | -.246 | -4.669 | .000 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 3 | **(Constant)** | 169743.398 | 6438.390 | | 26.364 | .000 |
| | **TOURIST** | 76.276 | 14.316 | .587 | 5.328 | .000 |
| | **RAMADAN** | -2045.098 | 415.455 | -.251 | -4.923 | .000 |
| | **TEMP** | 1686.729 | 755.720 | .240 | 2.232 | .030 |
| 4 | **(Constant)** | -155621.199 | 91038.625 | | -1.709 | .093 |
| | **TOURIST** | 30.709 | 18.196 | .236 | 1.688 | .097 |
| | **RAMADAN** | -2335.689 | 386.125 | -.287 | -6.049 | .000 |
| | **TEMP** | 3317.874 | 824.002 | .472 | 4.027 | .000 |
| | **D_A1** | 10658.197 | 2976.052 | .225 | 3.581 | .001 |

a Dependent Variable: Q_A1

**Excluded Variables(e)**

| Model | | Beta In | t | Sig. | Partial Correlation | Collinearity Statistics |
|---|---|---|---|---|---|---|
| | | | | | | Tolerance |
| 1 | **D_A1** | .041(a) | .595 | .554 | .079 | .677 |
| | **D_A5** | .052(a) | .861 | .393 | .113 | .883 |
| | **D_B4** | .080(a) | 1.365 | .177 | .178 | .914 |
| | **D_C1** | .020(a) | .329 | .743 | .044 | .910 |
| | **D_A2** | .057(a) | .957 | .343 | .126 | .896 |
| | **D_B3** | -.045(a) | -.744 | .460 | -.098 | .883 |
| | **D_A4** | .050(a) | .885 | .380 | .116 | .998 |
| | **D_B2** | .073(a) | 1.297 | .200 | .169 | .998 |
| | **P_A1** | -.061(a) | -1.061 | .293 | -.139 | .961 |
| | **P_B1** | -.034(a) | -.599 | .552 | -.079 | .982 |
| | **P_A5** | .028(a) | .485 | .630 | .064 | .996 |
| | **P_B4** | -.038(a) | -.654 | .516 | -.086 | .966 |
| | **P_C1** | -.010(a) | -.171 | .865 | -.023 | .969 |
| | **P_A6** | -.009(a) | -.150 | .881 | -.020 | .954 |
| | **P_A2** | -.065(a) | -1.134 | .262 | -.149 | .966 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | **P_B3** | -.014(a) | -.231 | .818 | -.031 | .941 |
| | **P_A3** | -.030(a) | -.526 | .601 | -.069 | .965 |
| | **P_A4** | .008(a) | .136 | .892 | .018 | 1.000 |
| | **P_B2** | .073(a) | 1.276 | .207 | .167 | .951 |
| | **TEMP** | .217(a) | 1.700 | .095 | .220 | .190 |
| | **GDP** | .067(a) | 1.185 | .241 | .155 | 1.000 |
| | **RAMADAN** | -.246(a) | -4.669 | .000 | -.526 | .841 |
| | **P_RAKI** | .029(a) | .517 | .607 | .068 | .994 |
| | **TREND** | -.004(a) | -.065 | .948 | -.009 | 1.000 |
| **2** | **D_A1** | .085(b) | 1.443 | .155 | .189 | .662 |
| | **D_A5** | .055(b) | 1.074 | .288 | .142 | .883 |
| | **D_B4** | .083(b) | 1.673 | .100 | .218 | .914 |
| | **D_C1** | .022(b) | .431 | .668 | .057 | .910 |
| | **D_A2** | .066(b) | 1.295 | .201 | .170 | .895 |
| | **D_B3** | -.042(b) | -.814 | .419 | -.108 | .883 |
| | **D_A4** | .036(b) | .743 | .461 | .099 | .994 |
| | **D_B2** | .071(b) | 1.487 | .143 | .195 | .998 |
| | **P_A1** | -.050(b) | -1.010 | .317 | -.134 | .959 |
| | **P_B1** | -.002(b) | -.043 | .966 | -.006 | .962 |
| | **P_A5** | .011(b) | .226 | .822 | .030 | .991 |
| | **P_B4** | -.039(b) | -.781 | .438 | -.104 | .966 |
| | **P_C1** | -.005(b) | -.095 | .925 | -.013 | .968 |
| | **P_A6** | -.014(b) | -.287 | .775 | -.038 | .953 |
| | **P_A2** | -.051(b) | -1.024 | .310 | -.136 | .962 |
| | **P_B3** | -.016(b) | -.315 | .754 | -.042 | .941 |
| | **P_A3** | -.018(b) | -.358 | .721 | -.048 | .962 |
| | **P_A4** | -.002(b) | -.040 | .968 | -.005 | .998 |
| | **P_B2** | .067(b) | 1.354 | .181 | .178 | .950 |
| | **TEMP** | .240(b) | 2.232 | .030 | .286 | .190 |
| | **GDP** | .077(b) | 1.611 | .113 | .210 | .998 |
| | **P_RAKI** | .039(b) | .799 | .428 | .106 | .992 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | **TREND** | .007(b) | .134 | .894 | .018 | .998 |
| 3 | **D_A1** | .225(c) | 3.581 | .001 | .435 | .459 |
| | **D_A5** | .119(c) | 2.261 | .028 | .292 | .742 |
| | **D_B4** | .131(c) | 2.671 | .010 | .339 | .823 |
| | **D_C1** | .091(c) | 1.682 | .098 | .221 | .719 |
| | **D_A2** | .103(c) | 2.067 | .043 | .269 | .829 |
| | **D_B3** | .018(c) | .316 | .753 | .043 | .661 |
| | **D_A4** | .033(c) | .707 | .482 | .095 | .994 |
| | **D_B2** | .079(c) | 1.711 | .093 | .225 | .993 |
| | **P_A1** | -.048(c) | -1.001 | .321 | -.134 | .959 |
| | **P_B1** | -.025(c) | -.501 | .619 | -.067 | .923 |
| | **P_A5** | -.030(c) | -.592 | .556 | -.080 | .866 |
| | **P_B4** | -.072(c) | -1.465 | .149 | -.194 | .899 |
| | **P_C1** | .053(c) | .998 | .323 | .133 | .777 |
| | **P_A6** | .015(c) | .308 | .759 | .041 | .885 |
| | **P_A2** | -.051(c) | -1.070 | .289 | -.143 | .962 |
| | **P_B3** | -.037(c) | -.746 | .459 | -.100 | .910 |
| | **P_A3** | -.016(c) | -.339 | .736 | -.046 | .962 |
| | **P_A4** | .003(c) | .057 | .955 | .008 | .996 |
| | **P_B2** | .079(c) | 1.659 | .103 | .218 | .940 |
| | **GDP** | .109(c) | 2.352 | .022 | .302 | .937 |
| | **P_RAKI** | .104(c) | 2.050 | .045 | .266 | .805 |
| | **TREND** | .057(c) | 1.125 | .266 | .150 | .839 |
| 4 | **D_A5** | .024(d) | .390 | .698 | .053 | .491 |
| | **D_B4** | .060(d) | 1.094 | .279 | .147 | .602 |
| | **D_C1** | .026(d) | .478 | .634 | .065 | .613 |
| | **D_A2** | .044(d) | .871 | .388 | .118 | .701 |
| | **D_B3** | -.009(d) | -.163 | .871 | -.022 | .647 |
| | **D_A4** | .043(d) | 1.017 | .314 | .137 | .989 |
| | **D_B2** | .061(d) | 1.420 | .161 | .190 | .977 |
| | **P_A1** | -.016(d) | -.359 | .721 | -.049 | .917 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | **P_B1** | .020(d) | .430 | .669 | .058 | .855 |
| | **P_A5** | .016(d) | .328 | .744 | .045 | .802 |
| | **P_B4** | -.051(d) | -1.129 | .264 | -.152 | .883 |
| | **P_C1** | -.034(d) | -.627 | .534 | -.085 | .610 |
| | **P_A6** | -.012(d) | -.267 | .790 | -.036 | .860 |
| | **P_A2** | -.022(d) | -.498 | .621 | -.068 | .927 |
| | **P_B3** | .002(d) | .034 | .973 | .005 | .857 |
| | **P_A3** | .003(d) | .063 | .950 | .009 | .948 |
| | **P_A4** | .032(d) | .739 | .463 | .100 | .961 |
| | **P_B2** | .084(d) | 1.969 | .054 | .259 | .939 |
| | **GDP** | .074(d) | 1.642 | .106 | .218 | .874 |
| | **P_RAKI** | .020(d) | .360 | .720 | .049 | .582 |
| | **TREND** | .023(d) | .486 | .629 | .066 | .802 |

a Predictors in the Model: (Constant), TOURIST

b Predictors in the Model: (Constant), TOURIST, RAMADAN

c Predictors in the Model: (Constant), TOURIST, RAMADAN, TEMP

d Predictors in the Model: (Constant), TOURIST, RAMADAN, TEMP, D_A1

e Dependent Variable: Q_A1

**Residuals Statistics(a)**

| | Minimum | Maximum | Mean | Std. Deviation | N |
|---|---|---|---|---|---|
| **Predicted Value** | 152032.0469 | 337683.9375 | 250426.8500 | 50638.3262 | 60 |
| **Residual** | -40388.5977 | 40471.7852 | -1.8917E-11 | 16825.5060 | 60 |
| **Std. Predicted Value** | -1.943 | 1.723 | .000 | 1.000 | 60 |
| **Std. Residual** | -2.318 | 2.322 | .000 | .966 | 60 |

a Dependent Variable: Q_A1

# APPENDIX B.8

## REGRESSION OUTPUT: LINEAR BRAND-LEVEL MODEL 1st BACKWARD REGRESSION

| Variables Entered/Removed(b) | | | |
|---|---|---|---|
| **Model** | **Variables Entered** | **Variables Removed** | **Method** |
| **1** | TREND, TOURIST, P_A5, GDP, RAMADAN, P_A3, D_B4, P_A6, D_A6, D_B1, D_A3, P_B2, P_A2, P_C1, D_A1, D_C1, P_B1, P_B4, P_A4, D_A2, D_B3, TEMP, P_RAKI, P_B3, D_A4, P_A1, D_A5, D_B2(a) | . | Enter |
| **2** | . | P_B3 | Backward (criterion: Probability of F-to-remove >= .100). |
| **3** | . | P_A4 | Backward (criterion: Probability of F-to-remove >= .100). |
| **4** | . | D_A5 | Backward (criterion: Probability of F-to-remove >= .100). |
| **5** | . | D_C1 | Backward (criterion: Probability of F-to-remove >= .100). |
| **6** | . | D_A2 | Backward (criterion: Probability of F-to-remove >= .100). |
| **7** | . | P_C1 | Backward (criterion: Probability of F-to-remove >= .100). |
| **8** | . | P_A1 | Backward (criterion: Probability of F-to-remove >= .100). |
| **9** | . | D_A6 | Backward (criterion: Probability of F-to-remove >= .100). |
| **10** | . | GDP | Backward (criterion: Probability of F-to-remove >= .100). |

| | | | |
|---|---|---|---|
| **11** | . | D_B1 | Backward (criterion: Probability of F-to-remove >= .100). |
| **12** | . | P_RAKI | Backward (criterion: Probability of F-to-remove >= .100). |
| **13** | . | P_A3 | Backward (criterion: Probability of F-to-remove >= .100). |
| **14** | . | P_A2 | Backward (criterion: Probability of F-to-remove >= .100). |
| **15** | . | P_A5 | Backward (criterion: Probability of F-to-remove >= .100). |
| **16** | . | D_A4 | Backward (criterion: Probability of F-to-remove >= .100). |
| **17** | . | D_B2 | Backward (criterion: Probability of F-to-remove >= .100). |
| **18** | . | P_A6 | Backward (criterion: Probability of F-to-remove >= .100). |
| **19** | . | TOURIST | Backward (criterion: Probability of F-to-remove >= .100). |
| a All requested variables entered. | | | |
| b Dependent Variable: Q_A1 | | | |

**Model Summary(t)**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate | Change Statistics | | | | | Durbin-Watson |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | R Square Change | F Change | df1 | df2 | Sig. F Change | |
| **1** | .976(a) | .953 | .910 | 16031.8623 | .953 | 22.236 | 28 | 31 | .000 | |
| **2** | .976(b) | .953 | .913 | 15781.0862 | .000 | .007 | 1 | 33 | .935 | |
| **3** | .976(c) | .953 | .915 | 15541.2962 | .000 | .005 | 1 | 34 | .945 | |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **4** | .976(d) | .953 | .918 | 15311.8759 | .000 | .004 | 1 | 35 | .953 | |
| **5** | .976(e) | .953 | .920 | 15092.1910 | .000 | .003 | 1 | 36 | .957 | |
| **6** | .976(f) | .952 | .922 | 14894.9318 | .000 | .065 | 1 | 37 | .800 | |
| **7** | .976(g) | .952 | .924 | 14714.2249 | .000 | .108 | 1 | 38 | .745 | |
| **8** | .976(h) | .952 | .926 | 14546.1160 | .000 | .137 | 1 | 39 | .714 | |
| **9** | .976(i) | .952 | .927 | 14432.7824 | .000 | .395 | 1 | 40 | .534 | |
| **10** | .975(j) | .951 | .928 | 14279.2694 | .000 | .154 | 1 | 41 | .697 | |
| **11** | .975(k) | .951 | .929 | 14184.9797 | -.001 | .460 | 1 | 42 | .501 | |
| **12** | .975(l) | .951 | .931 | 14055.4914 | .000 | .237 | 1 | 43 | .629 | |
| **13** | .975(m) | .950 | .931 | 13989.6576 | -.001 | .598 | 1 | 44 | .444 | |
| **14** | .974(n) | .949 | .932 | 13899.3924 | -.001 | .434 | 1 | 45 | .514 | |
| **15** | .973(o) | .948 | .931 | 13998.1937 | -.002 | 1.642 | 1 | 46 | .207 | |
| **16** | .973(p) | .946 | .931 | 14043.3451 | -.002 | 1.297 | 1 | 47 | .261 | |
| **17** | .971(q) | .944 | .929 | 14177.7052 | -.002 | 1.904 | 1 | 48 | .174 | |
| **18** | .971(r) | .942 | .929 | 14259.2181 | -.002 | 1.554 | 1 | 49 | .219 | |
| **19** | .969(s) | .939 | .926 | 14503.2639 | -.003 | 2.692 | 1 | 50 | .107 | 1.906 |

a Predictors: (Constant), TREND, TOURIST, P_A5, GDP, RAMADAN, P_A3, D_B4, P_A6, D_A6, D_B1, D_A3, P_B2, P_A2, P_C1, D_A1, D_C1, P_B1, P_B4, P_A4, D_A2, D_B3, TEMP, P_RAKI, P_B3, D_A4, P_A1, D_A5, D_B2

b Predictors: (Constant), TREND, TOURIST, P_A5, GDP, RAMADAN, P_A3, D_B4, P_A6, D_A6, D_B1, D_A3, P_B2, P_A2, P_C1, D_A1, D_C1, P_B1, P_B4, P_A4, D_A2, D_B3, TEMP, P_RAKI, D_A4, P_A1, D_A5, D_B2

c Predictors: (Constant), TREND, TOURIST, P_A5, GDP, RAMADAN, P_A3, D_B4, P_A6, D_A6, D_B1, D_A3, P_B2, P_A2, P_C1, D_A1, D_C1, P_B1, P_B4, D_A2, D_B3, TEMP, P_RAKI, D_A4, P_A1, D_A5, D_B2

d Predictors: (Constant), TREND, TOURIST, P_A5, GDP, RAMADAN, P_A3, D_B4, P_A6, D_A6, D_B1, D_A3, P_B2, P_A2, P_C1, D_A1, D_C1, P_B1, P_B4, D_A2, D_B3, TEMP, P_RAKI, D_A4, P_A1, D_B2

e Predictors: (Constant), TREND, TOURIST, P_A5, GDP, RAMADAN, P_A3, D_B4, P_A6, D_A6, D_B1, D_A3, P_B2, P_A2, P_C1, D_A1, P_B1, P_B4, D_A2, D_B3, TEMP, P_RAKI, D_A4, P_A1, D_B2

f Predictors: (Constant), TREND, TOURIST, P_A5, GDP, RAMADAN, P_A3, D_B4, P_A6, D_A6, D_B1, D_A3, P_B2, P_A2, P_C1, D_A1, P_B1, P_B4, D_B3, TEMP, P_RAKI, D_A4, P_A1, D_B2

g Predictors: (Constant), TREND, TOURIST, P_A5, GDP, RAMADAN, P_A3, D_B4, P_A6, D_A6, D_B1, D_A3, P_B2, P_A2, D_A1, P_B1, P_B4, D_B3, TEMP, P_RAKI, D_A4, P_A1, D_B2

h Predictors: (Constant), TREND, TOURIST, P_A5, GDP, RAMADAN, P_A3, D_B4, P_A6, D_A6,

| |
|---|
| D_B1, D_A3, P_B2, P_A2, D_A1, P_B1, P_B4, D_B3, TEMP, P_RAKI, D_A4, D_B2 |
| i Predictors: (Constant), TREND, TOURIST, P_A5, GDP, RAMADAN, P_A3, D_B4, P_A6, D_B1, D_A3, P_B2, P_A2, D_A1, P_B1, P_B4, D_B3, TEMP, P_RAKI, D_A4, D_B2 |
| j Predictors: (Constant), TREND, TOURIST, P_A5, RAMADAN, P_A3, D_B4, P_A6, D_B1, D_A3, P_B2, P_A2, D_A1, P_B1, P_B4, D_B3, TEMP, P_RAKI, D_A4, D_B2 |
| k Predictors: (Constant), TREND, TOURIST, P_A5, RAMADAN, P_A3, D_B4, P_A6, D_A3, P_B2, P_A2, D_A1, P_B1, P_B4, D_B3, TEMP, P_RAKI, D_A4, D_B2 |
| l Predictors: (Constant), TREND, TOURIST, P_A5, RAMADAN, P_A3, D_B4, P_A6, D_A3, P_B2, P_A2, D_A1, P_B1, P_B4, D_B3, TEMP, D_A4, D_B2 |
| m Predictors: (Constant), TREND, TOURIST, P_A5, RAMADAN, D_B4, P_A6, D_A3, P_B2, P_A2, D_A1, P_B1, P_B4, D_B3, TEMP, D_A4, D_B2 |
| n Predictors: (Constant), TREND, TOURIST, P_A5, RAMADAN, D_B4, P_A6, D_A3, P_B2, D_A1, P_B1, P_B4, D_B3, TEMP, D_A4, D_B2 |
| o Predictors: (Constant), TREND, TOURIST, RAMADAN, D_B4, P_A6, D_A3, P_B2, D_A1, P_B1, P_B4, D_B3, TEMP, D_A4, D_B2 |
| p Predictors: (Constant), TREND, TOURIST, RAMADAN, D_B4, P_A6, D_A3, P_B2, D_A1, P_B1, P_B4, D_B3, TEMP, D_B2 |
| q Predictors: (Constant), TREND, TOURIST, RAMADAN, D_B4, P_A6, D_A3, P_B2, D_A1, P_B1, P_B4, D_B3, TEMP |
| r Predictors: (Constant), TREND, TOURIST, RAMADAN, D_B4, D_A3, P_B2, D_A1, P_B1, P_B4, D_B3, TEMP |
| s Predictors: (Constant), TREND, RAMADAN, D_B4, D_A3, P_B2, D_A1, P_B1, P_B4, D_B3, TEMP |
| t Dependent Variable: Q_A1 |

**ANOVA(t)**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | **Regression** | 160025287331.860 | 28 | 5715188833.281 | 22.236 | .000(a) |
| | **Residual** | 7967638831.790 | 31 | 257020607.477 | | |
| | **Total** | 167992926163.650 | 59 | | | |
| 2 | **Regression** | 160023560364.582 | 27 | 5926798532.022 | 23.798 | .000(b) |
| | **Residual** | 7969365799.068 | 32 | 249042681.221 | | |
| | **Total** | 167992926163.650 | 59 | | | |
| 3 | **Regression** | 160022373871.699 | 26 | 6154706687.373 | 25.482 | .000(c) |

| | | | | | | |
|---|---|---|---|---|---|---|
| | **Residual** | 7970552291.951 | 33 | 241531887.635 | | |
| | **Total** | 167992926163.650 | 59 | | | |
| **4** | **Regression** | 160021505730.751 | 25 | 6400860229.230 | 27.301 | .000(d) |
| | **Residual** | 7971420432.899 | 34 | 234453542.144 | | |
| | **Total** | 167992926163.650 | 59 | | | |
| **5** | **Regression** | 160020828160.248 | 24 | 6667534506.677 | 29.273 | .000(e) |
| | **Residual** | 7972098003.402 | 35 | 227774228.669 | | |
| | **Total** | 167992926163.650 | 59 | | | |
| **6** | **Regression** | 160006002421.743 | 23 | 6956782713.989 | 31.357 | .000(f) |
| | **Residual** | 7986923741.907 | 36 | 221858992.831 | | |
| | **Total** | 167992926163.650 | 59 | | | |
| **7** | **Regression** | 159982114808.104 | 22 | 7271914309.459 | 33.587 | .000(g) |
| | **Residual** | 8010811355.546 | 37 | 216508415.015 | | |
| | **Total** | 167992926163.650 | 59 | | | |
| **8** | **Regression** | 159952525540.577 | 21 | 7616786930.504 | 35.998 | .000(h) |
| | **Residual** | 8040400623.073 | 38 | 211589490.081 | | |
| | **Total** | 167992926163.650 | 59 | | | |
| **9** | **Regression** | 159869023025.134 | 20 | 7993451151.257 | 38.374 | .000(i) |
| | **Residual** | 8123903138.516 | 39 | 208305208.680 | | |
| | **Total** | 167992926163.650 | 59 | | | |
| **10** | **Regression** | 159837024822.244 | 19 | 8412474990.644 | 41.258 | .000(j) |
| | **Residual** | 8155901341.406 | 40 | 203897533.535 | | |
| | **Total** | 167992926163.650 | 59 | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| **11** | **Regression** | 159743166505.432 | 18 | 8874620361.413 | 44.105 | .000(k) |
| | **Residual** | 8249759658.218 | 41 | 201213650.200 | | |
| | **Total** | 167992926163.650 | 59 | | | |
| **12** | **Regression** | 159695538926.656 | 17 | 9393855230.980 | 47.550 | .000(l) |
| | **Residual** | 8297387236.994 | 42 | 197556838.976 | | |
| | **Total** | 167992926163.650 | 59 | | | |
| **13** | **Regression** | 159577373850.114 | 16 | 9973585865.632 | 50.961 | .000(m) |
| | **Residual** | 8415552313.536 | 43 | 195710518.919 | | |
| | **Total** | 167992926163.650 | 59 | | | |
| **14** | **Regression** | 159492429303.201 | 15 | 10632828620.213 | 55.037 | .000(n) |
| | **Residual** | 8500496860.448 | 44 | 193193110.465 | | |
| | **Total** | 167992926163.650 | 59 | | | |
| **15** | **Regression** | 159175201919.608 | 14 | 11369657279.972 | 58.023 | .000(o) |
| | **Residual** | 8817724244.042 | 45 | 195949427.645 | | |
| | **Total** | 167992926163.650 | 59 | | | |
| **16** | **Regression** | 158921011240.847 | 13 | 12224693172.373 | 61.986 | .000(p) |
| | **Residual** | 9071914922.803 | 46 | 197215541.800 | | |
| | **Total** | 167992926163.650 | 59 | | | |
| **17** | **Regression** | 158545581941.687 | 12 | 13212131828.474 | 65.730 | .000(q) |
| | **Residual** | 9447344221.963 | 47 | 201007323.872 | | |
| | **Total** | 167992926163.650 | 59 | | | |
| **18** | **Regression** | 158233311758.624 | 11 | 14384846523.511 | 70.748 | .000(r) |
| | **Residual** | 9759614405.026 | 48 | 203325300.105 | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| | **Total** | 167992926163.650 | 59 | | | |
| **19** | **Regression** | 157686037661.947 | 10 | 15768603766.195 | 74.966 | .000(s) |
| | **Residual** | 10306888501.703 | 49 | 210344663.300 | | |
| | **Total** | 167992926163.650 | 59 | | | |
| a Predictors: (Constant), TREND, TOURIST, P_A5, GDP, RAMADAN, P_A3, D_B4, P_A6, D_A6, D_B1, D_A3, P_B2, P_A2, P_C1, D_A1, D_C1, P_B1, P_B4, P_A4, D_A2, D_B3, TEMP, P_RAKI, P_B3, D_A4, P_A1, D_A5, D_B2 | | | | | | |
| b Predictors: (Constant), TREND, TOURIST, P_A5, GDP, RAMADAN, P_A3, D_B4, P_A6, D_A6, D_B1, D_A3, P_B2, P_A2, P_C1, D_A1, D_C1, P_B1, P_B4, P_A4, D_A2, D_B3, TEMP, P_RAKI, D_A4, P_A1, D_A5, D_B2 | | | | | | |
| c Predictors: (Constant), TREND, TOURIST, P_A5, GDP, RAMADAN, P_A3, D_B4, P_A6, D_A6, D_B1, D_A3, P_B2, P_A2, P_C1, D_A1, D_C1, P_B1, P_B4, D_A2, D_B3, TEMP, P_RAKI, D_A4, P_A1, D_A5, D_B2 | | | | | | |
| d Predictors: (Constant), TREND, TOURIST, P_A5, GDP, RAMADAN, P_A3, D_B4, P_A6, D_A6, D_B1, D_A3, P_B2, P_A2, P_C1, D_A1, D_C1, P_B1, P_B4, D_A2, D_B3, TEMP, P_RAKI, D_A4, P_A1, D_B2 | | | | | | |
| e Predictors: (Constant), TREND, TOURIST, P_A5, GDP, RAMADAN, P_A3, D_B4, P_A6, D_A6, D_B1, D_A3, P_B2, P_A2, P_C1, D_A1, P_B1, P_B4, D_A2, D_B3, TEMP, P_RAKI, D_A4, P_A1, D_B2 | | | | | | |
| f Predictors: (Constant), TREND, TOURIST, P_A5, GDP, RAMADAN, P_A3, D_B4, P_A6, D_A6, D_B1, D_A3, P_B2, P_A2, P_C1, D_A1, P_B1, P_B4, D_B3, TEMP, P_RAKI, D_A4, P_A1, D_B2 | | | | | | |
| g Predictors: (Constant), TREND, TOURIST, P_A5, GDP, RAMADAN, P_A3, D_B4, P_A6, D_A6, D_B1, D_A3, P_B2, P_A2, D_A1, P_B1, P_B4, D_B3, TEMP, P_RAKI, D_A4, P_A1, D_B2 | | | | | | |
| h Predictors: (Constant), TREND, TOURIST, P_A5, GDP, RAMADAN, P_A3, D_B4, P_A6, D_A6, D_B1, D_A3, P_B2, P_A2, D_A1, P_B1, P_B4, D_B3, TEMP, P_RAKI, D_A4, D_B2 | | | | | | |
| i Predictors: (Constant), TREND, TOURIST, P_A5, GDP, RAMADAN, P_A3, D_B4, P_A6, D_B1, D_A3, P_B2, P_A2, D_A1, P_B1, P_B4, D_B3, TEMP, P_RAKI, D_A4, D_B2 | | | | | | |
| j Predictors: (Constant), TREND, TOURIST, P_A5, RAMADAN, P_A3, D_B4, P_A6, D_B1, D_A3, P_B2, P_A2, D_A1, P_B1, P_B4, D_B3, TEMP, P_RAKI, D_A4, D_B2 | | | | | | |
| k Predictors: (Constant), TREND, TOURIST, P_A5, RAMADAN, P_A3, D_B4, P_A6, D_A3, P_B2, P_A2, D_A1, P_B1, P_B4, D_B3, TEMP, P_RAKI, D_A4, D_B2 | | | | | | |
| l Predictors: (Constant), TREND, TOURIST, P_A5, RAMADAN, P_A3, D_B4, P_A6, D_A3, P_B2, P_A2, D_A1, P_B1, P_B4, D_B3, TEMP, D_A4, D_B2 | | | | | | |
| m Predictors: (Constant), TREND, TOURIST, P_A5, RAMADAN, D_B4, P_A6, D_A3, P_B2, P_A2, D_A1, P_B1, P_B4, D_B3, TEMP, D_A4, D_B2 | | | | | | |
| n Predictors: (Constant), TREND, TOURIST, P_A5, RAMADAN, D_B4, P_A6, D_A3, P_B2, D_A1, P_B1, P_B4, D_B3, TEMP, D_A4, D_B2 | | | | | | |

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|---|
| o Predictors: (Constant), TREND, TOURIST, RAMADAN, D_B4, P_A6, D_A3, P_B2, D_A1, P_B1, P_B4, D_B3, TEMP, D_A4, D_B2 |
| p Predictors: (Constant), TREND, TOURIST, RAMADAN, D_B4, P_A6, D_A3, P_B2, D_A1, P_B1, P_B4, D_B3, TEMP, D_B2 |
| q Predictors: (Constant), TREND, TOURIST, RAMADAN, D_B4, P_A6, D_A3, P_B2, D_A1, P_B1, P_B4, D_B3, TEMP |
| r Predictors: (Constant), TREND, TOURIST, RAMADAN, D_B4, D_A3, P_B2, D_A1, P_B1, P_B4, D_B3, TEMP |
| s Predictors: (Constant), TREND, RAMADAN, D_B4, D_A3, P_B2, D_A1, P_B1, P_B4, D_B3, TEMP |
| t Dependent Variable: Q_A1 |

**Coefficients(a)**

| | | **Unstandardized Coefficients** | | **Standardized Coefficients** | **t** | **Sig.** |
|---|---|---|---|---|---|---|
| **Model** | | **B** | **Std. Error** | **Beta** | | |
| **1** | **(Constant)** | -318679.477 | 260436.525 | | -1.224 | .230 |
| | **D_A1** | 4254.650 | 5563.546 | .090 | .765 | .450 |
| | **D_B1** | -1927.398 | 5441.755 | -.049 | -.354 | .726 |
| | **D_A5** | 325.846 | 3937.136 | .022 | .083 | .935 |
| | **D_B4** | 7901.588 | 4381.635 | .136 | 1.803 | .081 |
| | **D_C1** | -579.096 | 5604.872 | -.017 | -.103 | .918 |
| | **D_A6** | -1432.451 | 4470.044 | -.067 | -.320 | .751 |
| | **D_A2** | 983.371 | 4182.791 | .038 | .235 | .816 |
| | **D_B3** | 11450.290 | 6173.803 | .283 | 1.855 | .073 |
| | **D_A3** | 7151.570 | 4123.121 | .192 | 1.735 | .093 |
| | **D_A4** | 1088.547 | 3032.426 | .087 | .359 | .722 |
| | **D_B2** | 3514.505 | 2831.345 | .336 | 1.241 | .224 |
| | **P_A1** | 519.916 | 1648.476 | .081 | .315 | .755 |
| | **P_B1** | 574.756 | 975.280 | .109 | .589 | .560 |
| | **P_A5** | -554.679 | 817.007 | -.098 | -.679 | .502 |
| | **P_B4** | -860.001 | 655.922 | -.173 | -1.311 | .199 |
| | **P_C1** | -223.395 | 679.897 | -.061 | -.329 | .745 |
| | **P_A6** | 594.604 | 547.073 | .122 | 1.087 | .285 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | **P_A2** | -781.688 | 809.440 | -.148 | -.966 | .342 |
| | **P_B3** | 75.638 | 922.743 | .017 | .082 | .935 |
| | **P_A3** | 308.454 | 594.490 | .058 | .519 | .608 |
| | **P_A4** | 19.286 | 209.586 | .024 | .092 | .927 |
| | **P_B2** | 107.413 | 121.494 | .095 | .884 | .383 |
| | **TEMP** | 3052.034 | 1353.855 | .434 | 2.254 | .031 |
| | **GDP** | 1095.660 | 2127.544 | .058 | .515 | .610 |
| | **RAMADAN** | -2108.107 | 463.573 | -.259 | -4.548 | .000 |
| | **TOURIST** | 25.655 | 24.115 | .197 | 1.064 | .296 |
| | **P_RAKI** | 84.851 | 108.565 | .141 | .782 | .440 |
| | **TREND** | -2767.306 | 1581.657 | -.906 | -1.750 | .090 |
| **2** | **(Constant)** | -318717.758 | 256362.273 | | -1.243 | .223 |
| | **D_A1** | 4319.384 | 5421.065 | .091 | .797 | .431 |
| | **D_B1** | -1974.977 | 5326.074 | -.050 | -.371 | .713 |
| | **D_A5** | 282.256 | 3840.036 | .019 | .074 | .942 |
| | **D_B4** | 7950.905 | 4272.242 | .137 | 1.861 | .072 |
| | **D_C1** | -501.457 | 5437.852 | -.015 | -.092 | .927 |
| | **D_A6** | -1485.549 | 4353.675 | -.069 | -.341 | .735 |
| | **D_A2** | 907.623 | 4015.624 | .035 | .226 | .823 |
| | **D_B3** | 11402.894 | 6050.519 | .282 | 1.885 | .069 |
| | **D_A3** | 7221.256 | 3971.417 | .193 | 1.818 | .078 |
| | **D_A4** | 1142.804 | 2913.015 | .092 | .392 | .697 |
| | **D_B2** | 3523.306 | 2785.052 | .337 | 1.265 | .215 |
| | **P_A1** | 562.056 | 1541.764 | .088 | .365 | .718 |
| | **P_B1** | 599.338 | 913.516 | .114 | .656 | .516 |
| | **P_A5** | -552.918 | 803.949 | -.097 | -.688 | .497 |
| | **P_B4** | -871.899 | 629.653 | -.175 | -1.385 | .176 |
| | **P_C1** | -221.408 | 668.836 | -.060 | -.331 | .743 |
| | **P_A6** | 601.526 | 532.060 | .124 | 1.131 | .267 |
| | **P_A2** | -781.101 | 796.747 | -.148 | -.980 | .334 |
| | **P_A3** | 316.208 | 577.737 | .060 | .547 | .588 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | **P_A4** | 13.369 | 193.684 | .017 | .069 | .945 |
| | **P_B2** | 108.166 | 119.252 | .096 | .907 | .371 |
| | **TEMP** | 3051.310 | 1332.649 | .434 | 2.290 | .029 |
| | **GDP** | 1110.906 | 2086.246 | .059 | .532 | .598 |
| | **RAMADAN** | -2118.083 | 440.317 | -.260 | -4.810 | .000 |
| | **TOURIST** | 26.048 | 23.265 | .200 | 1.120 | .271 |
| | **P_RAKI** | 83.616 | 105.834 | .139 | .790 | .435 |
| | **TREND** | -2788.882 | 1535.205 | -.913 | -1.817 | .079 |
| **3** | **(Constant)** | -315184.467 | 247382.635 | | -1.274 | .212 |
| | **D_A1** | 4287.282 | 5319.009 | .090 | .806 | .426 |
| | **D_B1** | -1930.782 | 5207.105 | -.049 | -.371 | .713 |
| | **D_A5** | 220.477 | 3677.530 | .015 | .060 | .953 |
| | **D_B4** | 7894.155 | 4128.676 | .136 | 1.912 | .065 |
| | **D_C1** | -381.316 | 5073.478 | -.012 | -.075 | .941 |
| | **D_A6** | -1499.774 | 4282.716 | -.070 | -.350 | .728 |
| | **D_A2** | 902.242 | 3953.862 | .035 | .228 | .821 |
| | **D_B3** | 11358.303 | 5924.520 | .281 | 1.917 | .064 |
| | **D_A3** | 7186.627 | 3879.738 | .192 | 1.852 | .073 |
| | **D_A4** | 1290.506 | 1946.471 | .104 | .663 | .512 |
| | **D_B2** | 3544.072 | 2726.684 | .339 | 1.300 | .203 |
| | **P_A1** | 596.130 | 1438.401 | .093 | .414 | .681 |
| | **P_B1** | 598.053 | 899.448 | .113 | .665 | .511 |
| | **P_A5** | -554.255 | 791.504 | -.098 | -.700 | .489 |
| | **P_B4** | -867.178 | 616.416 | -.174 | -1.407 | .169 |
| | **P_C1** | -216.994 | 655.656 | -.059 | -.331 | .743 |
| | **P_A6** | 593.387 | 510.945 | .122 | 1.161 | .254 |
| | **P_A2** | -795.684 | 756.551 | -.150 | -1.052 | .301 |
| | **P_A3** | 314.077 | 568.146 | .059 | .553 | .584 |
| | **P_B2** | 110.005 | 114.470 | .097 | .961 | .344 |
| | **TEMP** | 3034.437 | 1290.131 | .432 | 2.352 | .025 |
| | **GDP** | 1084.084 | 2018.590 | .057 | .537 | .595 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | **RAMADAN** | -2118.277 | 433.617 | -.260 | -4.885 | .000 |
| | **TOURIST** | 26.439 | 22.223 | .203 | 1.190 | .243 |
| | **P_RAKI** | 83.359 | 104.161 | .138 | .800 | .429 |
| | **TREND** | -2780.634 | 1507.291 | -.910 | -1.845 | .074 |
| **4** | **(Constant)** | -317509.681 | 240716.761 | | -1.319 | .196 |
| | **D_A1** | 4380.002 | 5014.080 | .092 | .874 | .388 |
| | **D_B1** | -1953.346 | 5116.820 | -.049 | -.382 | .705 |
| | **D_B4** | 7907.731 | 4061.605 | .136 | 1.947 | .060 |
| | **D_C1** | -236.129 | 4392.387 | -.007 | -.054 | .957 |
| | **D_A6** | -1415.700 | 3986.878 | -.066 | -.355 | .725 |
| | **D_A2** | 965.169 | 3755.730 | .037 | .257 | .799 |
| | **D_B3** | 11332.734 | 5821.919 | .280 | 1.947 | .060 |
| | **D_A3** | 7169.066 | 3811.556 | .192 | 1.881 | .069 |
| | **D_A4** | 1249.561 | 1795.816 | .100 | .696 | .491 |
| | **D_B2** | 3510.245 | 2628.289 | .336 | 1.336 | .191 |
| | **P_A1** | 586.313 | 1407.953 | .092 | .416 | .680 |
| | **P_B1** | 590.121 | 876.532 | .112 | .673 | .505 |
| | **P_A5** | -558.272 | 777.020 | -.098 | -.718 | .477 |
| | **P_B4** | -872.462 | 601.077 | -.175 | -1.451 | .156 |
| | **P_C1** | -228.958 | 615.328 | -.062 | -.372 | .712 |
| | **P_A6** | 601.220 | 486.666 | .124 | 1.235 | .225 |
| | **P_A2** | -776.419 | 674.811 | -.147 | -1.151 | .258 |
| | **P_A3** | 304.843 | 538.796 | .058 | .566 | .575 |
| | **P_B2** | 108.436 | 109.794 | .096 | .988 | .330 |
| | **TEMP** | 3071.786 | 1113.079 | .437 | 2.760 | .009 |
| | **GDP** | 1095.803 | 1979.444 | .058 | .554 | .583 |
| | **RAMADAN** | -2123.499 | 418.507 | -.261 | -5.074 | .000 |
| | **TOURIST** | 26.054 | 20.961 | .200 | 1.243 | .222 |
| | **P_RAKI** | 84.481 | 100.951 | .140 | .837 | .409 |
| | **TREND** | -2736.757 | 1298.238 | -.896 | -2.108 | .042 |
| **5** | **(Constant)** | -317797.950 | 237204.237 | | -1.340 | .189 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | **D_A1** | 4439.325 | 4820.970 | .094 | .921 | .363 |
| | **D_B1** | -1999.845 | 4970.825 | -.051 | -.402 | .690 |
| | **D_B4** | 7814.568 | 3620.630 | .135 | 2.158 | .038 |
| | **D_A6** | -1515.327 | 3479.325 | -.070 | -.436 | .666 |
| | **D_A2** | 915.962 | 3590.223 | .035 | .255 | .800 |
| | **D_B3** | 11300.069 | 5707.051 | .279 | 1.980 | .056 |
| | **D_A3** | 7171.799 | 3756.536 | .192 | 1.909 | .064 |
| | **D_A4** | 1280.514 | 1676.604 | .103 | .764 | .450 |
| | **D_B2** | 3556.708 | 2446.508 | .340 | 1.454 | .155 |
| | **P_A1** | 590.298 | 1385.828 | .092 | .426 | .673 |
| | **P_B1** | 593.017 | 862.324 | .112 | .688 | .496 |
| | **P_A5** | -561.958 | 762.885 | -.099 | -.737 | .466 |
| | **P_B4** | -872.994 | 592.373 | -.176 | -1.474 | .149 |
| | **P_C1** | -226.168 | 604.338 | -.062 | -.374 | .710 |
| | **P_A6** | 597.431 | 474.626 | .123 | 1.259 | .216 |
| | **P_A2** | -778.171 | 664.353 | -.147 | -1.171 | .249 |
| | **P_A3** | 294.233 | 494.152 | .056 | .595 | .555 |
| | **P_B2** | 108.755 | 108.060 | .096 | 1.006 | .321 |
| | **TEMP** | 3083.953 | 1074.191 | .439 | 2.871 | .007 |
| | **GDP** | 1115.453 | 1917.491 | .059 | .582 | .564 |
| | **RAMADAN** | -2123.691 | 412.487 | -.261 | -5.149 | .000 |
| | **TOURIST** | 25.772 | 20.006 | .198 | 1.288 | .206 |
| | **P_RAKI** | 85.442 | 97.932 | .142 | .872 | .389 |
| | **TREND** | -2768.768 | 1137.071 | -.906 | -2.435 | .020 |
| **6** | **(Constant)** | -287885.110 | 203506.220 | | -1.415 | .166 |
| | **D_A1** | 4418.067 | 4757.247 | .093 | .929 | .359 |
| | **D_B1** | -2598.438 | 4324.980 | -.066 | -.601 | .552 |
| | **D_B4** | 7921.259 | 3549.393 | .137 | 2.232 | .032 |
| | **D_A6** | -1420.428 | 3414.169 | -.066 | -.416 | .680 |
| | **D_B3** | 11514.550 | 5571.014 | .285 | 2.067 | .046 |
| | **D_A3** | 7568.298 | 3375.279 | .203 | 2.242 | .031 |

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|---|---|---|---|---|---|---|
| | **D_A4** | 1360.113 | 1625.788 | .109 | .837 | .408 |
| | **D_B2** | 3495.961 | 2403.069 | .334 | 1.455 | .154 |
| | **P_A1** | 474.676 | 1292.515 | .074 | .367 | .716 |
| | **P_B1** | 645.073 | 826.886 | .122 | .780 | .440 |
| | **P_A5** | -614.116 | 725.375 | -.108 | -.847 | .403 |
| | **P_B4** | -910.847 | 565.996 | -.183 | -1.609 | .116 |
| | **P_C1** | -190.359 | 580.130 | -.052 | -.328 | .745 |
| | **P_A6** | 653.926 | 414.316 | .134 | 1.578 | .123 |
| | **P_A2** | -804.005 | 648.009 | -.152 | -1.241 | .223 |
| | **P_A3** | 292.990 | 487.670 | .055 | .601 | .552 |
| | **P_B2** | 103.826 | 104.929 | .092 | .989 | .329 |
| | **TEMP** | 3178.516 | 995.040 | .452 | 3.194 | .003 |
| | **GDP** | 1068.685 | 1883.761 | .056 | .567 | .574 |
| | **RAMADAN** | -2112.870 | 404.938 | -.260 | -5.218 | .000 |
| | **TOURIST** | 25.772 | 19.745 | .198 | 1.305 | .200 |
| | **P_RAKI** | 81.932 | 95.694 | .136 | .856 | .398 |
| | **TREND** | -2703.943 | 1093.832 | -.885 | -2.472 | .018 |
| **7** | **(Constant)** | -294859.918 | 199937.625 | | -1.475 | .149 |
| | **D_A1** | 4291.785 | 4684.129 | .090 | .916 | .365 |
| | **D_B1** | -2661.400 | 4268.302 | -.067 | -.624 | .537 |
| | **D_B4** | 7952.587 | 3505.062 | .137 | 2.269 | .029 |
| | **D_A6** | -1710.582 | 3257.663 | -.080 | -.525 | .603 |
| | **D_B3** | 11569.372 | 5500.951 | .286 | 2.103 | .042 |
| | **D_A3** | 7724.429 | 3301.032 | .207 | 2.340 | .025 |
| | **D_A4** | 1554.163 | 1496.044 | .125 | 1.039 | .306 |
| | **D_B2** | 3823.333 | 2159.653 | .366 | 1.770 | .085 |
| | **P_A1** | 472.015 | 1276.809 | .074 | .370 | .714 |
| | **P_B1** | 650.122 | 816.713 | .123 | .796 | .431 |
| | **P_A5** | -717.375 | 645.631 | -.126 | -1.111 | .274 |
| | **P_B4** | -873.556 | 547.742 | -.176 | -1.595 | .119 |
| | **P_A6** | 661.434 | 408.664 | .136 | 1.619 | .114 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | **P_A2** | -763.223 | 628.262 | -.144 | -1.215 | .232 |
| | **P_A3** | 241.555 | 456.188 | .046 | .530 | .600 |
| | **P_B2** | 108.925 | 102.513 | .096 | 1.063 | .295 |
| | **TEMP** | 3179.596 | 982.963 | .452 | 3.235 | .003 |
| | **GDP** | 1202.925 | 1816.493 | .063 | .662 | .512 |
| | **RAMADAN** | -2103.038 | 398.929 | -.259 | -5.272 | .000 |
| | **TOURIST** | 24.849 | 19.306 | .191 | 1.287 | .206 |
| | **P_RAKI** | 63.357 | 76.218 | .105 | .831 | .411 |
| | **TREND** | -2872.266 | 954.368 | -.940 | -3.010 | .005 |
| **8** | **(Constant)** | -277867.896 | 192359.509 | | -1.445 | .157 |
| | **D_A1** | 4155.081 | 4616.161 | .088 | .900 | .374 |
| | **D_B1** | -3261.870 | 3902.068 | -.083 | -.836 | .408 |
| | **D_B4** | 8036.933 | 3457.668 | .139 | 2.324 | .026 |
| | **D_A6** | -1974.085 | 3142.412 | -.092 | -.628 | .534 |
| | **D_B3** | 11371.287 | 5412.243 | .281 | 2.101 | .042 |
| | **D_A3** | 8032.625 | 3157.534 | .215 | 2.544 | .015 |
| | **D_A4** | 1721.338 | 1409.769 | .138 | 1.221 | .230 |
| | **D_B2** | 3572.150 | 2026.565 | .342 | 1.763 | .086 |
| | **P_B1** | 842.750 | 621.713 | .160 | 1.356 | .183 |
| | **P_A5** | -694.228 | 635.246 | -.122 | -1.093 | .281 |
| | **P_B4** | -862.661 | 540.699 | -.174 | -1.595 | .119 |
| | **P_A6** | 690.368 | 396.517 | .142 | 1.741 | .090 |
| | **P_A2** | -667.346 | 565.696 | -.126 | -1.180 | .245 |
| | **P_A3** | 289.532 | 432.342 | .055 | .670 | .507 |
| | **P_B2** | 97.667 | 96.767 | .086 | 1.009 | .319 |
| | **TEMP** | 3167.160 | 971.163 | .450 | 3.261 | .002 |
| | **GDP** | 1192.000 | 1795.502 | .063 | .664 | .511 |
| | **RAMADAN** | -2132.884 | 386.211 | -.262 | -5.523 | .000 |
| | **TOURIST** | 25.990 | 18.840 | .200 | 1.380 | .176 |
| | **P_RAKI** | 70.212 | 73.083 | .117 | .961 | .343 |
| | **TREND** | -2812.448 | 929.805 | -.920 | -3.025 | .004 |

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|---|---|---|---|---|---|---|
| 9 | **(Constant)** | -208547.320 | 156334.377 | | -1.334 | .190 |
| | **D_A1** | 3477.843 | 4453.542 | .073 | .781 | .440 |
| | **D_B1** | -2730.724 | 3779.686 | -.069 | -.722 | .474 |
| | **D_B4** | 7899.918 | 3423.896 | .136 | 2.307 | .026 |
| | **D_B3** | 11676.338 | 5348.417 | .289 | 2.183 | .035 |
| | **D_A3** | 7553.130 | 3040.020 | .202 | 2.485 | .017 |
| | **D_A4** | 1455.005 | 1334.035 | .117 | 1.091 | .282 |
| | **D_B2** | 2714.975 | 1486.712 | .260 | 1.826 | .075 |
| | **P_B1** | 851.943 | 616.698 | .162 | 1.381 | .175 |
| | **P_A5** | -718.976 | 629.083 | -.127 | -1.143 | .260 |
| | **P_B4** | -915.001 | 530.079 | -.184 | -1.726 | .092 |
| | **P_A6** | 638.761 | 384.892 | .131 | 1.660 | .105 |
| | **P_A2** | -583.746 | 545.537 | -.110 | -1.070 | .291 |
| | **P_A3** | 361.728 | 413.541 | .068 | .875 | .387 |
| | **P_B2** | 116.704 | 91.184 | .103 | 1.280 | .208 |
| | **TEMP** | 3128.674 | 961.677 | .445 | 3.253 | .002 |
| | **GDP** | 590.776 | 1507.337 | .031 | .392 | .697 |
| | **RAMADAN** | -2101.935 | 380.071 | -.258 | -5.530 | .000 |
| | **TOURIST** | 26.992 | 18.626 | .208 | 1.449 | .155 |
| | **P_RAKI** | 49.086 | 64.381 | .082 | .762 | .450 |
| | **TREND** | -2403.891 | 659.336 | -.787 | -3.646 | .001 |
| **10** | **(Constant)** | -176163.303 | 131303.652 | | -1.342 | .187 |
| | **D_A1** | 4262.372 | 3936.036 | .090 | 1.083 | .285 |
| | **D_B1** | -2508.388 | 3697.126 | -.064 | -.678 | .501 |
| | **D_B4** | 7810.038 | 3379.872 | .135 | 2.311 | .026 |
| | **D_B3** | 11840.119 | 5275.353 | .293 | 2.244 | .030 |
| | **D_A3** | 8039.624 | 2745.548 | .215 | 2.928 | .006 |
| | **D_A4** | 1628.687 | 1244.899 | .131 | 1.308 | .198 |
| | **D_B2** | 2741.374 | 1469.388 | .262 | 1.866 | .069 |
| | **P_B1** | 907.993 | 593.506 | .172 | 1.530 | .134 |
| | **P_A5** | -752.795 | 616.509 | -.132 | -1.221 | .229 |

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|---|---|---|---|---|---|---|
| | **P_B4** | -843.368 | 492.281 | -.170 | -1.713 | .094 |
| | **P_A6** | 624.463 | 379.083 | .128 | 1.647 | .107 |
| | **P_A2** | -588.894 | 539.578 | -.111 | -1.091 | .282 |
| | **P_A3** | 328.085 | 400.231 | .062 | .820 | .417 |
| | **P_B2** | 119.371 | 89.963 | .105 | 1.327 | .192 |
| | **TEMP** | 3022.042 | 912.579 | .430 | 3.312 | .002 |
| | **RAMADAN** | -2116.498 | 374.227 | -.260 | -5.656 | .000 |
| | **TOURIST** | 26.665 | 18.410 | .205 | 1.448 | .155 |
| | **P_RAKI** | 45.957 | 63.205 | .076 | .727 | .471 |
| | **TREND** | -2443.314 | 644.687 | -.800 | -3.790 | .000 |
| **11** | **(Constant)** | -197911.561 | 126490.008 | | -1.565 | .125 |
| | **D_A1** | 4802.994 | 3829.084 | .101 | 1.254 | .217 |
| | **D_B4** | 7800.564 | 3357.525 | .135 | 2.323 | .025 |
| | **D_B3** | 9671.090 | 4168.586 | .239 | 2.320 | .025 |
| | **D_A3** | 7402.396 | 2562.869 | .198 | 2.888 | .006 |
| | **D_A4** | 1219.679 | 1082.008 | .098 | 1.127 | .266 |
| | **D_B2** | 2710.411 | 1458.981 | .259 | 1.858 | .070 |
| | **P_B1** | 790.726 | 564.032 | .150 | 1.402 | .168 |
| | **P_A5** | -649.120 | 593.328 | -.114 | -1.094 | .280 |
| | **P_B4** | -833.891 | 488.833 | -.168 | -1.706 | .096 |
| | **P_A6** | 611.266 | 376.084 | .126 | 1.625 | .112 |
| | **P_A2** | -420.935 | 476.272 | -.080 | -.884 | .382 |
| | **P_A3** | 286.727 | 392.949 | .054 | .730 | .470 |
| | **P_B2** | 127.447 | 88.583 | .113 | 1.439 | .158 |
| | **TEMP** | 2820.947 | 857.406 | .401 | 3.290 | .002 |
| | **RAMADAN** | -2165.434 | 364.786 | -.266 | -5.936 | .000 |
| | **TOURIST** | 29.444 | 17.830 | .227 | 1.651 | .106 |
| | **P_RAKI** | 27.611 | 56.751 | .046 | .487 | .629 |
| | **TREND** | -2351.120 | 626.042 | -.769 | -3.756 | .001 |
| **12** | **(Constant)** | -202351.912 | 125008.651 | | -1.619 | .113 |
| | **D_A1** | 5538.802 | 3485.638 | .117 | 1.589 | .120 |

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| | **D_B4** | 8309.722 | 3161.136 | .143 | 2.629 | .012 |
| | **D_B3** | 8619.421 | 3531.804 | .213 | 2.441 | .019 |
| | **D_A3** | 7209.159 | 2508.793 | .193 | 2.874 | .006 |
| | **D_A4** | 1113.495 | 1050.094 | .089 | 1.060 | .295 |
| | **D_B2** | 2819.238 | 1428.571 | .270 | 1.973 | .055 |
| | **P_B1** | 788.843 | 558.870 | .150 | 1.411 | .165 |
| | **P_A5** | -706.453 | 576.199 | -.124 | -1.226 | .227 |
| | **P_B4** | -880.300 | 475.059 | -.177 | -1.853 | .071 |
| | **P_A6** | 678.336 | 346.713 | .139 | 1.956 | .057 |
| | **P_A2** | -399.302 | 469.863 | -.076 | -.850 | .400 |
| | **P_A3** | 300.362 | 388.371 | .057 | .773 | .444 |
| | **P_B2** | 122.322 | 87.152 | .108 | 1.404 | .168 |
| | **TEMP** | 2757.038 | 839.549 | .392 | 3.284 | .002 |
| | **RAMADAN** | -2181.791 | 359.918 | -.268 | -6.062 | .000 |
| | **TOURIST** | 30.060 | 17.622 | .231 | 1.706 | .095 |
| | **TREND** | -2278.872 | 602.623 | -.746 | -3.782 | .000 |
| **13** | **(Constant)** | -187270.990 | 122900.072 | | -1.524 | .135 |
| | **D_A1** | 5452.117 | 3467.517 | .115 | 1.572 | .123 |
| | **D_B4** | 8189.210 | 3142.505 | .141 | 2.606 | .013 |
| | **D_B3** | 8328.633 | 3495.285 | .206 | 2.383 | .022 |
| | **D_A3** | 6940.297 | 2472.952 | .186 | 2.806 | .007 |
| | **D_A4** | 1057.445 | 1042.683 | .085 | 1.014 | .316 |
| | **D_B2** | 2641.161 | 1403.289 | .253 | 1.882 | .067 |
| | **P_B1** | 958.335 | 511.700 | .182 | 1.873 | .068 |
| | **P_A5** | -765.821 | 568.388 | -.135 | -1.347 | .185 |
| | **P_B4** | -850.312 | 471.256 | -.171 | -1.804 | .078 |
| | **P_A6** | 669.084 | 344.883 | .138 | 1.940 | .059 |
| | **P_A2** | -295.183 | 448.055 | -.056 | -.659 | .514 |
| | **P_B2** | 132.353 | 85.777 | .117 | 1.543 | .130 |
| | **TEMP** | 2925.364 | 807.049 | .416 | 3.625 | .001 |
| | **RAMADAN** | -2233.635 | 351.964 | -.275 | -6.346 | .000 |

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| | **TOURIST** | 28.044 | 17.347 | .216 | 1.617 | .113 |
| | **TREND** | -2105.655 | 556.836 | -.689 | -3.781 | .000 |
| **14** | **(Constant)** | -194566.409 | 121610.415 | | -1.600 | .117 |
| | **D_A1** | 5498.432 | 3444.436 | .116 | 1.596 | .118 |
| | **D_B4** | 8475.503 | 3092.232 | .146 | 2.741 | .009 |
| | **D_B3** | 7750.969 | 3361.685 | .192 | 2.306 | .026 |
| | **D_A3** | 7180.274 | 2430.196 | .192 | 2.955 | .005 |
| | **D_A4** | 1398.448 | 899.298 | .112 | 1.555 | .127 |
| | **D_B2** | 2485.315 | 1374.282 | .238 | 1.808 | .077 |
| | **P_B1** | 711.077 | 345.576 | .135 | 2.058 | .046 |
| | **P_A5** | -717.621 | 560.023 | -.126 | -1.281 | .207 |
| | **P_B4** | -930.651 | 452.268 | -.187 | -2.058 | .046 |
| | **P_A6** | 641.132 | 340.055 | .132 | 1.885 | .066 |
| | **P_B2** | 122.301 | 83.865 | .108 | 1.458 | .152 |
| | **TEMP** | 2948.443 | 801.086 | .419 | 3.681 | .001 |
| | **RAMADAN** | -2193.953 | 344.534 | -.270 | -6.368 | .000 |
| | **TOURIST** | 27.974 | 17.234 | .215 | 1.623 | .112 |
| | **TREND** | -2114.576 | 553.080 | -.692 | -3.823 | .000 |
| **15** | **(Constant)** | -252635.341 | 113653.979 | | -2.223 | .031 |
| | **D_A1** | 6583.232 | 3362.515 | .139 | 1.958 | .056 |
| | **D_B4** | 9262.065 | 3052.239 | .160 | 3.035 | .004 |
| | **D_B3** | 8175.067 | 3369.134 | .202 | 2.426 | .019 |
| | **D_A3** | 6881.180 | 2436.156 | .184 | 2.825 | .007 |
| | **D_A4** | 950.372 | 834.422 | .076 | 1.139 | .261 |
| | **D_B2** | 2009.442 | 1332.561 | .192 | 1.508 | .139 |
| | **P_B1** | 569.142 | 329.670 | .108 | 1.726 | .091 |
| | **P_B4** | -1256.854 | 376.479 | -.253 | -3.338 | .002 |
| | **P_A6** | 632.207 | 342.401 | .130 | 1.846 | .071 |
| | **P_B2** | 105.727 | 83.450 | .093 | 1.267 | .212 |
| | **TEMP** | 2772.252 | 794.808 | .394 | 3.488 | .001 |
| | **RAMADAN** | -2125.090 | 342.736 | -.261 | -6.200 | .000 |

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| | **TOURIST** | 32.006 | 17.065 | .246 | 1.875 | .067 |
| | **TREND** | -2129.739 | 556.884 | -.697 | -3.824 | .000 |
| **16** | **(Constant)** | -238566.286 | 113345.132 | | -2.105 | .041 |
| | **D_A1** | 5953.207 | 3327.402 | .125 | 1.789 | .080 |
| | **D_B4** | 8877.678 | 3043.308 | .153 | 2.917 | .005 |
| | **D_B3** | 7545.830 | 3334.249 | .187 | 2.263 | .028 |
| | **D_A3** | 7274.533 | 2419.330 | .195 | 3.007 | .004 |
| | **D_B2** | 1831.828 | 1327.673 | .175 | 1.380 | .174 |
| | **P_B1** | 569.146 | 330.734 | .108 | 1.721 | .092 |
| | **P_B4** | -1039.804 | 325.732 | -.209 | -3.192 | .003 |
| | **P_A6** | 499.733 | 323.079 | .103 | 1.547 | .129 |
| | **P_B2** | 128.223 | 81.341 | .113 | 1.576 | .122 |
| | **TEMP** | 2931.331 | 784.963 | .417 | 3.734 | .001 |
| | **RAMADAN** | -2198.523 | 337.703 | -.270 | -6.510 | .000 |
| | **TOURIST** | 31.319 | 17.110 | .241 | 1.831 | .074 |
| | **TREND** | -1835.151 | 494.765 | -.601 | -3.709 | .001 |
| **17** | **(Constant)** | -162459.397 | 99964.553 | | -1.625 | .111 |
| | **D_A1** | 4879.980 | 3266.157 | .103 | 1.494 | .142 |
| | **D_B4** | 8871.334 | 3072.421 | .153 | 2.887 | .006 |
| | **D_B3** | 4661.426 | 2622.307 | .115 | 1.778 | .082 |
| | **D_A3** | 8468.931 | 2280.765 | .227 | 3.713 | .001 |
| | **P_B1** | 466.479 | 325.337 | .088 | 1.434 | .158 |
| | **P_B4** | -1092.188 | 326.607 | -.220 | -3.344 | .002 |
| | **P_A6** | 395.205 | 317.075 | .081 | 1.246 | .219 |
| | **P_B2** | 133.534 | 82.027 | .118 | 1.628 | .110 |
| | **TEMP** | 3285.380 | 748.933 | .467 | 4.387 | .000 |
| | **RAMADAN** | -2252.901 | 338.604 | -.277 | -6.653 | .000 |
| | **TOURIST** | 31.530 | 17.273 | .243 | 1.825 | .074 |
| | **TREND** | -1300.631 | 310.689 | -.426 | -4.186 | .000 |
| **18** | **(Constant)** | -198883.870 | 96147.179 | | -2.069 | .044 |
| | **D_A1** | 6380.153 | 3053.759 | .134 | 2.089 | .042 |

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|---|---|---|---|---|---|---|
| | **D_B4** | 8703.164 | 3087.105 | .150 | 2.819 | .007 |
| | **D_B3** | 5699.948 | 2500.709 | .141 | 2.279 | .027 |
| | **D_A3** | 7261.737 | 2076.774 | .194 | 3.497 | .001 |
| | **P_B1** | 569.969 | 316.372 | .108 | 1.802 | .078 |
| | **P_B4** | -903.730 | 291.165 | -.182 | -3.104 | .003 |
| | **P_B2** | 158.003 | 80.101 | .140 | 1.973 | .054 |
| | **TEMP** | 3382.858 | 749.121 | .481 | 4.516 | .000 |
| | **RAMADAN** | -2330.115 | 334.803 | -.286 | -6.960 | .000 |
| | **TOURIST** | 28.146 | 17.156 | .217 | 1.641 | .107 |
| | **TREND** | -1144.664 | 286.010 | -.375 | -4.002 | .000 |
| **19** | **(Constant)** | -304097.892 | 72860.624 | | -4.174 | .000 |
| | **D_A1** | 8827.145 | 2710.348 | .186 | 3.257 | .002 |
| | **D_B4** | 8764.846 | 3139.708 | .151 | 2.792 | .007 |
| | **D_B3** | 7250.093 | 2354.965 | .179 | 3.079 | .003 |
| | **D_A3** | 7428.489 | 2109.787 | .199 | 3.521 | .001 |
| | **P_B1** | 745.045 | 302.929 | .141 | 2.459 | .017 |
| | **P_B4** | -957.549 | 294.262 | -.193 | -3.254 | .002 |
| | **P_B2** | 141.942 | 80.862 | .125 | 1.755 | .085 |
| | **TEMP** | 4500.700 | 316.675 | .640 | 14.212 | .000 |
| | **RAMADAN** | -2524.789 | 318.428 | -.310 | -7.929 | .000 |
| | **TREND** | -1140.843 | 290.896 | -.373 | -3.922 | .000 |

a Dependent Variable: Q_A1

**Excluded Variables(s)**

| **Model** | | **Beta In** | **t** | **Sig.** | **Partial Correlation** | **Collinearity Statistics** |
|---|---|---|---|---|---|---|
| | | | | | | **Tolerance** |
| **2** | **P_B3** | .017(a) | .082 | .935 | .015 | 3.383E-02 |
| **3** | **P_B3** | .011(b) | .054 | .957 | .010 | 3.838E-02 |
| | **P_A4** | .017(b) | .069 | .945 | .012 | 2.517E-02 |

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|---|---|---|---|---|---|---|
| **4** | **P_B3** | .010(c) | .052 | .959 | .009 | 3.847E-02 |
| | **P_A4** | .013(c) | .054 | .957 | .009 | 2.662E-02 |
| | **D_A5** | .015(c) | .060 | .953 | .010 | 2.302E-02 |
| **5** | **P_B3** | .010(d) | .051 | .960 | .009 | 3.852E-02 |
| | **P_A4** | .009(d) | .040 | .968 | .007 | 2.825E-02 |
| | **D_A5** | .006(d) | .028 | .978 | .005 | 2.982E-02 |
| | **D_C1** | -.007(d) | -.054 | .957 | -.009 | 7.943E-02 |
| **6** | **P_B3** | -.001(e) | -.005 | .996 | -.001 | 4.047E-02 |
| | **P_A4** | .008(e) | .035 | .972 | .006 | 2.826E-02 |
| | **D_A5** | .023(e) | .115 | .909 | .019 | 3.388E-02 |
| | **D_C1** | .001(e) | .009 | .993 | .002 | 8.445E-02 |
| | **D_A2** | .035(e) | .255 | .800 | .043 | 7.073E-02 |
| **7** | **P_B3** | .001(f) | .007 | .994 | .001 | 4.053E-02 |
| | **P_A4** | -.003(f) | -.012 | .990 | -.002 | 2.887E-02 |
| | **D_A5** | .036(f) | .186 | .853 | .031 | 3.565E-02 |
| | **D_C1** | .002(f) | .018 | .986 | .003 | 8.451E-02 |
| | **D_A2** | .023(f) | .175 | .862 | .029 | 7.476E-02 |
| | **P_C1** | -.052(f) | -.328 | .745 | -.055 | 5.293E-02 |
| **8** | **P_B3** | .019(g) | .112 | .911 | .018 | 4.409E-02 |
| | **P_A4** | .023(g) | .113 | .911 | .019 | 3.260E-02 |
| | **D_A5** | .018(g) | .097 | .923 | .016 | 3.770E-02 |
| | **D_C1** | -.004(g) | -.033 | .974 | -.005 | 8.613E-02 |
| | **D_A2** | .006(g) | .051 | .960 | .008 | 8.316E-02 |
| | **P_C1** | -.051(g) | -.330 | .743 | -.054 | 5.293E-02 |
| | **P_A1** | .074(g) | .370 | .714 | .061 | 3.242E-02 |
| **9** | **P_B3** | .043(h) | .258 | .798 | .042 | 4.671E-02 |
| | **P_A4** | .029(h) | .149 | .882 | .024 | 3.270E-02 |
| | **D_A5** | -.037(h) | -.236 | .815 | -.038 | 5.104E-02 |
| | **D_C1** | -.036(h) | -.346 | .731 | -.056 | .116 |
| | **D_A2** | -.011(h) | -.094 | .925 | -.015 | 8.783E-02 |
| | **P_C1** | -.073(h) | -.486 | .629 | -.079 | 5.689E-02 |

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|---|---|---|---|---|---|---|
| | **P_A1** | .097(h) | .501 | .619 | .081 | 3.405E-02 |
| | **D_A6** | -.092(h) | -.628 | .534 | -.101 | 5.895E-02 |
| **10** | **P_B3** | .045(i) | .274 | .785 | .044 | 4.677E-02 |
| | **P_A4** | .002(i) | .010 | .992 | .002 | 3.691E-02 |
| | **D_A5** | -.015(i) | -.100 | .921 | -.016 | 5.691E-02 |
| | **D_C1** | -.031(i) | -.303 | .764 | -.048 | .118 |
| | **D_A2** | -.012(i) | -.099 | .921 | -.016 | 8.784E-02 |
| | **P_C1** | -.077(i) | -.524 | .603 | -.084 | 5.733E-02 |
| | **P_A1** | .083(i) | .440 | .663 | .070 | 3.488E-02 |
| | **D_A6** | -.040(i) | -.327 | .746 | -.052 | 8.235E-02 |
| | **GDP** | .031(i) | .392 | .697 | .063 | .196 |
| **11** | **P_B3** | .055(j) | .339 | .736 | .054 | 4.719E-02 |
| | **P_A4** | -.003(j) | -.015 | .988 | -.002 | 3.696E-02 |
| | **D_A5** | -.002(j) | -.011 | .991 | -.002 | 5.791E-02 |
| | **D_C1** | -.032(j) | -.311 | .758 | -.049 | .118 |
| | **D_A2** | .020(j) | .186 | .854 | .029 | .106 |
| | **P_C1** | -.074(j) | -.510 | .613 | -.080 | 5.737E-02 |
| | **P_A1** | .115(j) | .659 | .514 | .104 | 4.008E-02 |
| | **D_A6** | -.031(j) | -.254 | .801 | -.040 | 8.333E-02 |
| | **GDP** | .023(j) | .288 | .774 | .046 | .201 |
| | **D_B1** | -.064(j) | -.678 | .501 | -.107 | .138 |
| **12** | **P_B3** | .030(k) | .193 | .848 | .030 | 5.116E-02 |
| | **P_A4** | .005(k) | .028 | .978 | .004 | 3.726E-02 |
| | **D_A5** | -.003(k) | -.023 | .982 | -.004 | 5.794E-02 |
| | **D_C1** | -.035(k) | -.345 | .732 | -.054 | .118 |
| | **D_A2** | .011(k) | .108 | .915 | .017 | .108 |
| | **P_C1** | .000(k) | .003 | .998 | .000 | .122 |
| | **P_A1** | .116(k) | .673 | .505 | .104 | 4.009E-02 |
| | **D_A6** | -.009(k) | -.076 | .940 | -.012 | 9.422E-02 |
| | **GDP** | .020(k) | .259 | .797 | .040 | .201 |
| | **D_B1** | -.034(k) | -.409 | .685 | -.064 | .169 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | **P_RAKI** | .046(k) | .487 | .629 | .076 | .135 |
| **13** | **P_B3** | .061(l) | .420 | .677 | .065 | 5.642E-02 |
| | **P_A4** | .048(l) | .287 | .776 | .044 | 4.208E-02 |
| | **D_A5** | -.042(l) | -.321 | .750 | -.050 | 6.834E-02 |
| | **D_C1** | -.022(l) | -.218 | .828 | -.034 | .121 |
| | **D_A2** | -.001(l) | -.012 | .991 | -.002 | .111 |
| | **P_C1** | .019(l) | .198 | .844 | .031 | .131 |
| | **P_A1** | .144(l) | .883 | .382 | .135 | 4.423E-02 |
| | **D_A6** | -.033(l) | -.310 | .758 | -.048 | .104 |
| | **GDP** | .008(l) | .109 | .914 | .017 | .209 |
| | **D_B1** | -.023(l) | -.276 | .784 | -.042 | .174 |
| | **P_RAKI** | .051(l) | .543 | .590 | .083 | .136 |
| | **P_A3** | .057(l) | .773 | .444 | .118 | .219 |
| **14** | **P_B3** | .014(m) | .107 | .915 | .016 | 6.857E-02 |
| | **P_A4** | .066(m) | .401 | .691 | .061 | 4.344E-02 |
| | **D_A5** | -.051(m) | -.389 | .699 | -.059 | 6.907E-02 |
| | **D_C1** | -.011(m) | -.117 | .907 | -.018 | .124 |
| | **D_A2** | .016(m) | .161 | .873 | .024 | .119 |
| | **P_C1** | .022(m) | .236 | .815 | .036 | .131 |
| | **P_A1** | .035(m) | .273 | .786 | .042 | 7.314E-02 |
| | **D_A6** | -.016(m) | -.152 | .880 | -.023 | .110 |
| | **GDP** | .016(m) | .218 | .828 | .033 | .215 |
| | **D_B1** | -.001(m) | -.020 | .984 | -.003 | .201 |
| | **P_RAKI** | .043(m) | .465 | .645 | .071 | .138 |
| | **P_A3** | .039(m) | .555 | .582 | .084 | .238 |
| | **P_A2** | -.056(m) | -.659 | .514 | -.100 | .162 |
| **15** | **P_B3** | .003(n) | .026 | .980 | .004 | 6.885E-02 |
| | **P_A4** | .042(n) | .256 | .799 | .039 | 4.397E-02 |
| | **D_A5** | -.026(n) | -.197 | .845 | -.030 | 7.059E-02 |
| | **D_C1** | -.014(n) | -.146 | .885 | -.022 | .124 |
| | **D_A2** | .014(n) | .145 | .886 | .022 | .119 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | **P_C1** | .000(n) | .000 | 1.000 | .000 | .136 |
| | **P_A1** | .030(n) | .233 | .817 | .035 | 7.321E-02 |
| | **D_A6** | -.017(n) | -.166 | .869 | -.025 | .110 |
| | **GDP** | .027(n) | .365 | .717 | .055 | .218 |
| | **D_B1** | .023(n) | .316 | .754 | .048 | .216 |
| | **P_RAKI** | .066(n) | .734 | .467 | .110 | .145 |
| | **P_A3** | .052(n) | .754 | .455 | .113 | .245 |
| | **P_A2** | -.041(n) | -.485 | .630 | -.073 | .165 |
| | **P_A5** | -.126(n) | -1.281 | .207 | -.190 | .118 |
| **16** | **P_B3** | -.042(o) | -.340 | .736 | -.051 | 7.690E-02 |
| | **P_A4** | .090(o) | 1.116 | .270 | .164 | .178 |
| | **D_A5** | -.066(o) | -.535 | .595 | -.080 | 7.805E-02 |
| | **D_C1** | -.022(o) | -.223 | .825 | -.033 | .125 |
| | **D_A2** | .020(o) | .197 | .845 | .029 | .119 |
| | **P_C1** | -.040(o) | -.470 | .640 | -.070 | .165 |
| | **P_A1** | -.021(o) | -.177 | .861 | -.026 | 8.347E-02 |
| | **D_A6** | .040(o) | .453 | .653 | .067 | .152 |
| | **GDP** | .057(o) | .939 | .353 | .139 | .318 |
| | **D_B1** | .054(o) | .830 | .411 | .123 | .284 |
| | **P_RAKI** | .020(o) | .235 | .815 | .035 | .170 |
| | **P_A3** | .024(o) | .362 | .719 | .054 | .271 |
| | **P_A2** | -.073(o) | -1.038 | .305 | -.153 | .239 |
| | **P_A5** | -.067(o) | -.723 | .473 | -.107 | .140 |
| | **D_A4** | .076(o) | 1.139 | .261 | .167 | .260 |
| **17** | **P_B3** | -.074(p) | -.600 | .551 | -.088 | 8.006E-02 |
| | **P_A4** | .064(p) | .792 | .433 | .116 | .186 |
| | **D_A5** | -.021(p) | -.176 | .861 | -.026 | 8.319E-02 |
| | **D_C1** | -.022(p) | -.218 | .829 | -.032 | .125 |
| | **D_A2** | .020(p) | .202 | .841 | .030 | .119 |
| | **P_C1** | -.051(p) | -.599 | .552 | -.088 | .166 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | **P_A1** | -.069(p) | -.602 | .550 | -.088 | 9.303E-02 |
| | **D_A6** | .083(p) | 1.113 | .271 | .162 | .213 |
| | **GDP** | .052(p) | .849 | .400 | .124 | .319 |
| | **D_B1** | .042(p) | .650 | .519 | .095 | .288 |
| | **P_RAKI** | .035(p) | .424 | .674 | .062 | .174 |
| | **P_A3** | .013(p) | .201 | .842 | .030 | .274 |
| | **P_A2** | -.053(p) | -.761 | .450 | -.112 | .247 |
| | **P_A5** | -.038(p) | -.414 | .681 | -.061 | .146 |
| | **D_A4** | .064(p) | .956 | .344 | .140 | .264 |
| | **D_B2** | .175(p) | 1.380 | .174 | .199 | 7.283E-02 |
| **18** | **P_B3** | -.036(q) | -.299 | .766 | -.044 | 8.448E-02 |
| | **P_A4** | .024(q) | .314 | .755 | .046 | .211 |
| | **D_A5** | .043(q) | .396 | .694 | .058 | .104 |
| | **D_C1** | .019(q) | .204 | .839 | .030 | .140 |
| | **D_A2** | .057(q) | .589 | .558 | .086 | .133 |
| | **P_C1** | -.003(q) | -.044 | .965 | -.006 | .199 |
| | **P_A1** | -.014(q) | -.125 | .901 | -.018 | .106 |
| | **D_A6** | .071(q) | .949 | .347 | .137 | .216 |
| | **GDP** | .026(q) | .434 | .666 | .063 | .350 |
| | **D_B1** | .041(q) | .623 | .536 | .091 | .289 |
| | **P_RAKI** | .070(q) | .932 | .356 | .135 | .217 |
| | **P_A3** | .025(q) | .369 | .714 | .054 | .280 |
| | **P_A2** | -.028(q) | -.411 | .683 | -.060 | .265 |
| | **P_A5** | -.056(q) | -.615 | .542 | -.089 | .150 |
| | **D_A4** | .032(q) | .497 | .622 | .072 | .295 |
| | **D_B2** | .129(q) | 1.031 | .308 | .149 | 7.707E-02 |
| | **P_A6** | .081(q) | 1.246 | .219 | .179 | .282 |
| **19** | **P_B3** | -.020(r) | -.167 | .868 | -.024 | 8.500E-02 |
| | **P_A4** | .046(r) | .599 | .552 | .086 | .218 |
| | **D_A5** | .017(r) | .158 | .875 | .023 | .106 |
| | **D_C1** | .028(r) | .296 | .768 | .043 | .141 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | **D_A2** | .058(r) | .592 | .556 | .085 | .133 |
| | **P_C1** | -.003(r) | -.037 | .971 | -.005 | .199 |
| | **P_A1** | .002(r) | .014 | .989 | .002 | .107 |
| | **D_A6** | .072(r) | .945 | .349 | .135 | .216 |
| | **GDP** | .026(r) | .428 | .671 | .062 | .350 |
| | **D_B1** | .026(r) | .392 | .697 | .056 | .294 |
| | **P_RAKI** | .073(r) | .960 | .342 | .137 | .217 |
| | **P_A3** | .012(r) | .173 | .863 | .025 | .284 |
| | **P_A2** | -.028(r) | -.398 | .692 | -.057 | .265 |
| | **P_A5** | -.076(r) | -.841 | .405 | -.120 | .154 |
| | **D_A4** | .034(r) | .515 | .609 | .074 | .295 |
| | **D_B2** | .138(r) | 1.088 | .282 | .155 | 7.723E-02 |
| | **P_A6** | .063(r) | .949 | .347 | .136 | .289 |
| | **TOURIST** | .217(r) | 1.641 | .107 | .230 | 6.946E-02 |

a Predictors in the Model: (Constant), TREND, TOURIST, P_A5, GDP, RAMADAN, P_A3, D_B4, P_A6, D_A6, D_B1, D_A3, P_B2, P_A2, P_C1, D_A1, D_C1, P_B1, P_B4, P_A4, D_A2, D_B3, TEMP, P_RAKI, D_A4, P_A1, D_A5, D_B2

b Predictors in the Model: (Constant), TREND, TOURIST, P_A5, GDP, RAMADAN, P_A3, D_B4, P_A6, D_A6, D_B1, D_A3, P_B2, P_A2, P_C1, D_A1, D_C1, P_B1, P_B4, D_A2, D_B3, TEMP, P_RAKI, D_A4, P_A1, D_A5, D_B2

c Predictors in the Model: (Constant), TREND, TOURIST, P_A5, GDP, RAMADAN, P_A3, D_B4, P_A6, D_A6, D_B1, D_A3, P_B2, P_A2, P_C1, D_A1, D_C1, P_B1, P_B4, D_A2, D_B3, TEMP, P_RAKI, D_A4, P_A1, D_B2

d Predictors in the Model: (Constant), TREND, TOURIST, P_A5, GDP, RAMADAN, P_A3, D_B4, P_A6, D_A6, D_B1, D_A3, P_B2, P_A2, P_C1, D_A1, P_B1, P_B4, D_A2, D_B3, TEMP, P_RAKI, D_A4, P_A1, D_B2

e Predictors in the Model: (Constant), TREND, TOURIST, P_A5, GDP, RAMADAN, P_A3, D_B4, P_A6, D_A6, D_B1, D_A3, P_B2, P_A2, P_C1, D_A1, P_B1, P_B4, D_B3, TEMP, P_RAKI, D_A4, P_A1, D_B2

f Predictors in the Model: (Constant), TREND, TOURIST, P_A5, GDP, RAMADAN, P_A3, D_B4, P_A6, D_A6, D_B1, D_A3, P_B2, P_A2, D_A1, P_B1, P_B4, D_B3, TEMP, P_RAKI, D_A4, P_A1, D_B2

g Predictors in the Model: (Constant), TREND, TOURIST, P_A5, GDP, RAMADAN, P_A3, D_B4, P_A6, D_A6, D_B1, D_A3, P_B2, P_A2, D_A1, P_B1, P_B4, D_B3, TEMP, P_RAKI, D_A4, D_B2

h Predictors in the Model: (Constant), TREND, TOURIST, P_A5, GDP, RAMADAN, P_A3, D_B4, P_A6, D_B1, D_A3, P_B2, P_A2, D_A1, P_B1, P_B4, D_B3, TEMP, P_RAKI, D_A4, D_B2

i Predictors in the Model: (Constant), TREND, TOURIST, P_A5, RAMADAN, P_A3, D_B4, P_A6,

| |
|---|
| D_B1, D_A3, P_B2, P_A2, D_A1, P_B1, P_B4, D_B3, TEMP, P_RAKI, D_A4, D_B2 |
| j Predictors in the Model: (Constant), TREND, TOURIST, P_A5, RAMADAN, P_A3, D_B4, P_A6, D_A3, P_B2, P_A2, D_A1, P_B1, P_B4, D_B3, TEMP, P_RAKI, D_A4, D_B2 |
| k Predictors in the Model: (Constant), TREND, TOURIST, P_A5, RAMADAN, P_A3, D_B4, P_A6, D_A3, P_B2, P_A2, D_A1, P_B1, P_B4, D_B3, TEMP, D_A4, D_B2 |
| l Predictors in the Model: (Constant), TREND, TOURIST, P_A5, RAMADAN, D_B4, P_A6, D_A3, P_B2, P_A2, D_A1, P_B1, P_B4, D_B3, TEMP, D_A4, D_B2 |
| m Predictors in the Model: (Constant), TREND, TOURIST, P_A5, RAMADAN, D_B4, P_A6, D_A3, P_B2, D_A1, P_B1, P_B4, D_B3, TEMP, D_A4, D_B2 |
| n Predictors in the Model: (Constant), TREND, TOURIST, RAMADAN, D_B4, P_A6, D_A3, P_B2, D_A1, P_B1, P_B4, D_B3, TEMP, D_A4, D_B2 |
| o Predictors in the Model: (Constant), TREND, TOURIST, RAMADAN, D_B4, P_A6, D_A3, P_B2, D_A1, P_B1, P_B4, D_B3, TEMP, D_B2 |
| p Predictors in the Model: (Constant), TREND, TOURIST, RAMADAN, D_B4, P_A6, D_A3, P_B2, D_A1, P_B1, P_B4, D_B3, TEMP |
| q Predictors in the Model: (Constant), TREND, TOURIST, RAMADAN, D_B4, D_A3, P_B2, D_A1, P_B1, P_B4, D_B3, TEMP |
| r Predictors in the Model: (Constant), TREND, RAMADAN, D_B4, D_A3, P_B2, D_A1, P_B1, P_B4, D_B3, TEMP |
| s Dependent Variable: Q_A1 |

**Residuals Statistics(a)**

| | Minimum | Maximum | Mean | Std. Deviation | N |
|---|---|---|---|---|---|
| **Predicted Value** | 135145.8281 | 338666.2813 | 250426.8500 | 51697.6277 | 60 |
| **Residual** | -35374.5156 | 28247.6367 | -9.4587E-11 | 13217.1489 | 60 |
| **Std. Predicted Value** | -2.230 | 1.707 | .000 | 1.000 | 60 |
| **Std. Residual** | -2.439 | 1.948 | .000 | .911 | 60 |

a Dependent Variable: Q_A1

# APPENDIX B.9

# REGRESSION OUTPUT: LINEAR BRAND-LEVEL MODEL 10th BACKWARD REGRESSION

| Variables Entered/Removed(b) | | | |
|---|---|---|---|
| **Model** | **Variables Entered** | **Variables Removed** | **Method** |
| **1** | TREND, TOURIST, GDP, P_A3, RAMADAN, P_RAKI, P_A6, D_A6, P_B2, P_A2, P_A4, D_A1, D_C1, P_B1, TEMP, P_B3, P_A1, D_A4, D_A5(a) | . | Enter |
| **2** | . | D_C1 | Backward (criterion: Probability of F-to-remove >= .100). |
| **3** | . | D_A4 | Backward (criterion: Probability of F-to-remove >= .100). |
| **4** | . | P_A4 | Backward (criterion: Probability of F-to-remove >= .100). |
| **5** | . | P_A3 | Backward (criterion: Probability of F-to-remove >= .100). |
| **6** | . | P_B1 | Backward (criterion: Probability of F-to-remove >= .100). |
| **7** | . | D_A6 | Backward (criterion: Probability of F-to-remove >= .100). |
| **8** | . | P_A2 | Backward (criterion: Probability of F-to-remove >= .100). |
| **9** | . | TREND | Backward (criterion: Probability of F-to-remove >= .100). |
| **10** | . | P_A6 | Backward (criterion: Probability of F-to-remove >= .100). |
| **11** | . | D_A5 | Backward (criterion: |

| | | | |
|---|---|---|---|
| | | | Probability of F-to-remove >= .100). |
| **12** | . | GDP | Backward (criterion: Probability of F-to-remove >= .100). |
| **13** | . | P_RAKI | Backward (criterion: Probability of F-to-remove >= .100). |
| a All requested variables entered. | | | |
| b Dependent Variable: Q_A1 | | | |

**Model Summary(n)**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate | Change Statistics | | | | | Durbin-Watson |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | R Square Change | F Change | df1 | df2 | Sig. F Change | |
| **1** | .961(a) | .923 | .886 | 18018.1708 | .923 | 25.129 | 19 | 40 | .000 | |
| **2** | .960(b) | .923 | .889 | 17813.8705 | .000 | .076 | 1 | 42 | .785 | |
| **3** | .960(c) | .922 | .891 | 17610.8023 | .000 | .048 | 1 | 43 | .828 | |
| **4** | .960(d) | .922 | .893 | 17414.0059 | .000 | .044 | 1 | 44 | .834 | |
| **5** | .960(e) | .922 | .896 | 17241.9429 | .000 | .135 | 1 | 45 | .715 | |
| **6** | .960(f) | .922 | .897 | 17105.1814 | -.001 | .289 | 1 | 46 | .594 | |
| **7** | .960(g) | .921 | .899 | 16972.4430 | -.001 | .289 | 1 | 47 | .594 | |
| **8** | .960(h) | .921 | .900 | 16838.4157 | .000 | .261 | 1 | 48 | .612 | |
| **9** | .959(i) | .920 | .902 | 16692.3541 | .000 | .171 | 1 | 49 | .681 | |
| **10** | .959(j) | .920 | .904 | 16573.5316 | -.001 | .305 | 1 | 50 | .583 | |
| **11** | .959(k) | .920 | .905 | 16443.2044 | .000 | .217 | 1 | 51 | .644 | |
| **12** | .958(l) | .917 | .904 | 16522.1835 | -.002 | 1.491 | 1 | 52 | .228 | |
| **13** | .956(m) | .915 | .903 | 16597.2618 | -.002 | 1.474 | 1 | 53 | .230 | 1.835 |
| a Predictors: (Constant), TREND, TOURIST, GDP, P_A3, RAMADAN, P_RAKI, P_A6, D_A6, P_B2, P_A2, P_A4, D_A1, D_C1, P_B1, TEMP, P_B3, P_A1, D_A4, D_A5 | | | | | | | | | | |
| b Predictors: (Constant), TREND, TOURIST, GDP, P_A3, RAMADAN, P_RAKI, P_A6, D_A6, P_B2, P_A2, P_A4, D_A1, P_B1, TEMP, P_B3, P_A1, D_A4, D_A5 | | | | | | | | | | |

| |
|---|
| c Predictors: (Constant), TREND, TOURIST, GDP, P_A3, RAMADAN, P_RAKI, P_A6, D_A6, P_B2, P_A2, P_A4, D_A1, P_B1, TEMP, P_B3, P_A1, D_A5 |
| d Predictors: (Constant), TREND, TOURIST, GDP, P_A3, RAMADAN, P_RAKI, P_A6, D_A6, P_B2, P_A2, D_A1, P_B1, TEMP, P_B3, P_A1, D_A5 |
| e Predictors: (Constant), TREND, TOURIST, GDP, RAMADAN, P_RAKI, P_A6, D_A6, P_B2, P_A2, D_A1, P_B1, TEMP, P_B3, P_A1, D_A5 |
| f Predictors: (Constant), TREND, TOURIST, GDP, RAMADAN, P_RAKI, P_A6, D_A6, P_B2, P_A2, D_A1, TEMP, P_B3, P_A1, D_A5 |
| g Predictors: (Constant), TREND, TOURIST, GDP, RAMADAN, P_RAKI, P_A6, P_B2, P_A2, D_A1, TEMP, P_B3, P_A1, D_A5 |
| h Predictors: (Constant), TREND, TOURIST, GDP, RAMADAN, P_RAKI, P_A6, P_B2, D_A1, TEMP, P_B3, P_A1, D_A5 |
| i Predictors: (Constant), TOURIST, GDP, RAMADAN, P_RAKI, P_A6, P_B2, D_A1, TEMP, P_B3, P_A1, D_A5 |
| j Predictors: (Constant), TOURIST, GDP, RAMADAN, P_RAKI, P_B2, D_A1, TEMP, P_B3, P_A1, D_A5 |
| k Predictors: (Constant), TOURIST, GDP, RAMADAN, P_RAKI, P_B2, D_A1, TEMP, P_B3, P_A1 |
| l Predictors: (Constant), TOURIST, RAMADAN, P_RAKI, P_B2, D_A1, TEMP, P_B3, P_A1 |
| m Predictors: (Constant), TOURIST, RAMADAN, P_B2, D_A1, TEMP, P_B3, P_A1 |
| n Dependent Variable: Q_A1 |

**ANOVA(n)**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | **Regression** | 155006747004.553 | 19 | 8158249842.345 | 25.129 | .000(a) |
| | **Residual** | 12986179159.097 | 40 | 324654478.977 | | |
| | **Total** | 167992926163.650 | 59 | | | |
| 2 | **Regression** | 154982232882.457 | 18 | 8610124049.025 | 27.133 | .000(b) |
| | **Residual** | 13010693281.193 | 41 | 317333982.468 | | |
| | **Total** | 167992926163.650 | 59 | | | |
| 3 | **Regression** | 154967031136.273 | 17 | 9115707713.898 | 29.392 | .000(c) |
| | **Residual** | 13025895027.377 | 42 | 310140357.795 | | |
| | **Total** | 167992926163.650 | 59 | | | |
| 4 | **Regression** | 154953279248.628 | 16 | 9684579953.039 | 31.936 | .000(d) |
| | **Residual** | 13039646915.022 | 43 | 303247602.675 | | |
| | **Total** | 167992926163.650 | 59 | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| 5 | **Regression** | 154912404009.607 | 15 | 10327493600.640 | 34.739 | .000(e) |
| | **Residual** | 13080522154.043 | 44 | 297284594.410 | | |
| | **Total** | 167992926163.650 | 59 | | | |
| 6 | **Regression** | 154826500807.042 | 14 | 11059035771.932 | 37.797 | .000(f) |
| | **Residual** | 13166425356.608 | 45 | 292587230.147 | | |
| | **Total** | 167992926163.650 | 59 | | | |
| 7 | **Regression** | 154741990338.447 | 13 | 11903230026.034 | 41.322 | .000(g) |
| | **Residual** | 13250935825.202 | 46 | 288063822.287 | | |
| | **Total** | 167992926163.650 | 59 | | | |
| 8 | **Regression** | 154666910756.857 | 12 | 12888909229.738 | 45.458 | .000(h) |
| | **Residual** | 13326015406.793 | 47 | 283532242.698 | | |
| | **Total** | 167992926163.650 | 59 | | | |
| 9 | **Regression** | 154618461278.281 | 11 | 14056223752.571 | 50.447 | .000(i) |
| | **Residual** | 13374464885.369 | 48 | 278634685.112 | | |
| | **Total** | 167992926163.650 | 59 | | | |
| 10 | **Regression** | 154533510675.686 | 10 | 15453351067.569 | 56.259 | .000(j) |
| | **Residual** | 13459415487.964 | 49 | 274681948.734 | | |
| | **Total** | 167992926163.650 | 59 | | | |
| 11 | **Regression** | 154473977666.112 | 9 | 17163775296.235 | 63.480 | .000(k) |
| | **Residual** | 13518948497.538 | 50 | 270378969.951 | | |
| | **Total** | 167992926163.650 | 59 | | | |
| 12 | **Regression** | 154070816299.580 | 8 | 19258852037.447 | 70.550 | .000(l) |
| | **Residual** | 13922109864.070 | 51 | 272982546.354 | | |
| | **Total** | 167992926163.650 | 59 | | | |
| 13 | **Regression** | 153668532988.411 | 7 | 21952647569.773 | 79.692 | .000(m) |
| | **Residual** | 14324393175.239 | 52 | 275469099.524 | | |
| | **Total** | 167992926163.650 | 59 | | | |
| a Predictors: (Constant), TREND, TOURIST, GDP, P_A3, RAMADAN, P_RAKI, P_A6, D_A6, P_B2, P_A2, P_A4, D_A1, D_C1, P_B1, TEMP, P_B3, P_A1, D_A4, D_A5 | | | | | | |
| b Predictors: (Constant), TREND, TOURIST, GDP, P_A3, RAMADAN, P_RAKI, P_A6, D_A6, P_B2, P_A2, P_A4, D_A1, P_B1, TEMP, P_B3, P_A1, D_A4, D_A5 | | | | | | |
| c Predictors: (Constant), TREND, TOURIST, GDP, P_A3, RAMADAN, P_RAKI, P_A6, D_A6, P_B2, | | | | | | |

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|---|
| P_A2, P_A4, D_A1, P_B1, TEMP, P_B3, P_A1, D_A5 |
| d Predictors: (Constant), TREND, TOURIST, GDP, P_A3, RAMADAN, P_RAKI, P_A6, D_A6, P_B2, P_A2, D_A1, P_B1, TEMP, P_B3, P_A1, D_A5 |
| e Predictors: (Constant), TREND, TOURIST, GDP, RAMADAN, P_RAKI, P_A6, D_A6, P_B2, P_A2, D_A1, P_B1, TEMP, P_B3, P_A1, D_A5 |
| f Predictors: (Constant), TREND, TOURIST, GDP, RAMADAN, P_RAKI, P_A6, D_A6, P_B2, P_A2, D_A1, TEMP, P_B3, P_A1, D_A5 |
| g Predictors: (Constant), TREND, TOURIST, GDP, RAMADAN, P_RAKI, P_A6, P_B2, P_A2, D_A1, TEMP, P_B3, P_A1, D_A5 |
| h Predictors: (Constant), TREND, TOURIST, GDP, RAMADAN, P_RAKI, P_A6, P_B2, D_A1, TEMP, P_B3, P_A1, D_A5 |
| i Predictors: (Constant), TOURIST, GDP, RAMADAN, P_RAKI, P_A6, P_B2, D_A1, TEMP, P_B3, P_A1, D_A5 |
| j Predictors: (Constant), TOURIST, GDP, RAMADAN, P_RAKI, P_B2, D_A1, TEMP, P_B3, P_A1, D_A5 |
| k Predictors: (Constant), TOURIST, GDP, RAMADAN, P_RAKI, P_B2, D_A1, TEMP, P_B3, P_A1 |
| l Predictors: (Constant), TOURIST, RAMADAN, P_RAKI, P_B2, D_A1, TEMP, P_B3, P_A1 |
| m Predictors: (Constant), TOURIST, RAMADAN, P_B2, D_A1, TEMP, P_B3, P_A1 |
| n Dependent Variable: Q_A1 |

**Coefficients(a)**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | |
| 1 | (Constant) | -117849.197 | 181508.969 | | -.649 | .520 |
| | D_A1 | 4108.051 | 5639.378 | .087 | .728 | .471 |
| | D_A5 | 1986.358 | 3848.266 | .135 | .516 | .609 |
| | D_C1 | 1428.486 | 5198.505 | .043 | .275 | .785 |
| | D_A6 | -1204.631 | 2391.639 | -.056 | -.504 | .617 |
| | D_A4 | 819.853 | 2923.521 | .066 | .280 | .781 |
| | P_A1 | -923.760 | 1486.447 | -.144 | -.621 | .538 |
| | P_B1 | 502.974 | 927.469 | .095 | .542 | .591 |
| | P_A6 | -309.708 | 433.980 | -.064 | -.714 | .480 |
| | P_A2 | -485.361 | 743.681 | -.092 | -.653 | .518 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | **P_B3** | 626.796 | 963.291 | .144 | .651 | .519 |
| | **P_A3** | 174.777 | 610.544 | .033 | .286 | .776 |
| | **P_A4** | -84.762 | 227.602 | -.106 | -.372 | .712 |
| | **P_B2** | 195.292 | 110.153 | .173 | 1.773 | .084 |
| | **TEMP** | 2936.636 | 1257.862 | .418 | 2.335 | .025 |
| | **GDP** | 1325.163 | 1797.404 | .070 | .737 | .465 |
| | **RAMADAN** | -2234.322 | 491.927 | -.275 | -4.542 | .000 |
| | **TOURIST** | 45.363 | 24.304 | .349 | 1.866 | .069 |
| | **P_RAKI** | 69.229 | 66.333 | .115 | 1.044 | .303 |
| | **TREND** | -481.256 | 826.030 | -.158 | -.583 | .563 |
| **2** | **(Constant)** | -120661.066 | 179165.512 | | -.673 | .504 |
| | **D_A1** | 3876.604 | 5512.899 | .082 | .703 | .486 |
| | **D_A5** | 2643.439 | 2980.967 | .180 | .887 | .380 |
| | **D_A6** | -1175.348 | 2362.173 | -.055 | -.498 | .621 |
| | **D_A4** | 610.830 | 2790.821 | .049 | .219 | .828 |
| | **P_A1** | -981.423 | 1454.874 | -.153 | -.675 | .504 |
| | **P_B1** | 493.923 | 916.375 | .094 | .539 | .593 |
| | **P_A6** | -276.764 | 412.362 | -.057 | -.671 | .506 |
| | **P_A2** | -524.077 | 721.933 | -.099 | -.726 | .472 |
| | **P_B3** | 667.493 | 941.045 | .154 | .709 | .482 |
| | **P_A3** | 235.405 | 562.829 | .044 | .418 | .678 |
| | **P_A4** | -63.303 | 211.361 | -.079 | -.300 | .766 |
| | **P_B2** | 189.559 | 106.932 | .168 | 1.773 | .084 |
| | **TEMP** | 2836.809 | 1190.605 | .403 | 2.383 | .022 |
| | **GDP** | 1365.376 | 1771.124 | .072 | .771 | .445 |
| | **RAMADAN** | -2217.924 | 482.757 | -.273 | -4.594 | .000 |
| | **TOURIST** | 46.792 | 23.473 | .360 | 1.993 | .053 |
| | **P_RAKI** | 65.588 | 64.259 | .109 | 1.021 | .313 |
| | **TREND** | -489.042 | 816.183 | -.160 | -.599 | .552 |
| **3** | **(Constant)** | -136697.829 | 161634.639 | | -.846 | .403 |
| | **D_A1** | 4014.651 | 5414.269 | .085 | .741 | .463 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | **D_A5** | 2591.547 | 2937.650 | .176 | .882 | .383 |
| | **D_A6** | -1065.961 | 2282.380 | -.050 | -.467 | .643 |
| | **P_A1** | -1046.367 | 1408.058 | -.163 | -.743 | .462 |
| | **P_B1** | 473.045 | 901.007 | .090 | .525 | .602 |
| | **P_A6** | -256.468 | 397.220 | -.053 | -.646 | .522 |
| | **P_A2** | -496.304 | 702.593 | -.094 | -.706 | .484 |
| | **P_B3** | 700.735 | 918.121 | .162 | .763 | .450 |
| | **P_A3** | 209.990 | 544.442 | .040 | .386 | .702 |
| | **P_A4** | -25.925 | 123.117 | -.032 | -.211 | .834 |
| | **P_B2** | 186.348 | 104.714 | .165 | 1.780 | .082 |
| | **TEMP** | 2937.038 | 1086.487 | .418 | 2.703 | .010 |
| | **GDP** | 1514.622 | 1615.962 | .080 | .937 | .354 |
| | **RAMADAN** | -2224.080 | 476.443 | -.273 | -4.668 | .000 |
| | **TOURIST** | 45.011 | 21.767 | .346 | 2.068 | .045 |
| | **P_RAKI** | 63.695 | 62.949 | .106 | 1.012 | .317 |
| | **TREND** | -459.884 | 796.058 | -.151 | -.578 | .567 |
| **4** | **(Constant)** | -136456.025 | 159824.378 | | -.854 | .398 |
| | **D_A1** | 4164.471 | 5307.338 | .088 | .785 | .437 |
| | **D_A5** | 2897.500 | 2524.645 | .197 | 1.148 | .257 |
| | **D_A6** | -1253.104 | 2078.748 | -.058 | -.603 | .550 |
| | **P_A1** | -1172.068 | 1261.007 | -.183 | -.929 | .358 |
| | **P_B1** | 452.759 | 885.831 | .086 | .511 | .612 |
| | **P_A6** | -266.253 | 390.084 | -.055 | -.683 | .499 |
| | **P_A2** | -436.612 | 635.684 | -.083 | -.687 | .496 |
| | **P_B3** | 768.135 | 850.904 | .177 | .903 | .372 |
| | **P_A3** | 196.222 | 534.462 | .037 | .367 | .715 |
| | **P_B2** | 182.867 | 102.245 | .162 | 1.789 | .081 |
| | **TEMP** | 2922.964 | 1072.311 | .416 | 2.726 | .009 |
| | **GDP** | 1474.769 | 1586.907 | .078 | .929 | .358 |
| | **RAMADAN** | -2205.496 | 462.967 | -.271 | -4.764 | .000 |
| | **TOURIST** | 44.094 | 21.089 | .339 | 2.091 | .042 |

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|---|---|---|---|---|---|---|
| | **P_RAKI** | 67.694 | 59.345 | .112 | 1.141 | .260 |
| | **TREND** | -560.995 | 627.842 | -.184 | -.894 | .377 |
| **5** | **(Constant)** | -139068.982 | 158088.222 | | -.880 | .384 |
| | **D_A1** | 4366.256 | 5226.645 | .092 | .835 | .408 |
| | **D_A5** | 2698.153 | 2441.204 | .183 | 1.105 | .275 |
| | **D_A6** | -1392.385 | 2023.643 | -.065 | -.688 | .495 |
| | **P_A1** | -1121.469 | 1241.068 | -.175 | -.904 | .371 |
| | **P_B1** | 470.751 | 875.735 | .089 | .538 | .594 |
| | **P_A6** | -260.525 | 385.921 | -.054 | -.675 | .503 |
| | **P_A2** | -398.581 | 620.990 | -.075 | -.642 | .524 |
| | **P_B3** | 823.319 | 829.248 | .190 | .993 | .326 |
| | **P_B2** | 183.676 | 101.211 | .162 | 1.815 | .076 |
| | **TEMP** | 3042.830 | 1011.307 | .433 | 3.009 | .004 |
| | **GDP** | 1476.944 | 1571.217 | .078 | .940 | .352 |
| | **RAMADAN** | -2221.072 | 456.464 | -.273 | -4.866 | .000 |
| | **TOURIST** | 42.329 | 20.331 | .326 | 2.082 | .043 |
| | **P_RAKI** | 72.268 | 57.449 | .120 | 1.258 | .215 |
| | **TREND** | -497.235 | 597.385 | -.163 | -.832 | .410 |
| **6** | **(Constant)** | -140548.885 | 156810.497 | | -.896 | .375 |
| | **D_A1** | 3917.739 | 5118.691 | .083 | .765 | .448 |
| | **D_A5** | 2404.829 | 2360.564 | .163 | 1.019 | .314 |
| | **D_A6** | -1010.153 | 1879.574 | -.047 | -.537 | .594 |
| | **P_A1** | -807.626 | 1086.476 | -.126 | -.743 | .461 |
| | **P_A6** | -284.903 | 380.207 | -.059 | -.749 | .458 |
| | **P_A2** | -387.434 | 615.721 | -.073 | -.629 | .532 |
| | **P_B3** | 970.813 | 776.332 | .224 | 1.251 | .218 |
| | **P_B2** | 186.705 | 100.253 | .165 | 1.862 | .069 |
| | **TEMP** | 3137.319 | 988.015 | .446 | 3.175 | .003 |
| | **GDP** | 1588.934 | 1544.991 | .084 | 1.028 | .309 |
| | **RAMADAN** | -2114.654 | 408.037 | -.260 | -5.183 | .000 |
| | **TOURIST** | 42.070 | 20.164 | .324 | 2.086 | .043 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | **P_RAKI** | 75.539 | 56.673 | .125 | 1.333 | .189 |
| | **TREND** | -439.164 | 582.875 | -.144 | -.753 | .455 |
| **7** | **(Constant)** | -112896.294 | 146979.332 | | -.768 | .446 |
| | **D_A1** | 4467.878 | 4976.374 | .094 | .898 | .374 |
| | **D_A5** | 2036.153 | 2241.162 | .138 | .909 | .368 |
| | **P_A1** | -898.591 | 1064.883 | -.140 | -.844 | .403 |
| | **P_A6** | -212.958 | 353.099 | -.044 | -.603 | .549 |
| | **P_A2** | -301.099 | 589.783 | -.057 | -.511 | .612 |
| | **P_B3** | 1018.172 | 765.329 | .235 | 1.330 | .190 |
| | **P_B2** | 166.643 | 92.322 | .147 | 1.805 | .078 |
| | **TEMP** | 2943.114 | 912.427 | .419 | 3.226 | .002 |
| | **GDP** | 1073.461 | 1201.824 | .057 | .893 | .376 |
| | **RAMADAN** | -2084.386 | 400.995 | -.256 | -5.198 | .000 |
| | **TOURIST** | 43.991 | 19.691 | .338 | 2.234 | .030 |
| | **P_RAKI** | 59.809 | 48.154 | .099 | 1.242 | .221 |
| | **TREND** | -252.648 | 464.662 | -.083 | -.544 | .589 |
| **8** | **(Constant)** | -137543.227 | 137728.052 | | -.999 | .323 |
| | **D_A1** | 4788.527 | 4897.596 | .101 | .978 | .333 |
| | **D_A5** | 1550.079 | 2012.845 | .105 | .770 | .445 |
| | **P_A1** | -1154.257 | 932.357 | -.180 | -1.238 | .222 |
| | **P_A6** | -204.727 | 349.946 | -.042 | -.585 | .561 |
| | **P_B3** | 921.151 | 735.504 | .212 | 1.252 | .217 |
| | **P_B2** | 159.478 | 90.528 | .141 | 1.762 | .085 |
| | **TEMP** | 3052.800 | 879.769 | .434 | 3.470 | .001 |
| | **GDP** | 1245.743 | 1144.364 | .066 | 1.089 | .282 |
| | **RAMADAN** | -2123.099 | 390.651 | -.261 | -5.435 | .000 |
| | **TOURIST** | 42.924 | 19.425 | .330 | 2.210 | .032 |
| | **P_RAKI** | 62.518 | 47.483 | .104 | 1.317 | .194 |
| | **TREND** | -181.887 | 440.006 | -.060 | -.413 | .681 |
| **9** | **(Constant)** | -150802.163 | 132779.249 | | -1.136 | .262 |
| | **D_A1** | 5054.490 | 4813.036 | .107 | 1.050 | .299 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | **D_A5** | 1108.556 | 1691.284 | .075 | .655 | .515 |
| | **P_A1** | -1367.735 | 769.534 | -.214 | -1.777 | .082 |
| | **P_A6** | -190.640 | 345.261 | -.039 | -.552 | .583 |
| | **P_B3** | 1112.801 | 566.029 | .256 | 1.966 | .055 |
| | **P_B2** | 134.243 | 66.270 | .119 | 2.026 | .048 |
| | **TEMP** | 3160.285 | 833.176 | .449 | 3.793 | .000 |
| | **GDP** | 1295.548 | 1128.133 | .068 | 1.148 | .256 |
| | **RAMADAN** | -2141.457 | 384.752 | -.263 | -5.566 | .000 |
| | **TOURIST** | 40.560 | 18.403 | .312 | 2.204 | .032 |
| | **P_RAKI** | 63.957 | 46.944 | .106 | 1.362 | .179 |
| **10** | **(Constant)** | -143279.681 | 131138.289 | | -1.093 | .280 |
| | **D_A1** | 4812.148 | 4758.864 | .101 | 1.011 | .317 |
| | **D_A5** | 705.007 | 1514.362 | .048 | .466 | .644 |
| | **P_A1** | -1575.651 | 666.337 | -.246 | -2.365 | .022 |
| | **P_B3** | 1127.430 | 561.384 | .260 | 2.008 | .050 |
| | **P_B2** | 126.419 | 64.276 | .112 | 1.967 | .055 |
| | **TEMP** | 3163.910 | 827.219 | .450 | 3.825 | .000 |
| | **GDP** | 1352.736 | 1115.372 | .071 | 1.213 | .231 |
| | **RAMADAN** | -2116.502 | 379.368 | -.260 | -5.579 | .000 |
| | **TOURIST** | 41.590 | 18.178 | .320 | 2.288 | .026 |
| | **P_RAKI** | 69.171 | 45.657 | .115 | 1.515 | .136 |
| **11** | **(Constant)** | -157226.325 | 126666.715 | | -1.241 | .220 |
| | **D_A1** | 5840.182 | 4182.361 | .123 | 1.396 | .169 |
| | **P_A1** | -1511.962 | 647.014 | -.236 | -2.337 | .023 |
| | **P_B3** | 981.079 | 461.453 | .226 | 2.126 | .038 |
| | **P_B2** | 130.844 | 63.069 | .116 | 2.075 | .043 |
| | **TEMP** | 3192.371 | 818.470 | .454 | 3.900 | .000 |
| | **GDP** | 1351.271 | 1106.597 | .071 | 1.221 | .228 |
| | **RAMADAN** | -2144.717 | 371.551 | -.264 | -5.772 | .000 |
| | **TOURIST** | 42.307 | 17.970 | .326 | 2.354 | .023 |
| | **P_RAKI** | 73.992 | 44.118 | .123 | 1.677 | .100 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 12 | **(Constant)** | -82512.524 | 111441.697 | | -.740 | .462 |
| | **D_A1** | 8784.395 | 3433.827 | .185 | 2.558 | .014 |
| | **P_A1** | -1591.881 | 646.787 | -.249 | -2.461 | .017 |
| | **P_B3** | 1051.016 | 460.084 | .242 | 2.284 | .027 |
| | **P_B2** | 167.013 | 55.949 | .148 | 2.985 | .004 |
| | **TEMP** | 3037.897 | 812.518 | .432 | 3.739 | .000 |
| | **RAMADAN** | -2150.016 | 373.310 | -.264 | -5.759 | .000 |
| | **TOURIST** | 41.632 | 18.047 | .320 | 2.307 | .025 |
| | **P_RAKI** | 45.948 | 37.850 | .076 | 1.214 | .230 |
| 13 | **(Constant)** | -126930.108 | 105742.097 | | -1.200 | .235 |
| | **D_A1** | 10999.492 | 2922.101 | .232 | 3.764 | .000 |
| | **P_A1** | -1240.458 | 581.014 | -.194 | -2.135 | .037 |
| | **P_B3** | 758.635 | 393.786 | .175 | 1.927 | .060 |
| | **P_B2** | 158.446 | 55.754 | .140 | 2.842 | .006 |
| | **TEMP** | 3041.959 | 816.204 | .433 | 3.727 | .000 |
| | **RAMADAN** | -2205.098 | 372.226 | -.271 | -5.924 | .000 |
| | **TOURIST** | 39.061 | 18.004 | .301 | 2.170 | .035 |
| a Dependent Variable: Q_A1 | | | | | | |

**Excluded Variables(m)**

| **Model** | | **Beta In** | **t** | **Sig.** | **Partial Correlation** | **Collinearity Statistics** |
|---|---|---|---|---|---|---|
| | | | | | | **Tolerance** |
| **2** | **D_C1** | .043(a) | .275 | .785 | .043 | 7.853E-02 |
| **3** | **D_C1** | .032(b) | .211 | .834 | .033 | 8.423E-02 |
| | **D_A4** | .049(b) | .219 | .828 | .034 | 3.770E-02 |
| **4** | **D_C1** | .023(c) | .158 | .875 | .024 | 8.915E-02 |
| | **D_A4** | -.005(c) | -.040 | .969 | -.006 | .109 |
| | **P_A4** | -.032(c) | -.211 | .834 | -.032 | 7.758E-02 |
| **5** | **D_C1** | .039(d) | .298 | .767 | .045 | .108 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | **D_A4** | -.006(d) | -.050 | .960 | -.008 | .109 |
| | **P_A4** | -.025(d) | -.167 | .868 | -.025 | 7.872E-02 |
| | **P_A3** | .037(d) | .367 | .715 | .056 | .177 |
| **6** | **D_C1** | .041(e) | .322 | .749 | .048 | .108 |
| | **D_A4** | -.005(e) | -.038 | .970 | -.006 | .109 |
| | **P_A4** | -.016(e) | -.107 | .915 | -.016 | 7.973E-02 |
| | **P_A3** | .040(e) | .399 | .692 | .060 | .178 |
| | **P_B1** | .089(e) | .538 | .594 | .081 | 6.415E-02 |
| **7** | **D_C1** | .040(f) | .314 | .755 | .047 | .108 |
| | **D_A4** | -.032(f) | -.287 | .776 | -.043 | .140 |
| | **P_A4** | -.044(f) | -.326 | .746 | -.049 | 9.747E-02 |
| | **P_A3** | .048(f) | .490 | .626 | .073 | .183 |
| | **P_B1** | .049(f) | .318 | .752 | .047 | 7.318E-02 |
| | **D_A6** | -.047(f) | -.537 | .594 | -.080 | .228 |
| **8** | **D_C1** | .054(g) | .439 | .662 | .065 | .116 |
| | **D_A4** | -.011(g) | -.102 | .919 | -.015 | .157 |
| | **P_A4** | -.007(g) | -.063 | .950 | -.009 | .122 |
| | **P_A3** | .035(g) | .374 | .710 | .055 | .192 |
| | **P_B1** | .054(g) | .352 | .727 | .052 | 7.347E-02 |
| | **D_A6** | -.033(g) | -.389 | .699 | -.057 | .245 |
| | **P_A2** | -.057(g) | -.511 | .612 | -.075 | .138 |
| **9** | **D_C1** | .033(h) | .290 | .773 | .042 | .129 |
| | **D_A4** | -.027(h) | -.300 | .765 | -.044 | .213 |
| | **P_A4** | -.028(h) | -.296 | .769 | -.043 | .189 |
| | **P_A3** | .015(h) | .177 | .860 | .026 | .230 |
| | **P_B1** | .056(h) | .367 | .716 | .053 | 7.353E-02 |
| | **D_A6** | -.007(h) | -.097 | .923 | -.014 | .354 |
| | **P_A2** | -.039(h) | -.368 | .715 | -.054 | .151 |
| | **TREND** | -.060(h) | -.413 | .681 | -.060 | 8.138E-02 |
| **10** | **D_C1** | .019(i) | .173 | .863 | .025 | .134 |
| | **D_A4** | -.026(i) | -.299 | .766 | -.043 | .213 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | **P_A4** | -.024(i) | -.252 | .802 | -.036 | .190 |
| | **P_A3** | .013(i) | .155 | .878 | .022 | .230 |
| | **P_B1** | .072(i) | .491 | .626 | .071 | 7.797E-02 |
| | **D_A6** | .002(i) | .033 | .974 | .005 | .374 |
| | **P_A2** | -.038(i) | -.362 | .719 | -.052 | .151 |
| | **TREND** | -.051(i) | -.361 | .720 | -.052 | 8.216E-02 |
| | **P_A6** | -.039(i) | -.552 | .583 | -.079 | .329 |
| **11** | **D_C1** | .035(j) | .453 | .653 | .065 | .268 |
| | **D_A4** | -.034(j) | -.401 | .690 | -.057 | .225 |
| | **P_A4** | -.034(j) | -.393 | .696 | -.056 | .213 |
| | **P_A3** | .015(j) | .173 | .863 | .025 | .231 |
| | **P_B1** | .044(j) | .320 | .750 | .046 | 8.676E-02 |
| | **D_A6** | -.006(j) | -.090 | .929 | -.013 | .402 |
| | **P_A2** | -.018(j) | -.180 | .858 | -.026 | .172 |
| | **TREND** | -.006(j) | -.054 | .957 | -.008 | .116 |
| | **P_A6** | -.019(j) | -.300 | .765 | -.043 | .405 |
| | **D_A5** | .048(j) | .466 | .644 | .066 | .154 |
| **12** | **D_C1** | .038(k) | .488 | .628 | .069 | .269 |
| | **D_A4** | .024(k) | .335 | .739 | .047 | .325 |
| | **P_A4** | .007(k) | .084 | .933 | .012 | .247 |
| | **P_A3** | -.008(k) | -.091 | .928 | -.013 | .242 |
| | **P_B1** | .100(k) | .801 | .427 | .113 | .106 |
| | **D_A6** | .034(k) | .662 | .511 | .093 | .637 |
| | **P_A2** | -.043(k) | -.450 | .655 | -.063 | .182 |
| | **TREND** | -.018(k) | -.153 | .879 | -.022 | .117 |
| | **P_A6** | -.025(k) | -.399 | .692 | -.056 | .408 |
| | **D_A5** | .048(k) | .460 | .648 | .065 | .154 |
| | **GDP** | .071(k) | 1.221 | .228 | .170 | .472 |
| **13** | **D_C1** | .041(l) | .521 | .604 | .073 | .269 |
| | **D_A4** | -.013(l) | -.196 | .846 | -.027 | .393 |
| | **P_A4** | -.023(l) | -.293 | .770 | -.041 | .273 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | **P_A3** | .015(l) | .181 | .857 | .025 | .255 |
| | **P_B1** | .109(l) | .873 | .387 | .121 | .106 |
| | **D_A6** | .041(l) | .803 | .426 | .112 | .646 |
| | **P_A2** | -.026(l) | -.276 | .784 | -.039 | .185 |
| | **TREND** | .002(l) | .018 | .985 | .003 | .119 |
| | **P_A6** | -.029(l) | -.461 | .647 | -.064 | .409 |
| | **D_A5** | .076(l) | .762 | .450 | .106 | .166 |
| | **GDP** | .020(l) | .401 | .690 | .056 | .648 |
| | **P_RAKI** | .076(l) | 1.214 | .230 | .168 | .411 |

a Predictors in the Model: (Constant), TREND, TOURIST, GDP, P_A3, RAMADAN, P_RAKI, P_A6, D_A6, P_B2, P_A2, P_A4, D_A1, P_B1, TEMP, P_B3, P_A1, D_A4, D_A5

b Predictors in the Model: (Constant), TREND, TOURIST, GDP, P_A3, RAMADAN, P_RAKI, P_A6, D_A6, P_B2, P_A2, P_A4, D_A1, P_B1, TEMP, P_B3, P_A1, D_A5

c Predictors in the Model: (Constant), TREND, TOURIST, GDP, P_A3, RAMADAN, P_RAKI, P_A6, D_A6, P_B2, P_A2, D_A1, P_B1, TEMP, P_B3, P_A1, D_A5

d Predictors in the Model: (Constant), TREND, TOURIST, GDP, RAMADAN, P_RAKI, P_A6, D_A6, P_B2, P_A2, D_A1, P_B1, TEMP, P_B3, P_A1, D_A5

e Predictors in the Model: (Constant), TREND, TOURIST, GDP, RAMADAN, P_RAKI, P_A6, D_A6, P_B2, P_A2, D_A1, TEMP, P_B3, P_A1, D_A5

f Predictors in the Model: (Constant), TREND, TOURIST, GDP, RAMADAN, P_RAKI, P_A6, P_B2, P_A2, D_A1, TEMP, P_B3, P_A1, D_A5

g Predictors in the Model: (Constant), TREND, TOURIST, GDP, RAMADAN, P_RAKI, P_A6, P_B2, D_A1, TEMP, P_B3, P_A1, D_A5

h Predictors in the Model: (Constant), TOURIST, GDP, RAMADAN, P_RAKI, P_A6, P_B2, D_A1, TEMP, P_B3, P_A1, D_A5

i Predictors in the Model: (Constant), TOURIST, GDP, RAMADAN, P_RAKI, P_B2, D_A1, TEMP, P_B3, P_A1, D_A5

j Predictors in the Model: (Constant), TOURIST, GDP, RAMADAN, P_RAKI, P_B2, D_A1, TEMP, P_B3, P_A1

k Predictors in the Model: (Constant), TOURIST, RAMADAN, P_RAKI, P_B2, D_A1, TEMP, P_B3, P_A1

l Predictors in the Model: (Constant), TOURIST, RAMADAN, P_B2, D_A1, TEMP, P_B3, P_A1

m Dependent Variable: Q_A1

**Residuals Statistics(a)**

| | Minimum | Maximum | Mean | Std. Deviation | N |
|---|---|---|---|---|---|

| | | | | | |
|---|---|---|---|---|---|
| **Predicted Value** | 155181.8750 | 340318.1875 | 250426.8500 | 51034.8058 | 60 |
| **Residual** | -35646.0273 | 41487.1758 | 3.201E-11 | 15581.6021 | 60 |
| **Std. Predicted Value** | -1.866 | 1.761 | .000 | 1.000 | 60 |
| **Std. Residual** | -2.148 | 2.500 | .000 | .939 | 60 |
| a Dependent Variable: Q_A1 | | | | | |

# APPENDIX B.10

# REGRESSION OUTPUT:
# MULTIPLICATIVE BRAND-LEVEL MODEL
# FULL SET OF VARIABLES

**Variables Entered/Removed(b)**

| Model | Variables Entered | Variables Removed | Method |
|---|---|---|---|
| **1** | TREND, P_A1, RAMADAN, D_A1, D_A6, TEMP, D_B4, GDP, P_A6, D_B1, D_A3, P_A3, P_B4, D_C1, P_C1, P_A5, P_A2, D_B3, P_B2, D_A2, P_B1, TOURIST, P_A4, P_RAKI, D_A5, P_B3, D_B2, D_A4(a) | , | Enter |

a All requested variables entered.

b Dependent Variable: Q_A1

**Model Summary(b)**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate | Durbin-Watson |
|---|---|---|---|---|---|
| **1** | ,966(a) | ,934 | ,874 | 8,129E-02 | 2,231 |

a Predictors: (Constant), TREND, P_A1, RAMADAN, D_A1, D_A6, TEMP, D_B4, GDP, P_A6, D_B1, D_A3, P_A3, P_B4, D_C1, P_C1, P_A5, P_A2, D_B3, P_B2, D_A2, P_B1, TOURIST, P_A4, P_RAKI, D_A5, P_B3, D_B2, D_A4

b Dependent Variable: Q_A1

**ANOVA(b)**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| **1** | **Regression** | 2,885 | 28 | ,103 | 15,596 | ,000(a) |
| | **Residual** | ,205 | 31 | 6,608E-03 | | |
| | **Total** | 3,090 | 59 | | | |

a Predictors: (Constant), TREND, P_A1, RAMADAN, D_A1, D_A6, TEMP, D_B4, GDP, P_A6, D_B1, D_A3, P_A3, P_B4, D_C1, P_C1, P_A5, P_A2, D_B3, P_B2, D_A2, P_B1, TOURIST, P_A4, P_RAKI, D_A5, P_B3, D_B2, D_A4

b Dependent Variable: Q_A1

| Coefficients(a) | | | | | | |
|---|---|---|---|---|---|---|
| | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
| Model | | B | Std. Error | Beta | | |
| 1 | (Constant) | 11,294 | 7,504 | | 1,505 | ,142 |
| | D_A1 | -,463 | ,934 | -,071 | -,496 | ,624 |
| | D_B1 | ,384 | ,283 | ,230 | 1,360 | ,184 |
| | D_A5 | -5,681E-02 | ,147 | -,086 | -,385 | ,703 |
| | D_B4 | ,550 | ,261 | ,207 | 2,104 | ,044 |
| | D_C1 | -8,521E-02 | ,080 | -,204 | -1,061 | ,297 |
| | D_A6 | ,143 | ,053 | ,492 | 2,699 | ,011 |
| | D_A2 | ,228 | ,257 | ,172 | ,888 | ,381 |
| | D_B3 | ,348 | ,284 | ,226 | 1,227 | ,229 |
| | D_A3 | 7,708E-02 | ,185 | ,051 | ,416 | ,680 |
| | D_A4 | -9,688E-02 | ,188 | -,395 | -,515 | ,610 |
| | D_B2 | -3,342E-02 | ,066 | -,155 | -,505 | ,617 |
| | P_A1 | 1,135 | 1,293 | ,263 | ,878 | ,387 |
| | P_B1 | -,831 | ,696 | -,233 | -1,194 | ,242 |
| | P_A5 | -2,223E-02 | ,552 | -,008 | -,040 | ,968 |
| | P_B4 | -,208 | ,374 | -,080 | -,557 | ,582 |
| | P_C1 | -,161 | ,280 | -,119 | -,574 | ,570 |
| | P_A6 | ,177 | ,400 | ,064 | ,443 | ,661 |
| | P_A2 | -,364 | ,686 | -,093 | -,530 | ,600 |
| | P_B3 | ,376 | ,800 | ,116 | ,471 | ,641 |
| | P_A3 | ,533 | ,475 | ,137 | 1,121 | ,271 |
| | P_A4 | 2,684E-02 | ,089 | ,228 | ,302 | ,765 |
| | P_B2 | 8,835E-03 | ,027 | ,058 | ,330 | ,744 |
| | TEMP | 9,422E-02 | ,055 | ,294 | 1,729 | ,094 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | **GDP** | -1,215 | 1,472 | -,136 | -,825 | ,415 |
| | **RAMADAN** | -7,538E-02 | ,017 | -,327 | -4,534 | ,000 |
| | **TOURIST** | ,112 | ,087 | ,258 | 1,286 | ,208 |
| | **P_RAKI** | 5,897E-02 | ,326 | ,039 | ,181 | ,858 |
| | **TREND** | 5,702E-02 | ,087 | ,224 | ,653 | ,519 |
| a Dependent Variable: Q_A1 | | | | | | |

**Residuals Statistics(a)**

| | Minimum | Maximum | Mean | Std. Deviation | N |
|---|---|---|---|---|---|
| **Predicted Value** | 11,9091 | 12,7660 | 12,4060 | ,2211 | 60 |
| **Residual** | -,1559 | ,1592 | 2,517E-15 | 5,892E-02 | 60 |
| **Std. Predicted Value** | -2,247 | 1,628 | ,000 | 1,000 | 60 |
| **Std. Residual** | -1,918 | 1,958 | ,000 | ,725 | 60 |
| a Dependent Variable: Q_A1 | | | | | |

# APPENDIX B.11

# REGRESSION OUTPUT: MULTIPLICATIVE BRAND-LEVEL MODEL 1st STEPWISE REGRESSION

| Variables Entered/Removed(a) | | | |
|---|---|---|---|
| **Model** | **Variables Entered** | **Variables Removed** | **Method** |
| **1** | TOURIST | . | Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100). |
| **2** | RAMADAN | . | Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100). |
| **3** | D_A3 | . | Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100). |
| **4** | TEMP | . | Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100). |
| **5** | D_A1 | . | Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100). |
| a Dependent Variable: Q_A1 | | | |

| Model Summary(f) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | **Change Statistics** | | | | | |
| **Model** | **R** | **R Square** | **Adjusted R Square** | **Std. Error of the Estimate** | **R Square Change** | **F Change** | **df1** | **df2** | **Sig. F Change** | **Durbin-Watson** |
| **1** | .882(a) | .779 | .775 | .1086 | .779 | 204.034 | 1 | 58 | .000 | |
| **2** | .914(b) | .835 | .829 | 9.465E-02 | .056 | 19.355 | 1 | 57 | .000 | |
| **3** | .922(c) | .850 | .842 | 9.093E-02 | .015 | 5.763 | 1 | 56 | .020 | |
| **4** | .932(d) | .868 | .858 | 8.617E-02 | .018 | 7.353 | 1 | 55 | .009 | |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **5** | .937(e) | .878 | .866 | 8.368E-02 | .010 | 4.322 | 1 | 54 | .042 | 1.935 |
| a Predictors: (Constant), TOURIST | | | | | | | | | | |
| b Predictors: (Constant), TOURIST, RAMADAN | | | | | | | | | | |
| c Predictors: (Constant), TOURIST, RAMADAN, D_A3 | | | | | | | | | | |
| d Predictors: (Constant), TOURIST, RAMADAN, D_A3, TEMP | | | | | | | | | | |
| e Predictors: (Constant), TOURIST, RAMADAN, D_A3, TEMP, D_A1 | | | | | | | | | | |
| f Dependent Variable: Q_A1 | | | | | | | | | | |

**ANOVA(f)**

| **Model** | | **Sum of Squares** | **df** | **Mean Square** | **F** | **Sig.** |
|---|---|---|---|---|---|---|
| **1** | **Regression** | 2.406 | 1 | 2.406 | 204.034 | .000(a) |
| | **Residual** | .684 | 58 | 1.179E-02 | | |
| | **Total** | 3.090 | 59 | | | |
| **2** | **Regression** | 2.580 | 2 | 1.290 | 143.979 | .000(b) |
| | **Residual** | .511 | 57 | 8.958E-03 | | |
| | **Total** | 3.090 | 59 | | | |
| **3** | **Regression** | 2.627 | 3 | .876 | 105.927 | .000(c) |
| | **Residual** | .463 | 56 | 8.267E-03 | | |
| | **Total** | 3.090 | 59 | | | |
| **4** | **Regression** | 2.682 | 4 | .670 | 90.296 | .000(d) |
| | **Residual** | .408 | 55 | 7.425E-03 | | |
| | **Total** | 3.090 | 59 | | | |
| **5** | **Regression** | 2.712 | 5 | .542 | 77.465 | .000(e) |
| | **Residual** | .378 | 54 | 7.002E-03 | | |
| | **Total** | 3.090 | 59 | | | |
| a Predictors: (Constant), TOURIST | | | | | | |
| b Predictors: (Constant), TOURIST, RAMADAN | | | | | | |
| c Predictors: (Constant), TOURIST, RAMADAN, D_A3 | | | | | | |
| d Predictors: (Constant), TOURIST, RAMADAN, D_A3, TEMP | | | | | | |
| e Predictors: (Constant), TOURIST, RAMADAN, D_A3, TEMP, D_A1 | | | | | | |
| f Dependent Variable: Q_A1 | | | | | | |

| Coefficients(a) | | | | | | |
|---|---|---|---|---|---|---|
| | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
| Model | | B | Std. Error | Beta | | |
| 1 | (Constant) | 9.893 | .176 | | 56.059 | .000 |
| | TOURIST | .382 | .027 | .882 | 14.284 | .000 |
| 2 | (Constant) | 10.298 | .179 | | 57.442 | .000 |
| | TOURIST | .324 | .027 | .749 | 12.128 | .000 |
| | RAMADAN | -6.260E-02 | .014 | -.272 | -4.399 | .000 |
| 3 | (Constant) | 9.914 | .235 | | 42.151 | .000 |
| | TOURIST | .318 | .026 | .736 | 12.347 | .000 |
| | RAMADAN | -6.495E-02 | .014 | -.282 | -4.739 | .000 |
| | D_A3 | .187 | .078 | .125 | 2.401 | .020 |
| 4 | (Constant) | 10.450 | .298 | | 35.084 | .000 |
| | TOURIST | .192 | .053 | .444 | 3.648 | .001 |
| | RAMADAN | -7.725E-02 | .014 | -.335 | -5.615 | .000 |
| | D_A3 | .218 | .075 | .146 | 2.920 | .005 |
| | TEMP | 9.637E-02 | .036 | .300 | 2.712 | .009 |
| 5 | (Constant) | 7.861 | 1.278 | | 6.149 | .000 |
| | TOURIST | .110 | .064 | .255 | 1.709 | .093 |
| | RAMADAN | -8.508E-02 | .014 | -.369 | -6.129 | .000 |
| | D_A3 | .171 | .076 | .114 | 2.249 | .029 |
| | TEMP | .133 | .039 | .415 | 3.433 | .001 |
| | D_A1 | .908 | .437 | .140 | 2.079 | .042 |

a Dependent Variable: Q_A1

| Excluded Variables(f) |
|---|

| Model | | Beta In | t | Sig. | Partial Correlation | Collinearity Statistics |
|---|---|---|---|---|---|---|
| | | | | | | Tolerance |
| 1 | D_A1 | .044(a) | .602 | .549 | .080 | .724 |
| | D_B1 | .042(a) | .634 | .529 | .084 | .895 |
| | D_A5 | .039(a) | .602 | .550 | .079 | .897 |
| | D_B4 | .098(a) | 1.547 | .127 | .201 | .935 |
| | D_C1 | .002(a) | .032 | .975 | .004 | .917 |
| | D_A6 | .139(a) | 2.304 | .025 | .292 | .970 |
| | D_A2 | .035(a) | .542 | .590 | .072 | .903 |
| | D_B3 | -.036(a) | -.550 | .584 | -.073 | .884 |
| | D_A3 | .107(a) | 1.763 | .083 | .227 | .996 |
| | D_A4 | .024(a) | .391 | .697 | .052 | 1.000 |
| | D_B2 | .060(a) | .977 | .333 | .128 | .996 |
| | P_A1 | -.047(a) | -.754 | .454 | -.099 | .973 |
| | P_B1 | -.035(a) | -.560 | .578 | -.074 | .987 |
| | P_A5 | .008(a) | .120 | .905 | .016 | .996 |
| | P_B4 | -.046(a) | -.728 | .470 | -.096 | .956 |
| | P_C1 | -.002(a) | -.032 | .975 | -.004 | .972 |
| | P_A6 | -.027(a) | -.422 | .675 | -.056 | .949 |
| | P_A2 | -.050(a) | -.790 | .433 | -.104 | .976 |
| | P_B3 | -.001(a) | -.018 | .986 | -.002 | .945 |
| | P_A3 | .006(a) | .093 | .926 | .012 | .985 |
| | P_A4 | .012(a) | .194 | .847 | .026 | .999 |
| | P_B2 | .055(a) | .856 | .396 | .113 | .921 |
| | TEMP | .066(a) | .501 | .618 | .066 | .223 |
| | GDP | .049(a) | .796 | .429 | .105 | .998 |
| | RAMADAN | -.272(a) | -4.399 | .000 | -.503 | .760 |
| | P_RAKI | .037(a) | .596 | .553 | .079 | .997 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | **TREND** | .030(a) | .475 | .637 | .063 | .987 |
| **2** | **D_A1** | .080(b) | 1.253 | .215 | .165 | .713 |
| | **D_B1** | .093(b) | 1.626 | .110 | .212 | .862 |
| | **D_A5** | .040(b) | .707 | .483 | .094 | .897 |
| | **D_B4** | .097(b) | 1.775 | .081 | .231 | .935 |
| | **D_C1** | .006(b) | .108 | .914 | .014 | .916 |
| | **D_A6** | .116(b) | 2.183 | .033 | .280 | .960 |
| | **D_A2** | .055(b) | .961 | .340 | .127 | .897 |
| | **D_B3** | -.024(b) | -.411 | .682 | -.055 | .881 |
| | **D_A3** | .125(b) | 2.401 | .020 | .305 | .990 |
| | **D_A4** | .019(b) | .344 | .732 | .046 | .999 |
| | **D_B2** | .063(b) | 1.174 | .245 | .155 | .996 |
| | **P_A1** | -.030(b) | -.537 | .593 | -.072 | .967 |
| | **P_B1** | -.001(b) | -.014 | .989 | -.002 | .966 |
| | **P_A5** | -.006(b) | -.115 | .909 | -.015 | .993 |
| | **P_B4** | -.058(b) | -1.050 | .298 | -.139 | .954 |
| | **P_C1** | .020(b) | .357 | .722 | .048 | .964 |
| | **P_A6** | -.025(b) | -.455 | .651 | -.061 | .949 |
| | **P_A2** | -.035(b) | -.636 | .527 | -.085 | .972 |
| | **P_B3** | -.002(b) | -.040 | .969 | -.005 | .945 |
| | **P_A3** | .025(b) | .462 | .646 | .062 | .978 |
| | **P_A4** | .008(b) | .144 | .886 | .019 | .998 |
| | **P_B2** | .053(b) | .948 | .347 | .126 | .921 |
| | **TEMP** | .250(b) | 2.150 | .036 | .276 | .201 |
| | **GDP** | .058(b) | 1.078 | .286 | .143 | .997 |
| | **P_RAKI** | .060(b) | 1.112 | .271 | .147 | .988 |
| | **TREND** | .040(b) | .738 | .464 | .098 | .985 |
| **3** | **D_A1** | .034(c) | .527 | .601 | .071 | .634 |
| | **D_B1** | .034(c) | .525 | .602 | .071 | .643 |
| | **D_A5** | -.029(c) | -.461 | .646 | -.062 | .693 |
| | **D_B4** | .069(c) | 1.258 | .214 | .167 | .876 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | **D_C1** | -.087(c) | -1.378 | .174 | -.183 | .659 |
| | **D_A6** | .109(c) | 2.129 | .038 | .276 | .957 |
| | **D_A2** | -.035(c) | -.513 | .610 | -.069 | .584 |
| | **D_B3** | -.066(c) | -1.148 | .256 | -.153 | .813 |
| | **D_A4** | -.074(c) | -1.185 | .241 | -.158 | .688 |
| | **D_B2** | -.057(c) | -.753 | .454 | -.101 | .473 |
| | **P_A1** | -.005(c) | -.090 | .929 | -.012 | .930 |
| | **P_B1** | .028(c) | .518 | .607 | .070 | .921 |
| | **P_A5** | -.043(c) | -.801 | .427 | -.107 | .920 |
| | **P_B4** | -.020(c) | -.350 | .728 | -.047 | .859 |
| | **P_C1** | -.019(c) | -.336 | .738 | -.045 | .882 |
| | **P_A6** | -.048(c) | -.891 | .377 | -.119 | .922 |
| | **P_A2** | .007(c) | .127 | .899 | .017 | .868 |
| | **P_B3** | .060(c) | 1.031 | .307 | .138 | .787 |
| | **P_A3** | .029(c) | .554 | .582 | .074 | .977 |
| | **P_A4** | -.083(c) | -1.358 | .180 | -.180 | .711 |
| | **P_B2** | -.043(c) | -.629 | .532 | -.085 | .569 |
| | **TEMP** | .300(c) | 2.712 | .009 | .343 | .196 |
| | **GDP** | .002(c) | .028 | .978 | .004 | .789 |
| | **P_RAKI** | .028(c) | .522 | .604 | .070 | .916 |
| | **TREND** | -.115(c) | -1.507 | .137 | -.199 | .447 |
| **4** | **D_A1** | .140(d) | 2.079 | .042 | .272 | .502 |
| | **D_B1** | .052(d) | .846 | .401 | .114 | .635 |
| | **D_A5** | .015(d) | .249 | .805 | .034 | .642 |
| | **D_B4** | .104(d) | 1.986 | .052 | .261 | .837 |
| | **D_C1** | -.038(d) | -.587 | .560 | -.080 | .589 |
| | **D_A6** | .078(d) | 1.513 | .136 | .202 | .885 |
| | **D_A2** | -.008(d) | -.121 | .904 | -.016 | .570 |
| | **D_B3** | -.010(d) | -.163 | .872 | -.022 | .689 |
| | **D_A4** | -.094(d) | -1.603 | .115 | -.213 | .678 |
| | **D_B2** | -.076(d) | -1.068 | .290 | -.144 | .469 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | **P_A1** | .001(d) | .027 | .978 | .004 | .928 |
| | **P_B1** | .001(d) | .015 | .988 | .002 | .885 |
| | **P_A5** | -.104(d) | -1.959 | .055 | -.258 | .808 |
| | **P_B4** | -.031(d) | -.573 | .569 | -.078 | .854 |
| | **P_C1** | .044(d) | .772 | .444 | .104 | .745 |
| | **P_A6** | -.011(d) | -.196 | .845 | -.027 | .851 |
| | **P_A2** | .012(d) | .224 | .823 | .030 | .867 |
| | **P_B3** | .044(d) | .794 | .431 | .107 | .777 |
| | **P_A3** | .028(d) | .569 | .572 | .077 | .977 |
| | **P_A4** | -.097(d) | -1.684 | .098 | -.223 | .706 |
| | **P_B2** | -.053(d) | -.811 | .421 | -.110 | .567 |
| | **GDP** | .029(d) | .515 | .608 | .070 | .765 |
| | **P_RAKI** | .086(d) | 1.608 | .114 | .214 | .807 |
| | **TREND** | -.086(d) | -1.166 | .249 | -.157 | .436 |
| **5** | **D_B1** | .032(e) | .522 | .604 | .072 | .617 |
| | **D_A5** | -.081(e) | -1.127 | .265 | -.153 | .434 |
| | **D_B4** | .064(e) | 1.037 | .304 | .141 | .594 |
| | **D_C1** | -.088(e) | -1.356 | .181 | -.183 | .528 |
| | **D_A6** | .073(e) | 1.451 | .153 | .195 | .883 |
| | **D_A2** | -.053(e) | -.791 | .433 | -.108 | .518 |
| | **D_B3** | -.032(e) | -.540 | .591 | -.074 | .668 |
| | **D_A4** | -.059(e) | -.954 | .344 | -.130 | .593 |
| | **D_B2** | -.050(e) | -.702 | .486 | -.096 | .451 |
| | **P_A1** | .013(e) | .256 | .799 | .035 | .917 |
| | **P_B1** | .022(e) | .428 | .670 | .059 | .851 |
| | **P_A5** | -.068(e) | -1.144 | .258 | -.155 | .638 |
| | **P_B4** | -.016(e) | -.315 | .754 | -.043 | .839 |
| | **P_C1** | -.016(e) | -.255 | .800 | -.035 | .565 |
| | **P_A6** | -.027(e) | -.516 | .608 | -.071 | .832 |
| | **P_A2** | .018(e) | .357 | .722 | .049 | .863 |
| | **P_B3** | .061(e) | 1.120 | .268 | .152 | .763 |

| | | | | | |
|---|---|---|---|---|---|
| P_A3 | .034(e) | .706 | .483 | .097 | .974 |
| P_A4 | -.061(e) | -1.003 | .321 | -.136 | .608 |
| P_B2 | -.023(e) | -.344 | .732 | -.047 | .534 |
| GDP | .012(e) | .217 | .829 | .030 | .747 |
| P_RAKI | .036(e) | .552 | .584 | .076 | .550 |
| TREND | -.072(e) | -.990 | .327 | -.135 | .431 |

a Predictors in the Model: (Constant), TOURIST

b Predictors in the Model: (Constant), TOURIST, RAMADAN

c Predictors in the Model: (Constant), TOURIST, RAMADAN, D_A3

d Predictors in the Model: (Constant), TOURIST, RAMADAN, D_A3, TEMP

e Predictors in the Model: (Constant), TOURIST, RAMADAN, D_A3, TEMP, D_A1

f Dependent Variable: Q_A1

**Casewise Diagnostics(a)**

| Case Number | Std. Residual | Q_A1 | Predicted Value | Residual |
|---|---|---|---|---|
| 44 | -3.218 | 11.83 | 12.0993 | -.2693 |

a Dependent Variable: Q_A1

**Residuals Statistics(a)**

| | Minimum | Maximum | Mean | Std. Deviation | N |
|---|---|---|---|---|---|
| Predicted Value | 11.9520 | 12.7181 | 12.4060 | .2144 | 60 |
| Residual | -.2693 | .2412 | -3.1974E-15 | 8.005E-02 | 60 |
| Std. Predicted Value | -2.118 | 1.456 | .000 | 1.000 | 60 |
| Std. Residual | -3.218 | 2.882 | .000 | .957 | 60 |

a Dependent Variable: Q_A1

# APPENDIX B.12

# REGRESSION OUTPUT:
# MULTIPLICATIVE BRAND-LEVEL MODEL
# 1st BACKWARD REGRESSION

| Variables Entered/Removed(b) | | | |
|---|---|---|---|
| **Model** | **Variables Entered** | **Variables Removed** | **Method** |
| **1** | TREND, P_A1, RAMADAN, D_A1, D_A6, TEMP, D_B4, GDP, P_A6, D_B1, D_A3, P_A3, P_B4, D_C1, P_C1, P_A5, P_A2, D_B3, P_B2, D_A2, P_B1, TOURIST, P_A4, P_RAKI, D_A5, P_B3, D_B2, D_A4(a) | . | Enter |
| **2** | . | P_A5 | Backward (criterion: Probability of F-to-remove >= .100). |
| **3** | . | P_RAKI | Backward (criterion: Probability of F-to-remove >= .100). |
| **4** | . | P_B2 | Backward (criterion: Probability of F-to-remove >= .100). |
| **5** | . | D_A5 | Backward (criterion: Probability of F-to-remove >= .100). |
| **6** | . | P_A4 | Backward (criterion: Probability of F-to-remove >= .100). |
| **7** | . | P_C1 | Backward (criterion: Probability of F-to-remove >= .100). |
| **8** | . | D_A4 | Backward (criterion: Probability of F-to-remove >= .100). |
| **9** | . | TREND | Backward (criterion: Probability of F-to-remove >= .100). |
| **10** | . | D_B2 | Backward (criterion: Probability of F-to- |

| | | | |
|---|---|---|---|
| | | | remove >= .100). |
| **11** | . | D_A1 | Backward (criterion: Probability of F-to-remove >= .100). |
| **12** | . | D_A2 | Backward (criterion: Probability of F-to-remove >= .100). |
| **13** | . | P_A1 | Backward (criterion: Probability of F-to-remove >= .100). |
| **14** | . | P_B1 | Backward (criterion: Probability of F-to-remove >= .100). |
| **15** | . | P_A2 | Backward (criterion: Probability of F-to-remove >= .100). |
| **16** | . | P_B3 | Backward (criterion: Probability of F-to-remove >= .100). |
| **17** | . | P_B4 | Backward (criterion: Probability of F-to-remove >= .100). |
| **18** | . | P_A6 | Backward (criterion: Probability of F-to-remove >= .100). |
| a All requested variables entered. | | | |
| b Dependent Variable: Q_A1 | | | |

**Model Summary(s)**

| | | | | | **Change Statistics** | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Model** | **R** | **R Square** | **Adjusted R Square** | **Std. Error of the Estimate** | **R Square Change** | **F Change** | **df1** | **df2** | **Sig. F Change** | **Durbin-Watson** |
| **1** | .966(a) | .934 | .874 | 8.129E-02 | .934 | 15.596 | 28 | 31 | .000 | |
| **2** | .966(b) | .934 | .878 | 8.001E-02 | .000 | .002 | 1 | 33 | .968 | |
| **3** | .966(c) | .934 | .881 | 7.884E-02 | .000 | .045 | 1 | 34 | .833 | |
| **4** | .966(d) | .933 | .884 | 7.782E-02 | .000 | .121 | 1 | 35 | .730 | |
| **5** | .966(e) | .933 | .887 | 7.687E-02 | .000 | .151 | 1 | 36 | .700 | |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **6** | .966(f) | .932 | .889 | 7.624E-02 | -.001 | .411 | 1 | 37 | .526 | |
| **7** | .965(g) | .932 | .891 | 7.562E-02 | -.001 | .405 | 1 | 38 | .528 | |
| **8** | .965(h) | .931 | .893 | 7.500E-02 | -.001 | .373 | 1 | 39 | .545 | |
| **9** | .965(i) | .930 | .895 | 7.429E-02 | .000 | .273 | 1 | 40 | .604 | |
| **10** | .964(j) | .930 | .897 | 7.355E-02 | .000 | .202 | 1 | 41 | .656 | |
| **11** | .964(k) | .929 | .898 | 7.294E-02 | -.001 | .326 | 1 | 42 | .571 | |
| **12** | .964(l) | .929 | .900 | 7.231E-02 | .000 | .281 | 1 | 43 | .599 | |
| **13** | .963(m) | .928 | .901 | 7.205E-02 | -.001 | .681 | 1 | 44 | .414 | |
| **14** | .963(n) | .927 | .902 | 7.162E-02 | -.001 | .485 | 1 | 45 | .490 | |
| **15** | .962(o) | .925 | .902 | 7.172E-02 | -.002 | 1.120 | 1 | 46 | .296 | |
| **16** | .961(p) | .924 | .903 | 7.128E-02 | -.001 | .442 | 1 | 47 | .509 | |
| **17** | .960(q) | .922 | .902 | 7.180E-02 | -.003 | 1.682 | 1 | 48 | .201 | |
| **18** | .959(r) | .920 | .902 | 7.176E-02 | -.002 | .949 | 1 | 49 | .335 | 1.895 |

a Predictors: (Constant), TREND, P_A1, RAMADAN, D_A1, D_A6, TEMP, D_B4, GDP, P_A6, D_B1, D_A3, P_A3, P_B4, D_C1, P_C1, P_A5, P_A2, D_B3, P_B2, D_A2, P_B1, TOURIST, P_A4, P_RAKI, D_A5, P_B3, D_B2, D_A4

b Predictors: (Constant), TREND, P_A1, RAMADAN, D_A1, D_A6, TEMP, D_B4, GDP, P_A6, D_B1, D_A3, P_A3, P_B4, D_C1, P_C1, P_A2, D_B3, P_B2, D_A2, P_B1, TOURIST, P_A4, P_RAKI, D_A5, P_B3, D_B2, D_A4

c Predictors: (Constant), TREND, P_A1, RAMADAN, D_A1, D_A6, TEMP, D_B4, GDP, P_A6, D_B1, D_A3, P_A3, P_B4, D_C1, P_C1, P_A2, D_B3, P_B2, D_A2, P_B1, TOURIST, P_A4, D_A5, P_B3, D_B2, D_A4

d Predictors: (Constant), TREND, P_A1, RAMADAN, D_A1, D_A6, TEMP, D_B4, GDP, P_A6, D_B1, D_A3, P_A3, P_B4, D_C1, P_C1, P_A2, D_B3, D_A2, P_B1, TOURIST, P_A4, D_A5, P_B3, D_B2, D_A4

e Predictors: (Constant), TREND, P_A1, RAMADAN, D_A1, D_A6, TEMP, D_B4, GDP, P_A6, D_B1, D_A3, P_A3, P_B4, D_C1, P_C1, P_A2, D_B3, D_A2, P_B1, TOURIST, P_A4, P_B3, D_B2, D_A4

f Predictors: (Constant), TREND, P_A1, RAMADAN, D_A1, D_A6, TEMP, D_B4, GDP, P_A6, D_B1, D_A3, P_A3, P_B4, D_C1, P_C1, P_A2, D_B3, D_A2, P_B1, TOURIST, P_B3, D_B2, D_A4

g Predictors: (Constant), TREND, P_A1, RAMADAN, D_A1, D_A6, TEMP, D_B4, GDP, P_A6, D_B1, D_A3, P_A3, P_B4, D_C1, P_A2, D_B3, D_A2, P_B1, TOURIST, P_B3, D_B2, D_A4

h Predictors: (Constant), TREND, P_A1, RAMADAN, D_A1, D_A6, TEMP, D_B4, GDP, P_A6, D_B1, D_A3, P_A3, P_B4, D_C1, P_A2, D_B3, D_A2, P_B1, TOURIST, P_B3, D_B2

i Predictors: (Constant), P_A1, RAMADAN, D_A1, D_A6, TEMP, D_B4, GDP, P_A6, D_B1, D_A3, P_A3, P_B4, D_C1, P_A2, D_B3, D_A2, P_B1, TOURIST, P_B3, D_B2

j Predictors: (Constant), P_A1, RAMADAN, D_A1, D_A6, TEMP, D_B4, GDP, P_A6, D_B1, D_A3, P_A3, P_B4, D_C1, P_A2, D_B3, D_A2, P_B1, TOURIST, P_B3

| |
|---|
| k Predictors: (Constant), P_A1, RAMADAN, D_A6, TEMP, D_B4, GDP, P_A6, D_B1, D_A3, P_A3, P_B4, D_C1, P_A2, D_B3, D_A2, P_B1, TOURIST, P_B3 |
| l Predictors: (Constant), P_A1, RAMADAN, D_A6, TEMP, D_B4, GDP, P_A6, D_B1, D_A3, P_A3, P_B4, D_C1, P_A2, D_B3, P_B1, TOURIST, P_B3 |
| m Predictors: (Constant), RAMADAN, D_A6, TEMP, D_B4, GDP, P_A6, D_B1, D_A3, P_A3, P_B4, D_C1, P_A2, D_B3, P_B1, TOURIST, P_B3 |
| n Predictors: (Constant), RAMADAN, D_A6, TEMP, D_B4, GDP, P_A6, D_B1, D_A3, P_A3, P_B4, D_C1, P_A2, D_B3, TOURIST, P_B3 |
| o Predictors: (Constant), RAMADAN, D_A6, TEMP, D_B4, GDP, P_A6, D_B1, D_A3, P_A3, P_B4, D_C1, D_B3, TOURIST, P_B3 |
| p Predictors: (Constant), RAMADAN, D_A6, TEMP, D_B4, GDP, P_A6, D_B1, D_A3, P_A3, P_B4, D_C1, D_B3, TOURIST |
| q Predictors: (Constant), RAMADAN, D_A6, TEMP, D_B4, GDP, P_A6, D_B1, D_A3, P_A3, D_C1, D_B3, TOURIST |
| r Predictors: (Constant), RAMADAN, D_A6, TEMP, D_B4, GDP, D_B1, D_A3, P_A3, D_C1, D_B3, TOURIST |
| s Dependent Variable: Q_A1 |

**ANOVA(s)**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | **Regression** | 2.885 | 28 | .103 | 15.596 | .000(a) |
| | **Residual** | .205 | 31 | 6.608E-03 | | |
| | **Total** | 3.090 | 59 | | | |
| 2 | **Regression** | 2.885 | 27 | .107 | 16.694 | .000(b) |
| | **Residual** | .205 | 32 | 6.401E-03 | | |
| | **Total** | 3.090 | 59 | | | |
| 3 | **Regression** | 2.885 | 26 | .111 | 17.851 | .000(c) |
| | **Residual** | .205 | 33 | 6.216E-03 | | |
| | **Total** | 3.090 | 59 | | | |
| 4 | **Regression** | 2.884 | 25 | .115 | 19.053 | .000(d) |
| | **Residual** | .206 | 34 | 6.056E-03 | | |
| | **Total** | 3.090 | 59 | | | |
| 5 | **Regression** | 2.883 | 24 | .120 | 20.333 | .000(e) |
| | **Residual** | .207 | 35 | 5.909E-03 | | |
| | **Total** | 3.090 | 59 | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| **6** | **Regression** | 2.881 | 23 | .125 | 21.552 | .000(f) |
| | **Residual** | .209 | 36 | 5.812E-03 | | |
| | **Total** | 3.090 | 59 | | | |
| **7** | **Regression** | 2.879 | 22 | .131 | 22.881 | .000(g) |
| | **Residual** | .212 | 37 | 5.719E-03 | | |
| | **Total** | 3.090 | 59 | | | |
| **8** | **Regression** | 2.877 | 21 | .137 | 24.355 | .000(h) |
| | **Residual** | .214 | 38 | 5.624E-03 | | |
| | **Total** | 3.090 | 59 | | | |
| **9** | **Regression** | 2.875 | 20 | .144 | 26.044 | .000(i) |
| | **Residual** | .215 | 39 | 5.519E-03 | | |
| | **Total** | 3.090 | 59 | | | |
| **10** | **Regression** | 2.874 | 19 | .151 | 27.962 | .000(j) |
| | **Residual** | .216 | 40 | 5.409E-03 | | |
| | **Total** | 3.090 | 59 | | | |
| **11** | **Regression** | 2.872 | 18 | .160 | 29.990 | .000(k) |
| | **Residual** | .218 | 41 | 5.320E-03 | | |
| | **Total** | 3.090 | 59 | | | |
| **12** | **Regression** | 2.871 | 17 | .169 | 32.291 | .000(l) |
| | **Residual** | .220 | 42 | 5.229E-03 | | |
| | **Total** | 3.090 | 59 | | | |
| **13** | **Regression** | 2.867 | 16 | .179 | 34.523 | .000(m) |
| | **Residual** | .223 | 43 | 5.191E-03 | | |
| | **Total** | 3.090 | 59 | | | |
| **14** | **Regression** | 2.865 | 15 | .191 | 37.228 | .000(n) |
| | **Residual** | .226 | 44 | 5.130E-03 | | |
| | **Total** | 3.090 | 59 | | | |
| **15** | **Regression** | 2.859 | 14 | .204 | 39.701 | .000(o) |
| | **Residual** | .231 | 45 | 5.143E-03 | | |
| | **Total** | 3.090 | 59 | | | |
| **16** | **Regression** | 2.857 | 13 | .220 | 43.245 | .000(p) |

| | | | | | | |
|---|---|---|---|---|---|---|
| | **Residual** | .234 | 46 | 5.081E-03 | | |
| | **Total** | 3.090 | 59 | | | |
| **17** | **Regression** | 2.848 | 12 | .237 | 46.040 | .000(q) |
| | **Residual** | .242 | 47 | 5.155E-03 | | |
| | **Total** | 3.090 | 59 | | | |
| **18** | **Regression** | 2.843 | 11 | .258 | 50.193 | .000(r) |
| | **Residual** | .247 | 48 | 5.149E-03 | | |
| | **Total** | 3.090 | 59 | | | |

a Predictors: (Constant), TREND, P_A1, RAMADAN, D_A1, D_A6, TEMP, D_B4, GDP, P_A6, D_B1, D_A3, P_A3, P_B4, D_C1, P_C1, P_A5, P_A2, D_B3, P_B2, D_A2, P_B1, TOURIST, P_A4, P_RAKI, D_A5, P_B3, D_B2, D_A4

b Predictors: (Constant), TREND, P_A1, RAMADAN, D_A1, D_A6, TEMP, D_B4, GDP, P_A6, D_B1, D_A3, P_A3, P_B4, D_C1, P_C1, P_A2, D_B3, P_B2, D_A2, P_B1, TOURIST, P_A4, P_RAKI, D_A5, P_B3, D_B2, D_A4

c Predictors: (Constant), TREND, P_A1, RAMADAN, D_A1, D_A6, TEMP, D_B4, GDP, P_A6, D_B1, D_A3, P_A3, P_B4, D_C1, P_C1, P_A2, D_B3, P_B2, D_A2, P_B1, TOURIST, P_A4, D_A5, P_B3, D_B2, D_A4

d Predictors: (Constant), TREND, P_A1, RAMADAN, D_A1, D_A6, TEMP, D_B4, GDP, P_A6, D_B1, D_A3, P_A3, P_B4, D_C1, P_C1, P_A2, D_B3, D_A2, P_B1, TOURIST, P_A4, D_A5, P_B3, D_B2, D_A4

e Predictors: (Constant), TREND, P_A1, RAMADAN, D_A1, D_A6, TEMP, D_B4, GDP, P_A6, D_B1, D_A3, P_A3, P_B4, D_C1, P_C1, P_A2, D_B3, D_A2, P_B1, TOURIST, P_A4, P_B3, D_B2, D_A4

f Predictors: (Constant), TREND, P_A1, RAMADAN, D_A1, D_A6, TEMP, D_B4, GDP, P_A6, D_B1, D_A3, P_A3, P_B4, D_C1, P_C1, P_A2, D_B3, D_A2, P_B1, TOURIST, P_B3, D_B2, D_A4

g Predictors: (Constant), TREND, P_A1, RAMADAN, D_A1, D_A6, TEMP, D_B4, GDP, P_A6, D_B1, D_A3, P_A3, P_B4, D_C1, P_A2, D_B3, D_A2, P_B1, TOURIST, P_B3, D_B2, D_A4

h Predictors: (Constant), TREND, P_A1, RAMADAN, D_A1, D_A6, TEMP, D_B4, GDP, P_A6, D_B1, D_A3, P_A3, P_B4, D_C1, P_A2, D_B3, D_A2, P_B1, TOURIST, P_B3, D_B2

i Predictors: (Constant), P_A1, RAMADAN, D_A1, D_A6, TEMP, D_B4, GDP, P_A6, D_B1, D_A3, P_A3, P_B4, D_C1, P_A2, D_B3, D_A2, P_B1, TOURIST, P_B3, D_B2

j Predictors: (Constant), P_A1, RAMADAN, D_A1, D_A6, TEMP, D_B4, GDP, P_A6, D_B1, D_A3, P_A3, P_B4, D_C1, P_A2, D_B3, D_A2, P_B1, TOURIST, P_B3

k Predictors: (Constant), P_A1, RAMADAN, D_A6, TEMP, D_B4, GDP, P_A6, D_B1, D_A3, P_A3, P_B4, D_C1, P_A2, D_B3, D_A2, P_B1, TOURIST, P_B3

l Predictors: (Constant), P_A1, RAMADAN, D_A6, TEMP, D_B4, GDP, P_A6, D_B1, D_A3, P_A3, P_B4, D_C1, P_A2, D_B3, P_B1, TOURIST, P_B3

m Predictors: (Constant), RAMADAN, D_A6, TEMP, D_B4, GDP, P_A6, D_B1, D_A3, P_A3, P_B4, D_C1, P_A2, D_B3, P_B1, TOURIST, P_B3

n Predictors: (Constant), RAMADAN, D_A6, TEMP, D_B4, GDP, P_A6, D_B1, D_A3, P_A3, P_B4,

| |
|---|
| D_C1, P_A2, D_B3, TOURIST, P_B3 |
| o Predictors: (Constant), RAMADAN, D_A6, TEMP, D_B4, GDP, P_A6, D_B1, D_A3, P_A3, P_B4, D_C1, D_B3, TOURIST, P_B3 |
| p Predictors: (Constant), RAMADAN, D_A6, TEMP, D_B4, GDP, P_A6, D_B1, D_A3, P_A3, P_B4, D_C1, D_B3, TOURIST |
| q Predictors: (Constant), RAMADAN, D_A6, TEMP, D_B4, GDP, P_A6, D_B1, D_A3, P_A3, D_C1, D_B3, TOURIST |
| r Predictors: (Constant), RAMADAN, D_A6, TEMP, D_B4, GDP, D_B1, D_A3, P_A3, D_C1, D_B3, TOURIST |
| s Dependent Variable: Q_A1 |

**Coefficients(a)**

| | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|---|
| **Model** | | **B** | **Std. Error** | **Beta** | | |
| **1** | **(Constant)** | 11.294 | 7.504 | | 1.505 | .142 |
| | **D_A1** | -.463 | .934 | -.071 | -.496 | .624 |
| | **D_B1** | .384 | .283 | .230 | 1.360 | .184 |
| | **D_A5** | -5.681E-02 | .147 | -.086 | -.385 | .703 |
| | **D_B4** | .550 | .261 | .207 | 2.104 | .044 |
| | **D_C1** | -8.521E-02 | .080 | -.204 | -1.061 | .297 |
| | **D_A6** | .143 | .053 | .492 | 2.699 | .011 |
| | **D_A2** | .228 | .257 | .172 | .888 | .381 |
| | **D_B3** | .348 | .284 | .226 | 1.227 | .229 |
| | **D_A3** | 7.708E-02 | .185 | .051 | .416 | .680 |
| | **D_A4** | -9.688E-02 | .188 | -.395 | -.515 | .610 |
| | **D_B2** | -3.342E-02 | .066 | -.155 | -.505 | .617 |
| | **P_A1** | 1.135 | 1.293 | .263 | .878 | .387 |
| | **P_B1** | -.831 | .696 | -.233 | -1.194 | .242 |
| | **P_A5** | -2.223E-02 | .552 | -.008 | -.040 | .968 |
| | **P_B4** | -.208 | .374 | -.080 | -.557 | .582 |
| | **P_C1** | -.161 | .280 | -.119 | -.574 | .570 |
| | **P_A6** | .177 | .400 | .064 | .443 | .661 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | **P_A2** | -.364 | .686 | -.093 | -.530 | .600 |
| | **P_B3** | .376 | .800 | .116 | .471 | .641 |
| | **P_A3** | .533 | .475 | .137 | 1.121 | .271 |
| | **P_A4** | 2.684E-02 | .089 | .228 | .302 | .765 |
| | **P_B2** | 8.835E-03 | .027 | .058 | .330 | .744 |
| | **TEMP** | 9.422E-02 | .055 | .294 | 1.729 | .094 |
| | **GDP** | -1.215 | 1.472 | -.136 | -.825 | .415 |
| | **RAMADAN** | -7.538E-02 | .017 | -.327 | -4.534 | .000 |
| | **TOURIST** | .112 | .087 | .258 | 1.286 | .208 |
| | **P_RAKI** | 5.897E-02 | .326 | .039 | .181 | .858 |
| | **TREND** | 5.702E-02 | .087 | .224 | .653 | .519 |
| **2** | **(Constant)** | 11.219 | 7.157 | | 1.568 | .127 |
| | **D_A1** | -.462 | .919 | -.071 | -.503 | .618 |
| | **D_B1** | .388 | .264 | .232 | 1.466 | .152 |
| | **D_A5** | -5.666E-02 | .145 | -.086 | -.391 | .699 |
| | **D_B4** | .552 | .253 | .208 | 2.181 | .037 |
| | **D_C1** | -8.515E-02 | .079 | -.204 | -1.078 | .289 |
| | **D_A6** | .143 | .052 | .493 | 2.765 | .009 |
| | **D_A2** | .231 | .245 | .174 | .942 | .353 |
| | **D_B3** | .348 | .279 | .226 | 1.250 | .220 |
| | **D_A3** | 7.477E-02 | .173 | .050 | .431 | .669 |
| | **D_A4** | -9.956E-02 | .173 | -.406 | -.575 | .570 |
| | **D_B2** | -3.455E-02 | .059 | -.161 | -.585 | .562 |
| | **P_A1** | 1.136 | 1.273 | .263 | .892 | .379 |
| | **P_B1** | -.836 | .673 | -.235 | -1.243 | .223 |
| | **P_B4** | -.215 | .319 | -.083 | -.675 | .504 |
| | **P_C1** | -.166 | .240 | -.123 | -.691 | .495 |
| | **P_A6** | .174 | .387 | .063 | .451 | .655 |
| | **P_A2** | -.364 | .676 | -.093 | -.539 | .594 |
| | **P_B3** | .373 | .782 | .115 | .477 | .637 |
| | **P_A3** | .538 | .452 | .139 | 1.189 | .243 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | **P_A4** | 2.772E-02 | .085 | .236 | .326 | .746 |
| | **P_B2** | 8.770E-03 | .026 | .058 | .333 | .741 |
| | **TEMP** | 9.346E-02 | .050 | .291 | 1.859 | .072 |
| | **GDP** | -1.213 | 1.448 | -.136 | -.838 | .408 |
| | **RAMADAN** | -7.530E-02 | .016 | -.327 | -4.639 | .000 |
| | **TOURIST** | .113 | .081 | .261 | 1.396 | .172 |
| | **P_RAKI** | 6.363E-02 | .300 | .042 | .212 | .833 |
| | **TREND** | 5.761E-02 | .085 | .227 | .680 | .502 |
| **3** | **(Constant)** | 11.679 | 6.721 | | 1.738 | .092 |
| | **D_A1** | -.459 | .905 | -.071 | -.507 | .616 |
| | **D_B1** | .405 | .249 | .242 | 1.628 | .113 |
| | **D_A5** | -4.914E-02 | .139 | -.075 | -.355 | .725 |
| | **D_B4** | .569 | .236 | .214 | 2.414 | .022 |
| | **D_C1** | -8.645E-02 | .078 | -.207 | -1.113 | .274 |
| | **D_A6** | .147 | .048 | .506 | 3.070 | .004 |
| | **D_A2** | .224 | .239 | .168 | .935 | .356 |
| | **D_B3** | .329 | .259 | .213 | 1.270 | .213 |
| | **D_A3** | 7.113E-02 | .170 | .047 | .419 | .678 |
| | **D_A4** | -.107 | .167 | -.437 | -.641 | .526 |
| | **D_B2** | -3.839E-02 | .055 | -.178 | -.693 | .493 |
| | **P_A1** | 1.161 | 1.249 | .269 | .930 | .359 |
| | **P_B1** | -.856 | .657 | -.240 | -1.304 | .201 |
| | **P_B4** | -.236 | .300 | -.091 | -.785 | .438 |
| | **P_C1** | -.137 | .194 | -.102 | -.704 | .486 |
| | **P_A6** | .184 | .378 | .066 | .487 | .630 |
| | **P_A2** | -.332 | .649 | -.085 | -.511 | .613 |
| | **P_B3** | .334 | .749 | .103 | .446 | .659 |
| | **P_A3** | .540 | .446 | .139 | 1.211 | .235 |
| | **P_A4** | 3.022E-02 | .083 | .257 | .364 | .718 |
| | **P_B2** | 9.028E-03 | .026 | .060 | .348 | .730 |
| | **TEMP** | 9.226E-02 | .049 | .287 | 1.874 | .070 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | **GDP** | -1.255 | 1.413 | -.140 | -.888 | .381 |
| | **RAMADAN** | -7.488E-02 | .016 | -.325 | -4.716 | .000 |
| | **TOURIST** | .114 | .079 | .264 | 1.442 | .159 |
| | **TREND** | 6.365E-02 | .079 | .251 | .809 | .424 |
| **4** | **(Constant)** | 10.953 | 6.306 | | 1.737 | .091 |
| | **D_A1** | -.431 | .890 | -.066 | -.484 | .632 |
| | **D_B1** | .362 | .213 | .216 | 1.696 | .099 |
| | **D_A5** | -5.303E-02 | .136 | -.080 | -.389 | .700 |
| | **D_B4** | .591 | .224 | .222 | 2.632 | .013 |
| | **D_C1** | -9.826E-02 | .069 | -.235 | -1.425 | .163 |
| | **D_A6** | .143 | .046 | .494 | 3.106 | .004 |
| | **D_A2** | .236 | .234 | .177 | 1.010 | .320 |
| | **D_B3** | .329 | .255 | .214 | 1.289 | .206 |
| | **D_A3** | 9.343E-02 | .155 | .062 | .601 | .552 |
| | **D_A4** | -.114 | .164 | -.466 | -.699 | .490 |
| | **D_B2** | -3.786E-02 | .055 | -.176 | -.693 | .493 |
| | **P_A1** | .981 | 1.121 | .227 | .875 | .388 |
| | **P_B1** | -.818 | .639 | -.229 | -1.280 | .209 |
| | **P_B4** | -.266 | .284 | -.102 | -.936 | .356 |
| | **P_C1** | -.145 | .191 | -.108 | -.760 | .453 |
| | **P_A6** | .266 | .293 | .096 | .909 | .370 |
| | **P_A2** | -.323 | .640 | -.082 | -.505 | .617 |
| | **P_B3** | .378 | .729 | .116 | .518 | .608 |
| | **P_A3** | .591 | .415 | .152 | 1.423 | .164 |
| | **P_A4** | 3.710E-02 | .079 | .316 | .467 | .644 |
| | **TEMP** | 9.454E-02 | .048 | .295 | 1.963 | .058 |
| | **GDP** | -1.124 | 1.344 | -.126 | -.836 | .409 |
| | **RAMADAN** | -7.503E-02 | .016 | -.326 | -4.790 | .000 |
| | **TOURIST** | .110 | .077 | .253 | 1.422 | .164 |
| | **TREND** | 6.808E-02 | .077 | .268 | .888 | .381 |
| **5** | **(Constant)** | 11.080 | 6.221 | | 1.781 | .084 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | **D_A1** | -.562 | .813 | -.087 | -.692 | .494 |
| | **D_B1** | .359 | .211 | .214 | 1.703 | .097 |
| | **D_B4** | .588 | .222 | .221 | 2.655 | .012 |
| | **D_C1** | -.112 | .058 | -.269 | -1.932 | .061 |
| | **D_A6** | .144 | .046 | .495 | 3.154 | .003 |
| | **D_A2** | .210 | .221 | .158 | .950 | .349 |
| | **D_B3** | .356 | .243 | .231 | 1.467 | .151 |
| | **D_A3** | 9.821E-02 | .153 | .066 | .642 | .525 |
| | **D_A4** | -.128 | .158 | -.521 | -.809 | .424 |
| | **D_B2** | -3.902E-02 | .054 | -.181 | -.724 | .474 |
| | **P_A1** | .939 | 1.103 | .218 | .852 | .400 |
| | **P_B1** | -.784 | .625 | -.220 | -1.254 | .218 |
| | **P_B4** | -.250 | .278 | -.097 | -.902 | .373 |
| | **P_C1** | -.137 | .187 | -.102 | -.730 | .470 |
| | **P_A6** | .244 | .284 | .088 | .861 | .395 |
| | **P_A2** | -.402 | .600 | -.103 | -.671 | .507 |
| | **P_B3** | .473 | .679 | .146 | .697 | .490 |
| | **P_A3** | .610 | .407 | .157 | 1.497 | .143 |
| | **P_A4** | 4.743E-02 | .074 | .403 | .641 | .526 |
| | **TEMP** | 9.207E-02 | .047 | .287 | 1.952 | .059 |
| | **GDP** | -1.105 | 1.327 | -.124 | -.833 | .410 |
| | **RAMADAN** | -7.353E-02 | .015 | -.319 | -4.903 | .000 |
| | **TOURIST** | .110 | .076 | .254 | 1.442 | .158 |
| | **TREND** | 6.225E-02 | .074 | .245 | .839 | .407 |
| **6** | **(Constant)** | 12.016 | 5.997 | | 2.004 | .053 |
| | **D_A1** | -.560 | .806 | -.086 | -.695 | .492 |
| | **D_B1** | .343 | .207 | .205 | 1.653 | .107 |
| | **D_B4** | .561 | .216 | .211 | 2.601 | .013 |
| | **D_C1** | -.101 | .055 | -.243 | -1.840 | .074 |
| | **D_A6** | .140 | .045 | .483 | 3.125 | .004 |
| | **D_A2** | .172 | .212 | .130 | .814 | .421 |

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|---|---|---|---|---|---|---|
| | **D_B3** | .363 | .241 | .235 | 1.509 | .140 |
| | **D_A3** | .115 | .150 | .077 | .769 | .447 |
| | **D_A4** | -2.942E-02 | .037 | -.120 | -.795 | .432 |
| | **D_B2** | -3.632E-02 | .053 | -.169 | -.682 | .500 |
| | **P_A1** | 1.044 | 1.081 | .242 | .966 | .341 |
| | **P_B1** | -.714 | .610 | -.200 | -1.169 | .250 |
| | **P_B4** | -.254 | .275 | -.098 | -.921 | .363 |
| | **P_C1** | -.117 | .183 | -.087 | -.637 | .528 |
| | **P_A6** | .209 | .276 | .075 | .757 | .454 |
| | **P_A2** | -.477 | .583 | -.122 | -.819 | .418 |
| | **P_B3** | .434 | .670 | .134 | .647 | .522 |
| | **P_A3** | .628 | .403 | .162 | 1.557 | .128 |
| | **TEMP** | 8.308E-02 | .045 | .259 | 1.861 | .071 |
| | **GDP** | -1.343 | 1.264 | -.150 | -1.063 | .295 |
| | **RAMADAN** | -7.246E-02 | .015 | -.315 | -4.902 | .000 |
| | **TOURIST** | .119 | .074 | .275 | 1.606 | .117 |
| | **TREND** | 5.778E-02 | .073 | .227 | .788 | .436 |
| **7** | **(Constant)** | 11.993 | 5.949 | | 2.016 | .051 |
| | **D_A1** | -.737 | .751 | -.113 | -.981 | .333 |
| | **D_B1** | .290 | .189 | .174 | 1.538 | .133 |
| | **D_B4** | .554 | .214 | .208 | 2.593 | .014 |
| | **D_C1** | -.107 | .054 | -.256 | -1.980 | .055 |
| | **D_A6** | .140 | .045 | .483 | 3.152 | .003 |
| | **D_A2** | .144 | .205 | .108 | .701 | .488 |
| | **D_B3** | .430 | .215 | .279 | 1.997 | .053 |
| | **D_A3** | .132 | .146 | .088 | .906 | .371 |
| | **D_A4** | -2.090E-02 | .034 | -.085 | -.611 | .545 |
| | **D_B2** | -3.440E-02 | .053 | -.160 | -.652 | .518 |
| | **P_A1** | .836 | 1.023 | .194 | .818 | .419 |
| | **P_B1** | -.653 | .598 | -.183 | -1.091 | .282 |
| | **P_B4** | -.229 | .271 | -.088 | -.848 | .402 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | **P_A6** | .191 | .273 | .069 | .701 | .488 |
| | **P_A2** | -.447 | .577 | -.114 | -.775 | .443 |
| | **P_B3** | .521 | .651 | .161 | .800 | .429 |
| | **P_A3** | .573 | .391 | .148 | 1.467 | .151 |
| | **TEMP** | 9.226E-02 | .042 | .287 | 2.201 | .034 |
| | **GDP** | -1.219 | 1.238 | -.136 | -.984 | .331 |
| | **RAMADAN** | -7.258E-02 | .015 | -.315 | -4.950 | .000 |
| | **TOURIST** | .109 | .072 | .251 | 1.516 | .138 |
| | **TREND** | 4.912E-02 | .071 | .193 | .688 | .496 |
| **8** | **(Constant)** | 12.464 | 5.850 | | 2.131 | .040 |
| | **D_A1** | -.535 | .669 | -.082 | -.799 | .429 |
| | **D_B1** | .264 | .182 | .158 | 1.449 | .155 |
| | **D_B4** | .573 | .209 | .216 | 2.738 | .009 |
| | **D_C1** | -.110 | .053 | -.262 | -2.050 | .047 |
| | **D_A6** | .139 | .044 | .479 | 3.155 | .003 |
| | **D_A2** | .139 | .203 | .105 | .684 | .498 |
| | **D_B3** | .445 | .212 | .289 | 2.102 | .042 |
| | **D_A3** | .152 | .141 | .101 | 1.076 | .289 |
| | **D_B2** | -3.525E-02 | .052 | -.164 | -.674 | .504 |
| | **P_A1** | .608 | .944 | .141 | .644 | .523 |
| | **P_B1** | -.618 | .590 | -.173 | -1.047 | .302 |
| | **P_B4** | -.252 | .266 | -.097 | -.949 | .349 |
| | **P_A6** | .205 | .269 | .074 | .760 | .452 |
| | **P_A2** | -.310 | .527 | -.079 | -.589 | .560 |
| | **P_B3** | .582 | .638 | .180 | .913 | .367 |
| | **P_A3** | .556 | .387 | .143 | 1.439 | .158 |
| | **TEMP** | 8.720E-02 | .041 | .272 | 2.140 | .039 |
| | **GDP** | -1.454 | 1.167 | -.163 | -1.245 | .221 |
| | **RAMADAN** | -7.092E-02 | .014 | -.308 | -4.964 | .000 |
| | **TOURIST** | .108 | .071 | .249 | 1.514 | .138 |
| | **TREND** | 3.508E-02 | .067 | .138 | .523 | .604 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 9 | **(Constant)** | 10.159 | 3.809 | | 2.667 | .011 |
| | **D_A1** | -.458 | .646 | -.070 | -.708 | .483 |
| | **D_B1** | .235 | .172 | .141 | 1.367 | .180 |
| | **D_B4** | .581 | .207 | .219 | 2.806 | .008 |
| | **D_C1** | -.118 | .051 | -.281 | -2.320 | .026 |
| | **D_A6** | .127 | .038 | .439 | 3.385 | .002 |
| | **D_A2** | .128 | .200 | .096 | .639 | .526 |
| | **D_B3** | .451 | .209 | .292 | 2.153 | .038 |
| | **D_A3** | .172 | .135 | .115 | 1.276 | .209 |
| | **D_B2** | -1.144E-02 | .025 | -.053 | -.449 | .656 |
| | **P_A1** | .803 | .860 | .186 | .934 | .356 |
| | **P_B1** | -.604 | .584 | -.170 | -1.034 | .307 |
| | **P_B4** | -.270 | .261 | -.104 | -1.035 | .307 |
| | **P_A6** | .239 | .259 | .086 | .923 | .362 |
| | **P_A2** | -.377 | .506 | -.096 | -.744 | .461 |
| | **P_B3** | .501 | .613 | .155 | .818 | .418 |
| | **P_A3** | .574 | .381 | .148 | 1.504 | .141 |
| | **TEMP** | 8.771E-02 | .040 | .273 | 2.173 | .036 |
| | **GDP** | -1.095 | .935 | -.122 | -1.171 | .249 |
| | **RAMADAN** | -7.170E-02 | .014 | -.311 | -5.094 | .000 |
| | **TOURIST** | .106 | .070 | .246 | 1.509 | .139 |
| **10** | **(Constant)** | 9.783 | 3.678 | | 2.660 | .011 |
| | **D_A1** | -.325 | .569 | -.050 | -.571 | .571 |
| | **D_B1** | .227 | .169 | .136 | 1.339 | .188 |
| | **D_B4** | .570 | .203 | .214 | 2.800 | .008 |
| | **D_C1** | -.120 | .050 | -.287 | -2.400 | .021 |
| | **D_A6** | .127 | .037 | .436 | 3.400 | .002 |
| | **D_A2** | .122 | .198 | .092 | .616 | .541 |
| | **D_B3** | .469 | .203 | .304 | 2.306 | .026 |
| | **D_A3** | .138 | .111 | .092 | 1.246 | .220 |
| | **P_A1** | .780 | .850 | .181 | .918 | .364 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | **P_B1** | -.640 | .573 | -.179 | -1.116 | .271 |
| | **P_B4** | -.246 | .253 | -.095 | -.972 | .337 |
| | **P_A6** | .228 | .255 | .082 | .895 | .376 |
| | **P_A2** | -.401 | .498 | -.102 | -.804 | .426 |
| | **P_B3** | .642 | .523 | .198 | 1.228 | .227 |
| | **P_A3** | .523 | .361 | .135 | 1.450 | .155 |
| | **TEMP** | 8.839E-02 | .040 | .275 | 2.214 | .033 |
| | **GDP** | -1.112 | .925 | -.124 | -1.202 | .236 |
| | **RAMADAN** | -7.094E-02 | .014 | -.308 | -5.129 | .000 |
| | **TOURIST** | .102 | .069 | .235 | 1.474 | .148 |
| **11** | **(Constant)** | 9.628 | 3.638 | | 2.646 | .011 |
| | **D_B1** | .231 | .168 | .138 | 1.380 | .175 |
| | **D_B4** | .513 | .177 | .193 | 2.907 | .006 |
| | **D_C1** | -.116 | .049 | -.278 | -2.365 | .023 |
| | **D_A6** | .121 | .036 | .416 | 3.397 | .002 |
| | **D_A2** | .102 | .193 | .077 | .530 | .599 |
| | **D_B3** | .449 | .199 | .291 | 2.259 | .029 |
| | **D_A3** | .147 | .109 | .098 | 1.352 | .184 |
| | **P_A1** | .748 | .841 | .174 | .890 | .379 |
| | **P_B1** | -.570 | .556 | -.160 | -1.026 | .311 |
| | **P_B4** | -.219 | .246 | -.084 | -.888 | .380 |
| | **P_A6** | .204 | .249 | .073 | .816 | .419 |
| | **P_A2** | -.432 | .491 | -.110 | -.880 | .384 |
| | **P_B3** | .614 | .516 | .189 | 1.190 | .241 |
| | **P_A3** | .508 | .357 | .131 | 1.424 | .162 |
| | **TEMP** | 9.345E-02 | .039 | .291 | 2.420 | .020 |
| | **GDP** | -1.223 | .897 | -.137 | -1.363 | .180 |
| | **RAMADAN** | -7.345E-02 | .013 | -.319 | -5.648 | .000 |
| | **TOURIST** | 8.927E-02 | .065 | .206 | 1.375 | .177 |
| **12** | **(Constant)** | 10.608 | 3.107 | | 3.414 | .001 |
| | **D_B1** | .197 | .154 | .118 | 1.285 | .206 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | **D_B4** | .536 | .170 | .202 | 3.154 | .003 |
| | **D_C1** | -.110 | .047 | -.264 | -2.324 | .025 |
| | **D_A6** | .120 | .035 | .414 | 3.411 | .001 |
| | **D_B3** | .448 | .197 | .291 | 2.276 | .028 |
| | **D_A3** | .175 | .096 | .116 | 1.827 | .075 |
| | **P_A1** | .680 | .824 | .158 | .825 | .414 |
| | **P_B1** | -.560 | .550 | -.157 | -1.017 | .315 |
| | **P_B4** | -.281 | .214 | -.108 | -1.312 | .197 |
| | **P_A6** | .265 | .219 | .096 | 1.209 | .233 |
| | **P_A2** | -.467 | .483 | -.119 | -.968 | .339 |
| | **P_B3** | .526 | .484 | .162 | 1.086 | .284 |
| | **P_A3** | .538 | .349 | .139 | 1.540 | .131 |
| | **TEMP** | 9.578E-02 | .038 | .298 | 2.519 | .016 |
| | **GDP** | -1.239 | .889 | -.139 | -1.394 | .171 |
| | **RAMADAN** | -7.190E-02 | .013 | -.312 | -5.723 | .000 |
| | **TOURIST** | .102 | .060 | .236 | 1.713 | .094 |
| **13** | **(Constant)** | 10.280 | 3.070 | | 3.349 | .002 |
| | **D_B1** | .178 | .151 | .106 | 1.177 | .246 |
| | **D_B4** | .550 | .168 | .207 | 3.266 | .002 |
| | **D_C1** | -.110 | .047 | -.262 | -2.321 | .025 |
| | **D_A6** | .105 | .030 | .363 | 3.490 | .001 |
| | **D_B3** | .402 | .188 | .260 | 2.136 | .038 |
| | **D_A3** | .181 | .095 | .121 | 1.907 | .063 |
| | **P_B1** | -.329 | .472 | -.092 | -.696 | .490 |
| | **P_B4** | -.297 | .213 | -.115 | -1.398 | .169 |
| | **P_A6** | .317 | .209 | .114 | 1.517 | .137 |
| | **P_A2** | -.327 | .450 | -.083 | -.727 | .471 |
| | **P_B3** | .611 | .471 | .188 | 1.296 | .202 |
| | **P_A3** | .616 | .335 | .159 | 1.836 | .073 |
| | **TEMP** | 8.961E-02 | .037 | .279 | 2.412 | .020 |
| | **GDP** | -1.052 | .856 | -.118 | -1.229 | .226 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | **RAMADAN** | -7.229E-02 | .013 | -.314 | -5.779 | .000 |
| | **TOURIST** | .118 | .056 | .274 | 2.111 | .041 |
| 14 | **(Constant)** | 10.970 | 2.888 | | 3.799 | .000 |
| | **D_B1** | .155 | .147 | .093 | 1.058 | .296 |
| | **D_B4** | .582 | .161 | .219 | 3.611 | .001 |
| | **D_C1** | -.116 | .046 | -.278 | -2.528 | .015 |
| | **D_A6** | .111 | .029 | .381 | 3.797 | .000 |
| | **D_B3** | .476 | .154 | .309 | 3.095 | .003 |
| | **D_A3** | .181 | .094 | .121 | 1.916 | .062 |
| | **P_B4** | -.296 | .211 | -.114 | -1.398 | .169 |
| | **P_A6** | .324 | .208 | .117 | 1.559 | .126 |
| | **P_A2** | -.441 | .417 | -.112 | -1.058 | .296 |
| | **P_B3** | .465 | .420 | .143 | 1.108 | .274 |
| | **P_A3** | .575 | .328 | .148 | 1.751 | .087 |
| | **TEMP** | 8.382E-02 | .036 | .261 | 2.329 | .025 |
| | **GDP** | -1.271 | .791 | -.142 | -1.606 | .116 |
| | **RAMADAN** | -7.359E-02 | .012 | -.319 | -5.985 | .000 |
| | **TOURIST** | .121 | .056 | .280 | 2.172 | .035 |
| 15 | **(Constant)** | 10.105 | 2.773 | | 3.644 | .001 |
| | **D_B1** | .203 | .140 | .121 | 1.449 | .154 |
| | **D_B4** | .560 | .160 | .211 | 3.500 | .001 |
| | **D_C1** | -.110 | .046 | -.263 | -2.407 | .020 |
| | **D_A6** | .109 | .029 | .374 | 3.732 | .001 |
| | **D_B3** | .421 | .145 | .273 | 2.904 | .006 |
| | **D_A3** | .174 | .094 | .116 | 1.845 | .072 |
| | **P_B4** | -.293 | .212 | -.113 | -1.386 | .173 |
| | **P_A6** | .268 | .201 | .096 | 1.332 | .190 |
| | **P_B3** | .242 | .363 | .075 | .665 | .509 |
| | **P_A3** | .461 | .310 | .119 | 1.484 | .145 |
| | **TEMP** | 8.484E-02 | .036 | .264 | 2.355 | .023 |
| | **GDP** | -1.131 | .781 | -.127 | -1.448 | .155 |

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|---|---|---|---|---|---|---|
| | **RAMADAN** | -7.615E-02 | .012 | -.331 | -6.309 | .000 |
| | **TOURIST** | .121 | .056 | .280 | 2.169 | .035 |
| **16** | **(Constant)** | 9.935 | 2.745 | | 3.620 | .001 |
| | **D_B1** | .167 | .129 | .100 | 1.300 | .200 |
| | **D_B4** | .580 | .156 | .218 | 3.711 | .001 |
| | **D_C1** | -.125 | .039 | -.299 | -3.194 | .003 |
| | **D_A6** | .109 | .029 | .376 | 3.777 | .000 |
| | **D_B3** | .432 | .143 | .280 | 3.024 | .004 |
| | **D_A3** | .164 | .092 | .109 | 1.771 | .083 |
| | **P_B4** | -.269 | .207 | -.104 | -1.297 | .201 |
| | **P_A6** | .279 | .199 | .100 | 1.401 | .168 |
| | **P_A3** | .602 | .225 | .155 | 2.677 | .010 |
| | **TEMP** | 8.581E-02 | .036 | .267 | 2.398 | .021 |
| | **GDP** | -1.025 | .760 | -.115 | -1.348 | .184 |
| | **RAMADAN** | -7.586E-02 | .012 | -.329 | -6.327 | .000 |
| | **TOURIST** | .130 | .054 | .300 | 2.415 | .020 |
| **17** | **(Constant)** | 11.528 | 2.472 | | 4.662 | .000 |
| | **D_B1** | .225 | .121 | .135 | 1.858 | .069 |
| | **D_B4** | .583 | .157 | .219 | 3.701 | .001 |
| | **D_C1** | -.113 | .038 | -.271 | -2.953 | .005 |
| | **D_A6** | .111 | .029 | .384 | 3.834 | .000 |
| | **D_B3** | .448 | .144 | .290 | 3.118 | .003 |
| | **D_A3** | .207 | .087 | .138 | 2.395 | .021 |
| | **P_A6** | .181 | .185 | .065 | .974 | .335 |
| | **P_A3** | .586 | .226 | .151 | 2.593 | .013 |
| | **TEMP** | 7.555E-02 | .035 | .235 | 2.150 | .037 |
| | **GDP** | -1.567 | .640 | -.175 | -2.450 | .018 |
| | **RAMADAN** | -7.485E-02 | .012 | -.325 | -6.211 | .000 |
| | **TOURIST** | .127 | .054 | .294 | 2.347 | .023 |
| **18** | **(Constant)** | 10.931 | 2.394 | | 4.566 | .000 |
| | **D_B1** | .200 | .118 | .120 | 1.690 | .098 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | **D_B4** | .576 | .157 | .217 | 3.663 | .001 |
| | **D_C1** | -.103 | .037 | -.247 | -2.794 | .007 |
| | **D_A6** | .103 | .028 | .353 | 3.718 | .001 |
| | **D_B3** | .444 | .143 | .288 | 3.094 | .003 |
| | **D_A3** | .204 | .086 | .136 | 2.355 | .023 |
| | **P_A3** | .678 | .206 | .175 | 3.296 | .002 |
| | **TEMP** | 7.445E-02 | .035 | .232 | 2.120 | .039 |
| | **GDP** | -1.343 | .597 | -.150 | -2.251 | .029 |
| | **RAMADAN** | -7.545E-02 | .012 | -.328 | -6.273 | .000 |
| | **TOURIST** | .135 | .054 | .311 | 2.514 | .015 |
| a Dependent Variable: Q_A1 | | | | | | |

**Excluded Variables(r)**

| Model | | Beta In | t | Sig. | Partial Correlation | Collinearity Statistics |
|---|---|---|---|---|---|---|
| | | | | | | Tolerance |
| **2** | **P_A5** | -.008(a) | -.040 | .968 | -.007 | 5.723E-02 |
| **3** | **P_A5** | -.020(b) | -.113 | .910 | -.020 | 6.546E-02 |
| | **P_RAKI** | .042(b) | .212 | .833 | .037 | 5.388E-02 |
| **4** | **P_A5** | -.018(c) | -.101 | .920 | -.018 | 6.557E-02 |
| | **P_RAKI** | .045(c) | .231 | .819 | .040 | 5.399E-02 |
| | **P_B2** | .060(c) | .348 | .730 | .061 | 6.849E-02 |
| **5** | **P_A5** | -.010(d) | -.056 | .956 | -.010 | 6.647E-02 |
| | **P_RAKI** | .025(d) | .133 | .895 | .023 | 5.734E-02 |
| | **P_B2** | .065(d) | .383 | .704 | .066 | 6.894E-02 |
| | **D_A5** | -.080(d) | -.389 | .700 | -.067 | 4.580E-02 |
| **6** | **P_A5** | -.035(e) | -.215 | .831 | -.036 | 7.094E-02 |
| | **P_RAKI** | .033(e) | .181 | .857 | .031 | 5.766E-02 |
| | **P_B2** | .088(e) | .549 | .586 | .092 | 7.465E-02 |
| | **D_A5** | -.113(e) | -.585 | .562 | -.098 | 5.156E-02 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | **P_A4** | .403(e) | .641 | .526 | .108 | 4.827E-03 |
| **7** | **P_A5** | -.064(f) | -.415 | .681 | -.069 | 7.969E-02 |
| | **P_RAKI** | -.030(f) | -.201 | .842 | -.033 | 8.354E-02 |
| | **P_B2** | .094(f) | .591 | .559 | .098 | 7.490E-02 |
| | **D_A5** | -.090(f) | -.478 | .635 | -.079 | 5.294E-02 |
| | **P_A4** | .327(f) | .530 | .599 | .088 | 4.966E-03 |
| | **P_C1** | -.087(f) | -.637 | .528 | -.106 | .102 |
| **8** | **P_A5** | -.088(g) | -.663 | .512 | -.108 | .104 |
| | **P_RAKI** | .016(g) | .120 | .905 | .020 | .110 |
| | **P_B2** | .025(g) | .188 | .852 | .031 | .103 |
| | **D_A5** | -.029(g) | -.173 | .864 | -.028 | 6.495E-02 |
| | **P_A4** | -.066(g) | -.472 | .640 | -.077 | 9.620E-02 |
| | **P_C1** | -.048(g) | -.377 | .709 | -.062 | .117 |
| | **D_A4** | -.085(g) | -.611 | .545 | -.100 | 9.496E-02 |
| **9** | **P_A5** | -.091(h) | -.686 | .497 | -.111 | .104 |
| | **P_RAKI** | .030(h) | .243 | .809 | .039 | .116 |
| | **P_B2** | .041(h) | .322 | .749 | .052 | .111 |
| | **D_A5** | -.026(h) | -.156 | .877 | -.025 | 6.503E-02 |
| | **P_A4** | -.039(h) | -.297 | .768 | -.048 | .106 |
| | **P_C1** | -.043(h) | -.347 | .731 | -.056 | .117 |
| | **D_A4** | -.054(h) | -.414 | .681 | -.067 | .106 |
| | **TREND** | .138(h) | .523 | .604 | .085 | 2.610E-02 |
| **10** | **P_A5** | -.083(i) | -.824 | .415 | -.131 | .175 |
| | **P_RAKI** | .034(i) | .278 | .782 | .044 | .117 |
| | **P_B2** | .006(i) | .057 | .955 | .009 | .148 |
| | **D_A5** | -.033(i) | -.203 | .840 | -.032 | 6.572E-02 |
| | **P_A4** | -.054(i) | -.491 | .626 | -.078 | .146 |
| | **P_C1** | -.042(i) | -.343 | .733 | -.055 | .117 |
| | **D_A4** | -.065(i) | -.594 | .556 | -.095 | .147 |
| | **TREND** | -.017(i) | -.131 | .896 | -.021 | .108 |
| | **D_B2** | -.053(i) | -.449 | .656 | -.072 | .127 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 11 | **P_A5** | -.044(j) | -.490 | .627 | -.077 | .217 |
| | **P_RAKI** | -.010(j) | -.099 | .922 | -.016 | .175 |
| | **P_B2** | .027(j) | .267 | .791 | .042 | .172 |
| | **D_A5** | -.066(j) | -.469 | .642 | -.074 | 8.922E-02 |
| | **P_A4** | -.010(j) | -.112 | .912 | -.018 | .204 |
| | **P_C1** | -.062(j) | -.606 | .548 | -.095 | .169 |
| | **D_A4** | -.017(j) | -.186 | .853 | -.029 | .210 |
| | **TREND** | .006(j) | .049 | .961 | .008 | .119 |
| | **D_B2** | -.015(j) | -.142 | .888 | -.022 | .161 |
| | **D_A1** | -.050(j) | -.571 | .571 | -.090 | .229 |
| 12 | **P_A5** | -.047(k) | -.533 | .597 | -.083 | .218 |
| | **P_RAKI** | -.005(k) | -.049 | .961 | -.008 | .177 |
| | **P_B2** | .026(k) | .262 | .794 | .041 | .172 |
| | **D_A5** | -.035(k) | -.269 | .789 | -.042 | .100 |
| | **P_A4** | -.015(k) | -.164 | .870 | -.026 | .206 |
| | **P_C1** | -.045(k) | -.462 | .646 | -.072 | .180 |
| | **D_A4** | -.020(k) | -.221 | .826 | -.035 | .211 |
| | **TREND** | .003(k) | .025 | .980 | .004 | .119 |
| | **D_B2** | -.016(k) | -.152 | .880 | -.024 | .161 |
| | **D_A1** | -.041(k) | -.476 | .636 | -.074 | .235 |
| | **D_A2** | .077(k) | .530 | .599 | .083 | 8.156E-02 |
| 13 | **P_A5** | -.036(l) | -.409 | .685 | -.063 | .223 |
| | **P_RAKI** | .008(l) | .083 | .934 | .013 | .182 |
| | **P_B2** | .020(l) | .200 | .843 | .031 | .173 |
| | **D_A5** | -.051(l) | -.396 | .694 | -.061 | .103 |
| | **P_A4** | .014(l) | .170 | .866 | .026 | .244 |
| | **P_C1** | -.030(l) | -.316 | .754 | -.049 | .185 |
| | **D_A4** | .008(l) | .091 | .928 | .014 | .243 |
| | **TREND** | .025(l) | .216 | .830 | .033 | .126 |
| | **D_B2** | -.014(l) | -.131 | .896 | -.020 | .161 |
| | **D_A1** | -.038(l) | -.447 | .657 | -.069 | .236 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | **D_A2** | .057(l) | .398 | .692 | .061 | 8.355E-02 |
| | **P_A1** | .158(l) | .825 | .414 | .126 | 4.635E-02 |
| **14** | **P_A5** | -.051(m) | -.620 | .539 | -.094 | .250 |
| | **P_RAKI** | .019(m) | .204 | .839 | .031 | .187 |
| | **P_B2** | .001(m) | .009 | .993 | .001 | .186 |
| | **D_A5** | -.023(m) | -.189 | .851 | -.029 | .112 |
| | **P_A4** | -.007(m) | -.089 | .930 | -.014 | .280 |
| | **P_C1** | -.021(m) | -.225 | .823 | -.034 | .189 |
| | **D_A4** | -.011(m) | -.141 | .889 | -.021 | .272 |
| | **TREND** | -.004(m) | -.033 | .973 | -.005 | .143 |
| | **D_B2** | -.031(m) | -.310 | .758 | -.047 | .173 |
| | **D_A1** | -.024(m) | -.290 | .773 | -.044 | .247 |
| | **D_A2** | .062(m) | .436 | .665 | .066 | 8.376E-02 |
| | **P_A1** | .059(m) | .358 | .722 | .054 | 6.250E-02 |
| | **P_B1** | -.092(m) | -.696 | .490 | -.106 | 9.572E-02 |
| **15** | **P_A5** | -.049(n) | -.597 | .554 | -.090 | .250 |
| | **P_RAKI** | -.015(n) | -.167 | .868 | -.025 | .212 |
| | **P_B2** | .020(n) | .218 | .829 | .033 | .194 |
| | **D_A5** | -.062(n) | -.539 | .593 | -.081 | .127 |
| | **P_A4** | .001(n) | .008 | .994 | .001 | .282 |
| | **P_C1** | -.031(n) | -.325 | .746 | -.049 | .190 |
| | **D_A4** | -.003(n) | -.038 | .970 | -.006 | .275 |
| | **TREND** | -.021(n) | -.200 | .843 | -.030 | .147 |
| | **D_B2** | -.047(n) | -.477 | .636 | -.072 | .178 |
| | **D_A1** | -.026(n) | -.319 | .751 | -.048 | .247 |
| | **D_A2** | .092(n) | .666 | .509 | .100 | 8.843E-02 |
| | **P_A1** | -.027(n) | -.188 | .852 | -.028 | 8.115E-02 |
| | **P_B1** | -.127(n) | -1.037 | .305 | -.154 | .110 |
| | **P_A2** | -.112(n) | -1.058 | .296 | -.158 | .147 |
| **16** | **P_A5** | -.055(o) | -.682 | .499 | -.101 | .255 |
| | **P_RAKI** | -.025(o) | -.287 | .776 | -.043 | .220 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | **P_B2** | -.002(o) | -.023 | .982 | -.003 | .221 |
| | **D_A5** | -.079(o) | -.738 | .464 | -.109 | .143 |
| | **P_A4** | -.015(o) | -.200 | .842 | -.030 | .313 |
| | **P_C1** | -.042(o) | -.453 | .653 | -.067 | .198 |
| | **D_A4** | -.019(o) | -.263 | .794 | -.039 | .311 |
| | **TREND** | -.045(o) | -.460 | .648 | -.068 | .178 |
| | **D_B2** | -.063(o) | -.728 | .470 | -.108 | .222 |
| | **D_A1** | -.029(o) | -.353 | .726 | -.053 | .248 |
| | **D_A2** | .024(o) | .206 | .838 | .031 | .124 |
| | **P_A1** | .028(o) | .245 | .808 | .036 | .126 |
| | **P_B1** | -.043(o) | -.432 | .668 | -.064 | .172 |
| | **P_A2** | -.053(o) | -.578 | .566 | -.086 | .197 |
| | **P_B3** | .075(o) | .665 | .509 | .099 | .133 |
| **17** | **P_A5** | -.084(p) | -1.140 | .260 | -.166 | .302 |
| | **P_RAKI** | .030(p) | .389 | .699 | .057 | .292 |
| | **P_B2** | .024(p) | .283 | .778 | .042 | .234 |
| | **D_A5** | -.015(p) | -.153 | .879 | -.023 | .171 |
| | **P_A4** | -.016(p) | -.222 | .825 | -.033 | .313 |
| | **P_C1** | .011(p) | .133 | .895 | .020 | .242 |
| | **D_A4** | -.020(p) | -.273 | .786 | -.040 | .311 |
| | **TREND** | -.012(p) | -.132 | .896 | -.019 | .189 |
| | **D_B2** | -.041(p) | -.483 | .632 | -.071 | .230 |
| | **D_A1** | .004(p) | .050 | .960 | .007 | .273 |
| | **D_A2** | .080(p) | .784 | .437 | .115 | .160 |
| | **P_A1** | .022(p) | .189 | .851 | .028 | .127 |
| | **P_B1** | -.054(p) | -.548 | .586 | -.081 | .173 |
| | **P_A2** | -.062(p) | -.676 | .502 | -.099 | .198 |
| | **P_B3** | .047(p) | .425 | .673 | .062 | .137 |
| | **P_B4** | -.104(p) | -1.297 | .201 | -.188 | .258 |
| **18** | **P_A5** | -.061(q) | -.851 | .399 | -.123 | .323 |
| | **P_RAKI** | .048(q) | .670 | .506 | .097 | .323 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | **P_B2** | .047(q) | .580 | .565 | .084 | .261 |
| | **D_A5** | .015(q) | .155 | .878 | .023 | .189 |
| | **P_A4** | -.022(q) | -.303 | .764 | -.044 | .316 |
| | **P_C1** | .030(q) | .372 | .711 | .054 | .258 |
| | **D_A4** | -.024(q) | -.322 | .749 | -.047 | .312 |
| | **TREND** | -.005(q) | -.052 | .958 | -.008 | .190 |
| | **D_B2** | -.048(q) | -.559 | .579 | -.081 | .231 |
| | **D_A1** | .019(q) | .246 | .806 | .036 | .284 |
| | **D_A2** | .091(q) | .895 | .376 | .129 | .162 |
| | **P_A1** | .056(q) | .512 | .611 | .074 | .144 |
| | **P_B1** | -.040(q) | -.411 | .683 | -.060 | .176 |
| | **P_A2** | -.030(q) | -.342 | .734 | -.050 | .219 |
| | **P_B3** | .063(q) | .574 | .568 | .083 | .140 |
| | **P_B4** | -.061(q) | -.818 | .417 | -.119 | .301 |
| | **P_A6** | .065(q) | .974 | .335 | .141 | .373 |

a Predictors in the Model: (Constant), TREND, P_A1, RAMADAN, D_A1, D_A6, TEMP, D_B4, GDP, P_A6, D_B1, D_A3, P_A3, P_B4, D_C1, P_C1, P_A2, D_B3, P_B2, D_A2, P_B1, TOURIST, P_A4, P_RAKI, D_A5, P_B3, D_B2, D_A4

b Predictors in the Model: (Constant), TREND, P_A1, RAMADAN, D_A1, D_A6, TEMP, D_B4, GDP, P_A6, D_B1, D_A3, P_A3, P_B4, D_C1, P_C1, P_A2, D_B3, P_B2, D_A2, P_B1, TOURIST, P_A4, D_A5, P_B3, D_B2, D_A4

c Predictors in the Model: (Constant), TREND, P_A1, RAMADAN, D_A1, D_A6, TEMP, D_B4, GDP, P_A6, D_B1, D_A3, P_A3, P_B4, D_C1, P_C1, P_A2, D_B3, D_A2, P_B1, TOURIST, P_A4, D_A5, P_B3, D_B2, D_A4

d Predictors in the Model: (Constant), TREND, P_A1, RAMADAN, D_A1, D_A6, TEMP, D_B4, GDP, P_A6, D_B1, D_A3, P_A3, P_B4, D_C1, P_C1, P_A2, D_B3, D_A2, P_B1, TOURIST, P_A4, P_B3, D_B2, D_A4

e Predictors in the Model: (Constant), TREND, P_A1, RAMADAN, D_A1, D_A6, TEMP, D_B4, GDP, P_A6, D_B1, D_A3, P_A3, P_B4, D_C1, P_C1, P_A2, D_B3, D_A2, P_B1, TOURIST, P_B3, D_B2, D_A4

f Predictors in the Model: (Constant), TREND, P_A1, RAMADAN, D_A1, D_A6, TEMP, D_B4, GDP, P_A6, D_B1, D_A3, P_A3, P_B4, D_C1, P_A2, D_B3, D_A2, P_B1, TOURIST, P_B3, D_B2, D_A4

g Predictors in the Model: (Constant), TREND, P_A1, RAMADAN, D_A1, D_A6, TEMP, D_B4, GDP, P_A6, D_B1, D_A3, P_A3, P_B4, D_C1, P_A2, D_B3, D_A2, P_B1, TOURIST, P_B3, D_B2

h Predictors in the Model: (Constant), P_A1, RAMADAN, D_A1, D_A6, TEMP, D_B4, GDP, P_A6, D_B1, D_A3, P_A3, P_B4, D_C1, P_A2, D_B3, D_A2, P_B1, TOURIST, P_B3, D_B2

i Predictors in the Model: (Constant), P_A1, RAMADAN, D_A1, D_A6, TEMP, D_B4, GDP, P_A6,

| |
|---|
| D_B1, D_A3, P_A3, P_B4, D_C1, P_A2, D_B3, D_A2, P_B1, TOURIST, P_B3 |
| j Predictors in the Model: (Constant), P_A1, RAMADAN, D_A6, TEMP, D_B4, GDP, P_A6, D_B1, D_A3, P_A3, P_B4, D_C1, P_A2, D_B3, D_A2, P_B1, TOURIST, P_B3 |
| k Predictors in the Model: (Constant), P_A1, RAMADAN, D_A6, TEMP, D_B4, GDP, P_A6, D_B1, D_A3, P_A3, P_B4, D_C1, P_A2, D_B3, P_B1, TOURIST, P_B3 |
| l Predictors in the Model: (Constant), RAMADAN, D_A6, TEMP, D_B4, GDP, P_A6, D_B1, D_A3, P_A3, P_B4, D_C1, P_A2, D_B3, P_B1, TOURIST, P_B3 |
| m Predictors in the Model: (Constant), RAMADAN, D_A6, TEMP, D_B4, GDP, P_A6, D_B1, D_A3, P_A3, P_B4, D_C1, P_A2, D_B3, TOURIST, P_B3 |
| n Predictors in the Model: (Constant), RAMADAN, D_A6, TEMP, D_B4, GDP, P_A6, D_B1, D_A3, P_A3, P_B4, D_C1, D_B3, TOURIST, P_B3 |
| o Predictors in the Model: (Constant), RAMADAN, D_A6, TEMP, D_B4, GDP, P_A6, D_B1, D_A3, P_A3, P_B4, D_C1, D_B3, TOURIST |
| p Predictors in the Model: (Constant), RAMADAN, D_A6, TEMP, D_B4, GDP, P_A6, D_B1, D_A3, P_A3, D_C1, D_B3, TOURIST |
| q Predictors in the Model: (Constant), RAMADAN, D_A6, TEMP, D_B4, GDP, D_B1, D_A3, P_A3, D_C1, D_B3, TOURIST |
| r Dependent Variable: Q_A1 |

**Casewise Diagnostics(a)**

| Case Number | Std. Residual | Q_A1 | Predicted Value | Residual |
|---|---|---|---|---|
| **44** | -3.118 | 11.83 | 12.0538 | -.2238 |

a Dependent Variable: Q_A1

**Residuals Statistics(a)**

| | Minimum | Maximum | Mean | Std. Deviation | N |
|---|---|---|---|---|---|
| **Predicted Value** | 11.9262 | 12.7752 | 12.4060 | .2195 | 60 |
| **Residual** | -.2238 | .1931 | -9.7700E-16 | 6.472E-02 | 60 |
| **Std. Predicted Value** | -2.186 | 1.682 | .000 | 1.000 | 60 |
| **Std. Residual** | -3.118 | 2.692 | .000 | .902 | 60 |

a Dependent Variable: Q_A1

# APPENDIX B.13

## REGRESSION OUTPUT:
## MULTIPLICATIVE BRAND-LEVEL MODEL
## 5th STEPWISE REGRESSION

**Variables Entered/Removed(a)**

| Model | Variables Entered | Variables Removed | Method |
|---|---|---|---|
| **1** | TOURIST | . | Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100). |
| **2** | RAMADAN | . | Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100). |
| **3** | TEMP | . | Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100). |
| **4** | D_A1 | . | Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100). |
| **5** | . | TOURIST | Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100). |

a Dependent Variable: Q_A1

**Model Summary(f)**

| | | | | | Change Statistics | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Model** | **R** | **R Square** | **Adjusted R Square** | **Std. Error of the Estimate** | **R Square Change** | **F Change** | **df1** | **df2** | **Sig. F Change** | **Durbin-Watson** |
| **1** | .882(a) | .779 | .775 | .1086 | .779 | 204.034 | 1 | 58 | .000 | |
| **2** | .914(b) | .835 | .829 | 9.465E-02 | .056 | 19.355 | 1 | 57 | .000 | |
| **3** | .921(c) | .847 | .839 | 9.178E-02 | .013 | 4.623 | 1 | 56 | .036 | |
| **4** | .931(d) | .866 | .856 | 8.671E-02 | .019 | 7.732 | 1 | 55 | .007 | |
| **5** | .928(e) | .860 | .853 | 8.779E-02 | -.006 | 2.401 | 1 | 57 | .127 | 1.783 |

a Predictors: (Constant), TOURIST

| |
|---|
| b Predictors: (Constant), TOURIST, RAMADAN |
| c Predictors: (Constant), TOURIST, RAMADAN, TEMP |
| d Predictors: (Constant), TOURIST, RAMADAN, TEMP, D_A1 |
| e Predictors: (Constant), RAMADAN, TEMP, D_A1 |
| f Dependent Variable: Q_A1 |

**ANOVA(f)**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 2.406 | 1 | 2.406 | 204.034 | .000(a) |
| | Residual | .684 | 58 | 1.179E-02 | | |
| | Total | 3.090 | 59 | | | |
| 2 | Regression | 2.580 | 2 | 1.290 | 143.979 | .000(b) |
| | Residual | .511 | 57 | 8.958E-03 | | |
| | Total | 3.090 | 59 | | | |
| 3 | Regression | 2.619 | 3 | .873 | 103.627 | .000(c) |
| | Residual | .472 | 56 | 8.423E-03 | | |
| | Total | 3.090 | 59 | | | |
| 4 | Regression | 2.677 | 4 | .669 | 88.997 | .000(d) |
| | Residual | .414 | 55 | 7.519E-03 | | |
| | Total | 3.090 | 59 | | | |
| 5 | Regression | 2.659 | 3 | .886 | 114.985 | .000(e) |
| | Residual | .432 | 56 | 7.707E-03 | | |
| | Total | 3.090 | 59 | | | |

a Predictors: (Constant), TOURIST
b Predictors: (Constant), TOURIST, RAMADAN
c Predictors: (Constant), TOURIST, RAMADAN, TEMP
d Predictors: (Constant), TOURIST, RAMADAN, TEMP, D_A1
e Predictors: (Constant), RAMADAN, TEMP, D_A1
f Dependent Variable: Q_A1

**Coefficients(a)**

| | Unstandardized Coefficients | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|

| | | | | | | |
|---|---|---|---|---|---|---|
| Model | | B | Std. Error | Beta | | |
| 1 | (Constant) | 9.893 | .176 | | 56.059 | .000 |
| | TOURIST | .382 | .027 | .882 | 14.284 | .000 |
| 2 | (Constant) | 10.298 | .179 | | 57.442 | .000 |
| | TOURIST | .324 | .027 | .749 | 12.128 | .000 |
| | RAMADAN | -6.260E-02 | .014 | -.272 | -4.399 | .000 |
| 3 | (Constant) | 10.799 | .291 | | 37.170 | .000 |
| | TOURIST | .219 | .055 | .507 | 3.980 | .000 |
| | RAMADAN | -7.255E-02 | .015 | -.315 | -4.985 | .000 |
| | TEMP | 8.041E-02 | .037 | .250 | 2.150 | .036 |
| 4 | (Constant) | 7.274 | 1.297 | | 5.609 | .000 |
| | TOURIST | .103 | .067 | .239 | 1.550 | .127 |
| | RAMADAN | -8.425E-02 | .014 | -.366 | -5.859 | .000 |
| | TEMP | .134 | .040 | .416 | 3.325 | .002 |
| | D_A1 | 1.202 | .432 | .185 | 2.781 | .007 |
| 5 | (Constant) | 6.375 | 1.174 | | 5.430 | .000 |
| | RAMADAN | -9.663E-02 | .012 | -.419 | -7.981 | .000 |
| | TEMP | .190 | .017 | .592 | 10.893 | .000 |
| | D_A1 | 1.620 | .341 | .249 | 4.745 | .000 |

a Dependent Variable: Q_A1

**Excluded Variables(f)**

| Model | | Beta In | t | Sig. | Partial Correlation | Collinearity Statistics |
|---|---|---|---|---|---|---|
| | | | | | | Tolerance |
| 1 | D_A1 | .044(a) | .602 | .549 | .080 | .724 |
| | D_A5 | .039(a) | .602 | .550 | .079 | .897 |
| | D_C1 | .002(a) | .032 | .975 | .004 | .917 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | **D_A2** | .035(a) | .542 | .590 | .072 | .903 |
| | **D_B3** | -.036(a) | -.550 | .584 | -.073 | .884 |
| | **D_A4** | .024(a) | .391 | .697 | .052 | 1.000 |
| | **D_B2** | .060(a) | .977 | .333 | .128 | .996 |
| | **P_A1** | -.047(a) | -.754 | .454 | -.099 | .973 |
| | **P_B1** | -.035(a) | -.560 | .578 | -.074 | .987 |
| | **P_A5** | .008(a) | .120 | .905 | .016 | .996 |
| | **P_B4** | -.046(a) | -.728 | .470 | -.096 | .956 |
| | **P_C1** | -.002(a) | -.032 | .975 | -.004 | .972 |
| | **P_A6** | -.027(a) | -.422 | .675 | -.056 | .949 |
| | **P_A2** | -.050(a) | -.790 | .433 | -.104 | .976 |
| | **P_B3** | -.001(a) | -.018 | .986 | -.002 | .945 |
| | **P_A3** | .006(a) | .093 | .926 | .012 | .985 |
| | **P_A4** | .012(a) | .194 | .847 | .026 | .999 |
| | **P_B2** | .055(a) | .856 | .396 | .113 | .921 |
| | **TEMP** | .066(a) | .501 | .618 | .066 | .223 |
| | **GDP** | .049(a) | .796 | .429 | .105 | .998 |
| | **RAMADAN** | -.272(a) | -4.399 | .000 | -.503 | .760 |
| | **P_RAKI** | .037(a) | .596 | .553 | .079 | .997 |
| | **TREND** | .030(a) | .475 | .637 | .063 | .987 |
| **2** | **D_A1** | .080(b) | 1.253 | .215 | .165 | .713 |
| | **D_A5** | .040(b) | .707 | .483 | .094 | .897 |
| | **D_C1** | .006(b) | .108 | .914 | .014 | .916 |
| | **D_A2** | .055(b) | .961 | .340 | .127 | .897 |
| | **D_B3** | -.024(b) | -.411 | .682 | -.055 | .881 |
| | **D_A4** | .019(b) | .344 | .732 | .046 | .999 |
| | **D_B2** | .063(b) | 1.174 | .245 | .155 | .996 |
| | **P_A1** | -.030(b) | -.537 | .593 | -.072 | .967 |
| | **P_B1** | -.001(b) | -.014 | .989 | -.002 | .966 |
| | **P_A5** | -.006(b) | -.115 | .909 | -.015 | .993 |
| | **P_B4** | -.058(b) | -1.050 | .298 | -.139 | .954 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | **P_C1** | .020(b) | .357 | .722 | .048 | .964 |
| | **P_A6** | -.025(b) | -.455 | .651 | -.061 | .949 |
| | **P_A2** | -.035(b) | -.636 | .527 | -.085 | .972 |
| | **P_B3** | -.002(b) | -.040 | .969 | -.005 | .945 |
| | **P_A3** | .025(b) | .462 | .646 | .062 | .978 |
| | **P_A4** | .008(b) | .144 | .886 | .019 | .998 |
| | **P_B2** | .053(b) | .948 | .347 | .126 | .921 |
| | **TEMP** | .250(b) | 2.150 | .036 | .276 | .201 |
| | **GDP** | .058(b) | 1.078 | .286 | .143 | .997 |
| | **P_RAKI** | .060(b) | 1.112 | .271 | .147 | .988 |
| | **TREND** | .040(b) | .738 | .464 | .098 | .985 |
| **3** | **D_A1** | .185(c) | 2.781 | .007 | .351 | .551 |
| | **D_A5** | .085(c) | 1.480 | .144 | .196 | .812 |
| | **D_C1** | .055(c) | .935 | .354 | .125 | .801 |
| | **D_A2** | .084(c) | 1.507 | .137 | .199 | .856 |
| | **D_B3** | .031(c) | .502 | .618 | .068 | .731 |
| | **D_A4** | .017(c) | .329 | .743 | .044 | .999 |
| | **D_B2** | .068(c) | 1.314 | .194 | .175 | .994 |
| | **P_A1** | -.028(c) | -.524 | .602 | -.071 | .967 |
| | **P_B1** | -.028(c) | -.504 | .616 | -.068 | .918 |
| | **P_A5** | -.042(c) | -.771 | .444 | -.103 | .910 |
| | **P_B4** | -.072(c) | -1.356 | .181 | -.180 | .940 |
| | **P_C1** | .082(c) | 1.409 | .165 | .187 | .796 |
| | **P_A6** | .010(c) | .169 | .866 | .023 | .866 |
| | **P_A2** | -.037(c) | -.698 | .488 | -.094 | .972 |
| | **P_B3** | -.021(c) | -.389 | .698 | -.052 | .920 |
| | **P_A3** | .024(c) | .455 | .651 | .061 | .978 |
| | **P_A4** | .009(c) | .175 | .862 | .024 | .998 |
| | **P_B2** | .060(c) | 1.097 | .277 | .146 | .918 |
| | **GDP** | .088(c) | 1.664 | .102 | .219 | .946 |
| | **P_RAKI** | .118(c) | 2.152 | .036 | .279 | .854 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | **TREND** | .068(c) | 1.270 | .210 | .169 | .939 |
| **4** | **D_A5** | -.015(d) | -.217 | .829 | -.029 | .501 |
| | **D_C1** | -.011(d) | -.180 | .857 | -.025 | .662 |
| | **D_A2** | .028(d) | .480 | .633 | .065 | .713 |
| | **D_B3** | -.007(d) | -.120 | .905 | -.016 | .691 |
| | **D_A4** | .033(d) | .654 | .516 | .089 | .987 |
| | **D_B2** | .057(d) | 1.143 | .258 | .154 | .986 |
| | **P_A1** | -.005(d) | -.106 | .916 | -.014 | .941 |
| | **P_B1** | .007(d) | .133 | .894 | .018 | .865 |
| | **P_A5** | .003(d) | .053 | .958 | .007 | .821 |
| | **P_B4** | -.044(d) | -.850 | .399 | -.115 | .898 |
| | **P_C1** | .000(d) | .007 | .994 | .001 | .573 |
| | **P_A6** | -.017(d) | -.322 | .749 | -.044 | .838 |
| | **P_A2** | -.016(d) | -.317 | .752 | -.043 | .949 |
| | **P_B3** | .013(d) | .252 | .802 | .034 | .868 |
| | **P_A3** | .033(d) | .658 | .513 | .089 | .974 |
| | **P_A4** | .029(d) | .572 | .570 | .078 | .979 |
| | **P_B2** | .059(d) | 1.151 | .255 | .155 | .918 |
| | **GDP** | .055(d) | 1.043 | .302 | .141 | .881 |
| | **P_RAKI** | .046(d) | .688 | .494 | .093 | .553 |
| | **TREND** | .048(d) | .923 | .360 | .125 | .917 |
| **5** | **D_A5** | -.022(e) | -.310 | .758 | -.042 | .503 |
| | **D_C1** | .000(e) | .002 | .999 | .000 | .672 |
| | **D_A2** | .030(e) | .505 | .615 | .068 | .713 |
| | **D_B3** | .020(e) | .339 | .736 | .046 | .758 |
| | **D_A4** | .037(e) | .728 | .470 | .098 | .990 |
| | **D_B2** | .053(e) | 1.062 | .293 | .142 | .988 |
| | **P_A1** | .009(e) | .168 | .868 | .023 | .972 |
| | **P_B1** | .012(e) | .221 | .826 | .030 | .868 |
| | **P_A5** | -.001(e) | -.018 | .986 | -.002 | .823 |
| | **P_B4** | -.035(e) | -.660 | .512 | -.089 | .909 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | **P_C1** | .008(e) | .121 | .904 | .016 | .576 |
| | **P_A6** | -.002(e) | -.039 | .969 | -.005 | .866 |
| | **P_A2** | -.005(e) | -.091 | .928 | -.012 | .969 |
| | **P_B3** | .023(e) | .425 | .672 | .057 | .880 |
| | **P_A3** | .040(e) | .781 | .438 | .105 | .982 |
| | **P_A4** | .035(e) | .687 | .495 | .092 | .986 |
| | **P_B2** | .054(e) | 1.040 | .303 | .139 | .922 |
| | **GDP** | .056(e) | 1.058 | .295 | .141 | .881 |
| | **P_RAKI** | .038(e) | .563 | .576 | .076 | .556 |
| | **TREND** | .050(e) | .958 | .342 | .128 | .918 |
| | **TOURIST** | .239(e) | 1.550 | .127 | .205 | .102 |

a Predictors in the Model: (Constant), TOURIST

b Predictors in the Model: (Constant), TOURIST, RAMADAN

c Predictors in the Model: (Constant), TOURIST, RAMADAN, TEMP

d Predictors in the Model: (Constant), TOURIST, RAMADAN, TEMP, D_A1

e Predictors in the Model: (Constant), RAMADAN, TEMP, D_A1

f Dependent Variable: Q_A1

**Casewise Diagnostics(a)**

| Case Number | Std. Residual | Q_A1 | Predicted Value | Residual |
|---|---|---|---|---|
| **44** | -3.035 | 11.83 | 12.0965 | -.2665 |

a Dependent Variable: Q_A1

**Residuals Statistics(a)**

| | Minimum | Maximum | Mean | Std. Deviation | N |
|---|---|---|---|---|---|
| **Predicted Value** | 11.9095 | 12.6975 | 12.4060 | .2123 | 60 |
| **Residual** | -.2665 | .2578 | -1.0658E-15 | 8.553E-02 | 60 |
| **Std. Predicted Value** | -2.339 | 1.373 | .000 | 1.000 | 60 |
| **Std. Residual** | -3.035 | 2.937 | .000 | .974 | 60 |

a Dependent Variable: Q_A1

# APPENDIX C

## MODEL RESULTS FOR THE OTHER BRANDS

We present a compact of summary of the model results for the ten brands, except for Brand A1 which is discussed in detail in the main text.

<u>Brand A2</u>

Stepwise linear regression produces the neatest model, with four significant variables and an adj-$R^2$ of 71.5%:

$$(105)\,\mathbf{K}\quad q_{A_2t}^{(Ls)} = -162 + 799d_{A_2t} - 224d_{A_6t} - 54r_t - 87t + e_{A_2t}$$

Forward linear regression produces a model of six explanatory variables, and only two of these variables are in common with the preceding stepwise model: own distribution and Ramadan. The other two variables in the stepwise model are replaced by four new variables in the forward model. Forward model has lower explanatory power, and moreover it is not better in compliance to the error-term assumptions. Therefore, it can be concluded that stepwise linear model is superior to the forward linear model and presentation of the forward model is skipped.

On the other hand, backward linear regression produces a model with higher explanatory power ($R^2$= 76.9%, adj-$R^2$ = 74.3%), by covering all the four variables of the stepwise model and also adding two new variables, own price and temperature, on top:

$$(106)\,\mathbf{K}\quad q_{A_2t}^{(Lb)} = 5{,}322 + 644d_{A_2t} - 24p_{A_2t} - 252d_{A_6t} + 39Temp_t - 47r_t - 76t + e_{A_2t}$$

Stepwise multiplicative regression produces a model of five significant variables, covering all the four variables of the stepwise linear model:

$$(107)\,\mathbf{K}\quad q_{A_2t}^{(Ms)} = e^{6.36} d_{A_2t}^{0.83} d_{A_6t}^{-0.05} f_t^{0.11} r_t^{-0.06} t^{-0.15} e^{e_{A_2t}}$$

Stepwise multiplicative model performs worse that the stepwise linear model in terms of explanatory power ($R^2$ = 68.9%, adj-$R^2$ = 66.1%), despite the addition of tourism variable. The same finding is also true for the other two multiplicative regression variants. Therefore, it can be concluded that linear model covers the idiosyncrasies in Brand A2's sales data better than the multiplicative model and Equation (106) is the best regression model to represent Brand A2's sales volume.

**Brand A3**

Stepwise and forward linear regression produces a model with seven significant variables and all with expected signs in the very first iteration:

$$(108)\,\mathbf{K}\quad q_{A_3t}^{(Lf,s)} = 8{,}581 + 391d_{A_3t} + 14p_{A_5t} - 79d_{B_2t} - 349d_{C_1t} - 92GDP_t + 31Temp_t - 20r_t + e_{A_3t}$$

Backward linear regression also produces a model with eight significant variables and all with expected signs in the very first iteration:

$$(109)\,\mathbf{K}\quad q_{A_3t}^{(Lb)} = 10{,}188 + 392d_{A_3t} + 14p_{B_4t} - 52d_{B_2t} - 114d_{B_4t} - 332d_{C_1t} - 97GDP_t + 28Temp_t - 21r_t + e_{A_3t}$$

Above models have six variables in common; the only difference is that Brand A5's price in the former model is replaced with Brand B4's price and distribution in the later model. Models perform equal in terms of explanatory power (adj-$R^2$ is 83.1% and 83.7%, respectively) and other statistical measures.

Stepwise and forward multiplicative regression produces a model with six significant variables, and only three of these variables are in common with the linear models:

$$(110)\,\mathbf{K}\quad q_{A_3t}^{(Mf,s)} = e^{5.20} d_{A_3t}^{1.03} p_{A_4t}^{0.05} d_{C_1t}^{-0.50} f_t^{0.17} r_t^{-0.08} t^{-0.22} e^{e_{A_3t}}$$

Backward multiplicative model covers all the six variables of the forward and stepwise multiplicative model, and also includes two more explanatory variables, Brand A4's price and GDP:

$$(111)\,\mathbf{K}\quad q_{A_3t}^{(Mb)} = e^{12.12} d_{A_3t}^{1.28} p_{A_4t}^{0.05} p_{B_4t}^{0.69} d_{C_1t}^{-0.46} GDP_t^{-2.24} f_t^{0.14} r_t^{-0.07} t^{-0.23} e^{e_{A_3t}}$$

Multiplicative models perform as good as the preceding linear models, in terms of explanatory power; adj-$R^2$ is 82.7% for former, and 84.2% for later multiplicative model. Therefore, it is not possible to select any of the presented four models as being superior. New observations should be augmented to the data set, in order to break the real and artificial dependencies among the explanatory variables and identify a superior model.

**<u>Brand A4</u>**

Stepwise linear regression produces a model with six significant variables (adj-$R^2$ = 91.4%):

$$(112)\,\mathbf{K}\quad q_{A_4t}^{(Ls)} = -12{,}387 + 601 d_{A_4t} + 38 p_{A_1t} + 49 p_{B_4t} - 189 d_{A_3t} - 80 d_{A_6t} - 272 d_{C_1t} + e_{A_4t}$$

Forward linear regression also produces a model with six significant variables (adj-$R^2$ = 91.9%), but only four of these variables are in common with the stepwise linear model:

$$(113)\,\mathbf{K}\quad q_{A_4t}^{(Lf)} = -11{,}422 + 528 d_{A_4t} + 26 p_{A_6t} + 29 p_{B_3t} + 28 p_{B_4t} - 233 d_{A_3t} - 314 d_{C_1t} + e_{A_4t}$$

Backward linear regression produces a completely different and massive model with twelve variables (adj-$R^2$ = 95.8%):

$$(114)\,\mathbf{K}\ q_{A_4t}^{(Lb)} = 3{,}486 + 481 d_{A_4t} - 57 p_{A_4t} + 22 p_{A_3t} + 25 p_{A_6t} + 34 p_{B_3t} - 164 d_{A_1t} - 111 d_{A_2t} - 225 d_{A_3t} - 117 d_{B_1t} - 281 d_{C_1t} + 68 Temp_t + 22 t + e_{A_4t}$$

All multiplicative regression runs produce the same model, with nine significant variables (adj-$R^2$ = 93.8%), but only four of these variables are in common with the stepwise linear model:

$$(115)\,\mathbf{K}\quad q_{A_4t}^{(M)} = e^{12.51} d_{A_4t}^{1.45} p_{A_4t}^{-4.21} p_{A_3t}^{1.69} p_{A_6t}^{1.36} p_{B_3t}^{1.76} d_{A_1t}^{-3.32} d_{C_1t}^{-0.23} f_t^{0.29} t^{-0.30} e^{e_{A_4t}}$$

Four sales volume models include sixteen explanatory variables in total. There is significant variation in the composition of these models, and it is possible to select any of the presented four models as being superior.

**Brand A5**

Stepwise and backward linear regression produces the same model, with seven significant variables (adj-$R^2$ = 82.0%):

$$(116)\,\mathbf{K}\quad q_{A_5 t}^{(Ls,b)} = 26{,}103 + 909 d_{A_5 t} - 961 d_{A_1 t} - 463 d_{A_4 t} + 19 p_{st} + 241 Temp_t - 83 r_t - 127 t + e_{A_4 t}$$

Forward linear model has one more explanatory variable, but lower explanatory power (adj-$R^2$ = 81.9%) compared to the prior linear model.

Forward multiplicative model encompasses the same set of explanatory variables and stepwise multiplicative model lacks the trend variable only, but both models have comparably low explanatory power; adj-$R^2$ value is 78.7% and 79.7%, respectively. Backward multiplicative model also lacks the trend variable, but has one additional explanatory variable, but performs worse than the linear correspondent with an adj-$R^2$ value of 80.0%. Based on these findings, it can be concluded that linear model covers the idiosyncrasies in Brand A5's sales data better than the corresponding multiplicative model and Equation (116) is the best regression model to represent Brand A5's sales volume.

**Brand A6**

Multiplicative models have significantly higher explanatory power with adj-$R^2$ ~96%, compared to the linear models with adj-$R^2$ ~87-88%. Linear models are not better in fitting the data set or compliance to error- term assumptions. Therefore, it can be concluded that multiplicative model better covers the idiosyncrasies in the data.

Stepwise and forward multiplicative regression produces a model with six significant variables:

$$(117)\,\mathbf{K}\quad q_{A_6 t}^{(Ms,f)} = e^{1.96} d_{A_6 t}^{1.66} p_{B_1 t}^{3.74} d_{A_1 t}^{-6.69} p_{st}^{1.10} Temp_t^{0.28} t^{-0.14} e^{e_{A_6 t}}$$

Backward multiplicative model also produces a model with six significant variables, and four of these variables are in common with the former model. In the backward case, two variables of the former model, trend and raki price, are replaced with Brand A4's distribution and price:

$$(118)\ \mathbf{K}\quad q_{A_6t}^{(Mb)} = e^{3.73} d_{A_6t}^{1.77} p_{A_4t}^{0.68} p_{B_1t}^{2.92} d_{A_1t}^{-4.13} d_{A_4t}^{-1.50} Temp_t^{0.30} e^{e_{A_6t}}$$

Equation (118) is regarded as the best regression model to represent Brand A6's sales volume, as it performs better than the former one in key statistical measures.

**Brand B1**

Backward multiplicative regression produces the best model in terms of explanatory power with 82% adj-$R^2$ among the six model varieties; the other five have adj-$R^2$ values of 75%-77%. Backward multiplicative model is composed of eight explanatory variables, five of which are in common with the other models:

$$(119)\ \mathbf{K}\quad q_{B_1t}^{(Mb)} = e^{-4.45} d_{B_1t}^{0.94} p_{B_1t}^{-1.47} p_{A_3t}^{1.14} d_{A_4t}^{-0.05} d_{C_1t}^{-0.10} GDP_t^{2.82} Temp_t^{0.24} r_t^{-0.06} e^{e_{B_1t}}$$

**Brand B2**

Linear models for Brand B2 have lower explanatory power with 7% less adj-$R^2$ and higher autocorrelation risk, compared to the multiplicative models. Stepwise and forward multiplicative regressions produce a statistically satisfactory model, with four explanatory variables. However, backward multiplicative model adds an extra variable on top and performs better in terms of statistical measures ($R^2$ = 98.0%, adj-$R^2$ = 97.8%):

$$(120)\ \mathbf{K}\quad q_{B_2t}^{(Mb)} = e^{2.59} d_{B_2t}^{2.63} p_{B_2t}^{-1.74} p_{B_4t}^{2.43} d_{A_5t}^{-1.25} Temp_t^{0.13} e^{e_{B_2t}}$$

**Brand B3**

Four regression variants, stepwise and forward linear plus stepwise and forward multiplicative, produce the same model with four variables: own distribution, Brand A4's distribution, GDP and tourism. However, backward elimination provides the best model in terms of the explanatory power with an adj-$R^2$ of 81.5%:

$$(121)\ \mathbf{K}\quad q_{B_3t}^{(Mb)} = e^{-6.63} d_{B_3t}^{1.16} d_{A_4t}^{-0.10} Temp_t^{0.13} GDP_t^{2.31} r_t^{-0.06} e^{e_{B_3t}}$$

Compared to the former model, backward multiplicative regression replaces tourism variable with temperature and Ramadan, improving adj-$R^2$ by 2.2%.

**Brand B4**

Backward multiplicative regression produces the best model in terms of explanatory power with 61% adj-$R^2$:

$$(122)\,\mathbf{K}\quad q_{B_4t}^{(Mb)} = e^{7.53} d_{B_4t}^{0.98} p_{A_4t}^{0.19} d_{A_4t}^{-0.43} d_{A_5t}^{-0.27} Temp_t^{0.15} r_t^{-0.05} e^{e_{B_4t}}$$

Above model and backward linear model, the second best model in terms of explanatory power with 57% adj-$R^2$, own the same set of variables. This supports the stability of the best variable combination. But, the explanatory power of these models is comparably low, and almost 40-45% of variation in the sales volume remains unexplained. Low explanatory power can only be partially attributable to the variable deletion methodology, as models with full set of variables also have comparably low explanatory power with an adj-$R^2$ of 71.4%. Therefore, it is a probable that a number of important explanatory variables such as beer taste, package design, product image, unusual promotional activities are missing in the data set.

**Brand C1**

Models produced by six elimination methods resemble each other, in terms of the variable combination: own price and own distribution are common in six models; Brand A6's distribution is common in five models; temperature and Ramadan are common in four models. However, backward multiplicative model has the highest explanatory power with an adj-$R^2$ of 79.1% and encompasses all the five variables mentioned above plus three more:

$$(123)\,\mathbf{K}\quad q_{C_1t}^{(Mb)} = e^{16.48} d_{C_1t}^{0.70} p_{C_1t}^{-2.27} d_{A_4t}^{-0.24} d_{A_6t}^{-0.13} d_{B_2t}^{-0.14} Temp_t^{0.34} r_t^{-0.08} t^{0.42} e^{e_{C_1t}}$$

**Commentary on regression results**

It is worthwhile to discuss the regression findings and do some sanity check. Almost all the 88 regression variants, four regression variants for two formulations of the eleven brand-level sales volume models, produce similar results in terms of statistical measures:

1. Good fit of the data set explained: large F-statistics
2. High explanatory power: adj-$R^2$ more than 75%, except for one brand
3. Limited number of significant variables: 2 or 3 out of 28 for models with full set of explanatory variables
4. No severe violation in error term assumptions
5. Serious multicollinearity problem: significant portion - 30% on average - of estimated regression coefficients have signs contradictory to a priori expectations
6. Backward elimination method to produce the models with the highest explanatory power
7. No absolute superiority of linear or multiplicative model over the other

Best sales volume model is defined as the one with highest explanatory power, best data fit, and full compliance to error-term assumptions and identified for all, but three brands. Best model for Brand A3 and A4, marginal brands with less than 1% market share, cannot be identified, as it is not possible to select one regression variant as being superior to others and variable combination of the variants exhibit serious variation. Moreover, no satisfactory model can be formulated for Brand B4, as even the best model has low explanatory power.

We revisit the eight brand-level sales volume models. Almost all models include two primary variables, own price and own distribution, and two environmental variables, temperature and Ramadan. We leave these four variables aside, and comment on the other model variables present.

Brand A2: Model includes a cannibalization variable of Brand A6’s distribution, which deserves some discussion. Brand A6 experiences a phase-out cycle in the second half on the investigated period and its distribution steadily erodes from 10 to less than 1, following producer’s decision to discontinue this brand. In this period, producer may have replaced Brand A6 with Brand A2 in distribution system, and retailers may have been supplied with more of Brand A2 instead of the unsupplied Brand A6. To the extent that foregoing proposition is true, cannibalization variable represents the consequences of a managerial decision.

Brand A5: Model lacks own price variable, unlike the other models. One possible explanation of this can be that any adjustments in the price of Brand A5, which is already sold at 25% discount compared to the mainstream brands, do not affect consumers purchasing decisions. The same conclusion is also valid for the other discount brands. Model also includes two cannibalization variables: Brand A1's, and Brand A4's distribution. Based on this finding, following interpretation can be derived: "some consumers perceive discount Brand A5 as inferior, and switches to the other two brands if they are available". The same conclusion is also valid for Brand A6, whose sales volume model includes three cannibalization variables: Brand A1's distribution, Brand A4's distribution, and Brand A4's price.

Brand A6: Model includes a competition variable: Brand B1's price. These two brands could share a common consumer base, composed of highly price sensitive purchasers who switch to Brand A6 depending on Brand B1's price.

Brand B1: Model includes three competition variables. Interestingly, Brand B1 competes with Brand A3 on price and with Brand A4 and C1 on distribution. However, price is the dominant field of competition, as coefficients of the cross-distribution terms are negligibly small.

Brand B2: Model includes one cannibalization and one competition variable. Although both variables are associated with discount brands, field of opposition differs: Brand B2 competes with Brand B4 on price and with Brand A5 on distribution.

Brand B3: Model contains one competition variable, with a negligible coefficient. Therefore, it can be concluded that Brand B3 has very loyal consumers, who do not interact with the other brands and consume Brand B3, regardless of the other brands' price and availability.

Brand C1: Model contains an own price variable with a sizeable coefficient. Brand C1 is sold at 50% discount in the investigated period, and its consumers usually have low purchasing power. Consequently, it is well expected that these consumers exhibit some price sensitivity.