

DETERMINING OPTIMAL INVENTORY AND DISCOUNT LEVELS IN MULTI
STORE, MULTI ITEM INVENTORY SYSTEMS

by

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ABSTRACT

DETERMINING OPTIMAL INVENTORY AND DISCOUNT LEVELS IN MULTI-STORE, MULTI-ITEM INVENTORY SYSTEMS

This study focuses on the management of the inventory system in one of the biggest book and music chain stores in Turkey. The aim is to increase the profitability of the firm by determining the best ordering policy and the discount option. This is achieved by developing a simulation model and running it for two types of ordering policies. In the first policy, a store is allowed to receive products both from the warehouse and other stores. The second policy does not allow transfer of the products between stores. The necessary input data for the model is derived from the actual sales data within the past two years. The results indicate that transferring products between stores increases the profitability of the system. It is also found making discounts on the prices is not economically viable. The outcomes of this study guide the managers in their decision-making process of ordering and pricing on the basis of product groups, and determining the inventory levels at each store.

ÖZET

ÇOKLU MAĞAZA VE ÇOKLU ÜRÜN ENVANTER SİSTEMLERİNDE OPTİMUM ENVANTER VE İNDİRİM SEVİYELERİNİN BELİRLENMESİ

Bu çalışmada, Türkiye'nin en büyük kitap ve müzik mağaza zincirlerinden birinin envanter sistemi yönetimi incelenmiştir. Bizim amacımız en iyi sipariş verme politikasını ve fiyatlandırma seçeneğini tespit ederek firmanın karlılığı arttırmaktır. Simulasyon modelinin oluşturulması ve iki farklı sipariş verme politikası ile çalıştırılması sonucu başarıya ulaşılmıştır. İlk politika; mağazanın, depodan ve diğer mağazalardan ürün almasına izin vermektedir. İkinci politika mağazalar arası ürün transferine izin vermemektedir. Modelde gerekli olan veriler geçmiş iki yıllık satış verilerinden elde edilmiştir. Sonuçlar, mağazalar arası ürün transferine izin verilmesinin firmanın karlılığını arttırdığını göstermektedir. Ayrıca, sonuçlar fiyatlarda herhangi bir indirim yapmamamın daha karlı olduğunu göstermiştir. Bu çalışma, yöneticilere; sipariş verme, fiyatlandırma ve mağazaların envanter seviyelerinin belirlenmesi süreçlerinde yol göstermektedir.

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LIST OF SYMBOLS/ABBREVIATIONS

a	Levels of week days
c_{hj}	Unit holding cost of product j per day
c_{lj}	Unit handling cost of product j
c_{pj}	Unit penalty cost of product j
c_{sj}	Unit shipment cost of product j
c_{ij}	Unit transfer cost of product j
c_{ir}^t	Rental cost of store i on day t
cap_{ij}	Capacity of product j at store i
C_i^{0t}	Total cost of store i on day t when there is no discount
C_i^{12t}	Total cost of store i on day t when there is 12% discount
C_i^{9t}	Total cost of store i on day t when there is 9% discount
C_i^{6t}	Total cost of store i on day t when there is 6% discount
C_w^{0t}	Total cost of the warehouse on day t when there is no discount
C_w^{12t}	Total cost of the warehouse on day t when there is 12% discount
C_w^{9t}	Total cost of the warehouse on day t when there is 9% discount
C_w^{6t}	Total cost of the warehouse on day t when there is 6% discount
D_{ij}^{0t}	Sales quantity of product j at store i on day t when there is no discount
D_{ij}^{12t}	Sales quantity of product j at store i on day t when there is 12% discount
D_{ij}^{9t}	Sales quantity of product j at store i on day t when there is 9% discount
D_{ij}^{6t}	Sales quantity of product j at store i on day t when there is 6% discount
$F(y)$	Steady state distribution of the output process Y
I_{ij}^t	Inventory of product j at store i on day t
I_{ij}^{+t}	Excess inventory of product j at store i on day t

I_{ij}^{-t}	Shortage of product j at store i on day t
I_{wj}^t	Inventory of product j at the warehouse on day t
MS_E	Mean squares due to error
$MS_{Treatments}$	Mean squares due to treatments
N	Total number of observations of quantity of daily sales
n_i	Observations to be taken under treatment i
$O_{i(j,1)}^t$	Amount of order for product j placed by store i to the warehouse on day t
$O_{i(j,2)}^t$	Amount of unsatisfied order for product j at store i on day t
O_{wj}^t	Amount of the order for product j placed by the warehouse to the supplier on day t
P^{0t}	Net profit of the company on day t when there is no discount
P^{6t}	Net profit of the company on day t when there is 6% discount
P^{9t}	Net profit of the company on day t when there is 9% discount
P^{12t}	Net profit of the company on day t when there is 12% discount
P_i^{0t}	Total profit of all groups of products at store i on day t when there is no discount
P_i^{6t}	Total profit of all groups of products at store i on day t when there is 6% discount
P_i^{9t}	Total profit of all groups of products at store i on day t when there is 9% discount
P_i^{12t}	Total profit of all groups of products at store i on day t when there is 12% discount
P_{ij}^{0t}	Total profit at store i of product j on day t when there is no discount
P_{ij}^{6t}	Total profit of product j at store i on day t when there is 6% discount
P_{ij}^{9t}	Total profit of product j at store i on day t when there is 9% discount
P_{ij}^{12t}	Total profit of product j at store i on day t when there is 12% discount
pp_j^0	Purchasing price of product j when there is no discount

pp_j^6	Purchasing price of product j when there is %6 discount
pp_j^9	Purchasing price of product j when there is %9 discount
pp_j^{12}	Purchasing price of product j when there is %12 discount
pr_j	Proportion of the inventory already paid for product j
rr_j	Proportion of the warehouse's order for product j satisfied by the supplier
R_{ij}^t	Amount of product j returned from store i to the warehouse on day t
S_{ij}^t	Amount of product j shipped from the warehouse to store i on day t
S_{wj}^t	Amount of product j shipped from the supplier to the warehouse on day t
SS_E	Sum of squares due to error
$SS_{Treatments}$	Sum of squares due to treatments
ss_{ij}	Safety stock of product j at store i
ss_{wj}	Safety stock of product j at the warehouse
sp_j^0	Selling price of product j when there is no discount
sp_j^6	Selling price of product j when there is 6% discount
sp_j^9	Selling price of product j when there is 9% discount
sp_j^{12}	Selling price of product j when there is 12% discount
T_{ikj}^t	Amount of product j transferred from store i to k on day t
X_{ij}^{0zt}	Sales quantity of product j at store i for the last z days on day t when there is no discount
X_{ij}^{6zt}	Sales quantity of product j at store i for the last z days on day t when there is 6% discount
X_{ij}^{9zt}	Sales quantity of product j at store i for the last z days on day t when there is 9% discount
X_{ij}^{12zt}	Sales quantity of product j at store i for the last z days on day t when there is 12% discount
Y_{ij}^{0t}	Lost of sales of product j at store i on day t when there is no discount

Y_{ij}^{6t}	Lost of sales of product j at store i on day t when there is 6% discount
Y_{ij}^{9t}	Lost of sales of product j at store i on day t when there is 9% discount
Y_{ij}^{12t}	Lost of sales of product j at store i on day t when there is 12% discount
y_{ij}	Observation of quantity of daily sales
\overline{y}_i	Average of the observations of quantity of daily sales under i th treatment
\overline{y}_{\max}	Largest sample means
\overline{y}_{\min}	Smallest sample means
$y_{..}$	Grand total of all the observations of quantity of daily sales under the i th treatment
$\overline{y}_{..}$	Grand average of all the observations of quantity of daily sales
α	Upper percentage points of q
ε_{ij}	Random error component that incorporates all other sources of variability in the experiment including measurement
f	Number of degrees of freedom of MS_E
μ_i	Mean of the i th factor level
LSD	Fisher Least Significant Difference
RF	Radio Frequency

1. INTRODUCTION

Determining the right amount of inventory to hold without excesses or shortages has been the focus of many supply chain problems. Decisions about, when to re-order and in what quantities to order have to be made continuously. Companies hold inventory to balance supply and demand, to provide protection from uncertainties in demand. Inventory acts as a buffer between critical interfaces within the supply chain. Effective management of the supply chain is the key to the success of companies in terms of competition and profitability. Particularly the retail sector, which is under great competitive pressure, has to manage the supply chain as a competitive weapon. In a competition-fierce economy where there is a high demand for new products, it is necessary that old products are sold off quickly and replaced by new products. This helps to stay in the competition with others in the industry. In most cases, a fast inventory turnover is crucial.

The company that we consider is one of the most well-known and respected books and music retailers in Turkey. The categories that will be taken into consideration are music CDs, books, and videos. An effective supply chain management is a significant and strategic part of the business. The company is struggling with high rates of return from stores located in İstanbul. Product returns occur because either the stores have an excessive number of products due to a marketing promotion that calls for over-ordering, or the products do not sell as well as expected. In such a situation, there is a need to know exactly when the product was shipped. The retailing industry is already an advanced user of Information Technologies; therefore the company uses bar codes, computerized returns entry and radio frequency (RF) in order to track the inventory. The objective of this study is to investigate and evaluate the performance of an inventory system with one central warehouse and three stores. Each store has the option of transferring from the excess inventory of another in cases of shortage. Since the cost of transfer is generally lower than both the penalty cost and the cost of shipment from warehouse, and the transfer time is shorter than the shipment lead time, transfer simultaneously reduces the total system cost and increases the fill rates at the stores. The stores that share their inventory are called a pooling group since they effectively pool their resources in order to reduce the risk of losing of sales and to provide better service at a lower a cost. This study concentrates on an

analysis of the operation of a pooling group consisting of one to three retail stores that place regular orders to a central warehouse everyday. Simulation leads to some very interesting and practically valuable decisions.

The problem we analyze is a centralized warehouse and multi-retailer system with multiples of items. Inventory is being hold according to previous three days' sales. Sales and safety stock levels at stores are independent of each other. Shipment from warehouse to any store takes one day, and transfer of products between the stores occurs instantaneously. In this study, we assume that demands have the same distribution as the past two years' sales data. In this setting we want to find the optimal inventory levels and prices for each store so as to maximize the total profit of the system. This is achieved by creating a simulation model and running it for various demand patterns for each product group. The results may help the managers in their decision-making process of ordering and pricing various product categories and determining inventory levels. The impact of such decisions is tremendous both in cost reduction and in providing high quality, competitive, and on-time service.

The measure of performance is the expected profit per day, after deducting all costs consisting of holding cost, transportation from supplier to warehouse, from warehouse to stores, and transfers between stores. Penalty cost and rental costs are considered as well. The simulation results indicate that allowing transfers between stores is the best policy in all cases. These results also reveal that making discount is not profitable but may still be used for reducing excess inventory.

This study is organized as follows: In Section 2, various inventory models are reviewed. Section 3 explains our inventory model's characteristics, assumptions and formulations. In Section 4, simulation results and analyses of the model are given. The last section gives the conclusion and recommendations for further studies.

2. LITERATURE REVIEW

Effective management of supply chain is nowadays recognized as a key determinant in competition and success of most organizations. There are many quantitative models that have been constructed to provide decision support in the management of inventories in supply chains.

Since the network of facilities composing the entire supply chain is too complex to be analyzed and optimized globally, it is often desirable to concentrate on smaller parts of the system so as to gain a fuller understanding of its characteristics and performance and the tradeoffs involved.

Inventory pooling enables to respond rapidly to changes and to manage inventory pools optimally in order to achieve increased customer satisfaction, while minimizing inventory. Tagaras and Cohen (1992) study pooling in two-location inventory systems with non-negligible replenishment lead times and emergency transferring. Pooling strategy is used in order to deal with uncertainty in multi-location inventory system and prevent shortages. Emergency transfers are assumed to occur instantaneously. Four strategies are compared with simulation. These strategies are given below.

- Transfer is made when a shortage occurs at one of the retailers in the current period.
- Transfer is made if one retailer does not have shortage but on-hand inventory is under target level.
- Transfer is made if one retailer's inventory exceeds target inventory and other one has a shortage.
- Transfer is made if one retailer's inventory exceeds target inventory and there is no shortage in the other location.

Transfers under different cost conditions create a second echelon for emergency shipments and true pooling across retailers will occur under favorable cost conditions.

Tagaras (1998) investigates performance of multiple retail outlets (stocking locations), which are supplied by a central warehouse or distribution center. The stores share their inventory with each other so as to form a pooling group. The model is complex and intractable even in the simple case of two stocking locations, so Tagaras uses simulation in order to study the two-retailer inventory system with non-negligible replenishment lead times and unequal cost parameters. They find that complete pooling is better than partial pooling. Transfers are made in the following conditions.

- When at least one location faces a shortage at the end of a period while two or more other locations have a surplus of on-hand inventory
- When two or more locations face shortages and they request transfers from at least one location with surplus.

If the available inventory at one or two retailers is not enough to meet the local demand, emergency lateral transfer is made to the other retailers. Transfer costs are same for all retailers. Backlogging is permitted and inadequate demand is fulfilled in subsequent periods. Shortage, holding and transportation costs are equal for all retailers. Demand and replenishment lead time are not identical. Replenishment is done periodically. If the shortage at a location is greater than the total excess inventory, the other two locations will simply transfer their entire available inventory to the former in order to reduce the shortage. When the surplus at a location exceeds the total shortage at the other two locations, the former will transfer to the latter the quantities required to completely eliminate their shortages.

Tagaras finds that pooling stores with identical demands costs less than pooling asymmetric stores. He also investigates pooling in multi-location inventory distribution systems with lateral transfers in order to respond to shortages. The economic and service performance of a pooled group of retail stores is better than that of a group of independent stores, and it gets better as the number of stores in the pooling group increases (Tagaras, 1998).

Chiang and Monahan (2005) present a two-echelon dual channel inventory model in which inventory is kept in a warehouse and a retailer. Products are sold by the retailer or via the internet. Using multiple channels may reach more customers and increases market scope. Internet sales are delivered from the warehouse. Retail store sells from its own inventory. Preference rate is the proportion of customers who prefer buying the product. When there is a stock-out, customers shift to other channels at a known probability. The authors investigate possible distribution strategies considering inventory holding costs and cost of lost sales. Also they compare the performance of scenarios by changing parametric values of holding cost, cost of lost sales, demand rate and replenishment rate. The comparisons show that the total cost of using only retail channel increases as the direct channel preference rate increases. The total cost of direct channel via internet decreases as the preference rate increases. The dual channel strategy outperforms the alternative strategies for all preference rates. Although it includes other costs like rentals and wages, retail-only strategy outperforms the dual channel strategy when the preference rate is low. Also the direct-only strategy is better when the preference rate is high (Chiang and Monahan, 2005).

Hark Hwang *et al.*(2004) studies management of shelf space allocation and products display. It is assumed that the level of shelf space on which products are displayed affects the sales. The demand rate is assumed to be a function of the displayed inventory and the location of each brand. They model the problems of determining how many items to be ordered from each brand and where to place these items on shelves in order to maximize profit.

Vlachos and Tagaras (2001) propose a periodic-review inventory system with an emergency supply. They compare early and late ordering systems. Emergency supply, which is in small quantities and thus has higher costs per unit, is used when there is a stock-out in the main warehouse. Stocks are replenished periodically and the quantity of the order is raised up to a determined value with a specified lead time. Any defective demand is backordered and satisfied by an emergency order. In the early order policy, emergency orders are placed earlier in the cycle. Later ordering has more information about the stock level advantage and is placed as late as possible in the cycle. The objective function is to minimize the total costs. They simulate the models and compare

corresponding costs. The cost models provide near optimal solutions that can be derived very efficiently. The emergency channel's capacity constraint has a significant effect on the system performance under both emergency ordering policies, especially when the review period and the regular replenishment lead time are long. Placing the emergency order early in the replenishment cycle is better than placing the order later in the cycle as the demand becomes more variable, the shortage cost decreases and the regular lead time and review period become longer.

Jorgensen and Kort (2002) study pricing and displayed inventory. They find the optimal solutions of decentralized and centralized decision making under stock-dependent demand, and decentralized decision making under stock-independent demand. They identify solutions to the optimal control problems of the store manager and warehouse manager when they determine their optimal decisions as functions of time. Store manager aims to maximize the local profit. Warehouse manager aims to minimize local costs. In decentralized organization warehouse manager wants to minimize holding costs and starts to decrease the stock avoiding replenishment and holding cost. Replenishments are done according to stores' demand. Store manager selects the minimal price to reduce the inventory. In the centralized solution, replenishment of the in-store inventory already stops when its shadow price falls below the replenishment cost. In the decentralized solution, replenishment of the in-store inventory does not stop until the shadow price becomes zero.

One of the important subjects related to the channel coordination is the return policy. Many research papers examine an inventory model assuming that customer's demand rate is a decreasing function of the selling price. Suppliers offer lower prices to the retailers so that with the requirement that they will not return the unsold items. As a result, the suppliers become able to maintain better accounting and inventory systems while the retailers can lower the unit retail price, which, in turn, increases the product demand by customers. Consequently, in addition to the satisfaction of the customers, both parties enjoy higher financial gains and benefits resulting from the decreased quantity of outdated products and increased sales are shared among the suppliers, retailers and customers. Due to a lower unit selling price, this might result in an increased product demand. Consequently, the supplier could expect an increase in the sales volume which would eventually contribute to have a higher profit.

Pricing provides the retailer and supplier with a theoretical basis of the validity of the coordination efforts for the new market practice, especially, when the quantity of on-hand inventory level of the products is high (Hahn, Hwang and Shinn, 2004). Papachristos and Skouri reflect on a model where the demand rate is a convex decreasing function of the selling price and the backlogging rate is a time-dependent function. The inventory deteriorates during the storage period, and Papachristos and Skouri consider quantity discount (Papachristos and Skouri, 2003).

Viswanathan and Wang (2001) evaluate the effectiveness of alternative discount schemes in a simplified setting of a distribution channel consisting of single-supplier and single-retailer. Demand for the product arises only at the retailer. The retailer in turn buys the product from the supplier. The system profit is the sum of the profit of the supplier and the retailer. The supplier and the retailer are independent entities trying to maximize their own profit. Methods are developed to determine the optimal volume discount, quantity discount, and combined quantity and volume discount policies. Quantity discounts are offered with the intention of increasing the buyer's demand quantity in each order, thereby achieving reduction in the vendor's order processing cost. The demand faced by the retailer is sensitive to retail price. A discount on the wholesale price given by the supplier based on the retailer's volume of demand may motivate the retailer in turn to reduce retail price, generating higher demand and profits for both the supplier and retailer. This type of discount is called volume discount. Numerical evaluation of the alternative discount schemes indicate that volume discount achieves almost perfect coordination (93% of joint optimal profit) and is very effective when price sensitivity of demand is high. On the other hand, quantity discount is effective when price sensitivity of demand is low. Finally, for all the test problems, a simultaneous offer of quantity and volume discount is able to achieve perfect coordination. The supplier's aim is to offer volume discount to in order to increase both the demand and the revenue and profits. At the same time, the retailer would be willing to accept this discount only if he is in a better situation than what he was at the initial situation.

When the price elasticity of demand is high, the quantity discount offer may also result in a larger demand and this possibly results in larger sales volume. The supplier's profit increases as the order quantity increases. Therefore, the supplier would want to set

the order quantity for a particular purchasing price, aiming a sales volume as large as possible.

However, when the demand is price sensitive, there is an opportunity for the supplier to increase revenue by getting the retailer to generate a larger volume of demand. The initial market equilibrium price and the corresponding profit for the supplier and retailer serve as a basis for determining the discount pricing policy. The joint optimal system profit is a benchmark for evaluating the scenarios.

Both the supplier and retailer know the equilibrium purchasing price and the equilibrium demand when no price discounts are offered. The supplier offers a purchasing price, if the demand rate per period from the retailer is at least the initial demand or above. The retailer will accept the volume discount only if he is better off (or at least not worse off). The retailer will be able to generate this higher level of demand only if he reduces his own retail price. If the price is profitable to the supplier for some level of demand, then the supplier's profit increases as the demand increases, and the marginal profit at a particular level of demand is not less than the average profit per unit at that level. Therefore for a particular price, the supplier gains by making the required minimum demand as large as possible. With a price below the threshold value, the supplier's profit will be affected adversely. Prices below the threshold value would not be taken into consideration for a discount decision. Viswanathan and Wang (2001) indicate that as the purchasing price decreases, the retailer's optimal demand will increase. Therefore, the objective of the supplier would now be to reduce the purchasing price by offering discount, and enticing the retailer to order at a demand rate which is larger than his optimal demand at that price. The retailer would be willing to place higher order in order to increase his profit.

The supplier and the retailer act independently as rational economic agents, each maximizing their own profit. This is a common practice in distribution channels in which the supplier notifies his pricing policy and the retailer makes his optimal pricing and ordering decisions independently, even though acting under supplier's pricing policy (Viswanathan and Wang, 2001).

Yang (2004) develops an integrated pricing model for a deteriorating item with quantity discount. Demand is assumed to be price sensitive. A negotiation factor is included to balance the profit sharing between both players. Both the firm and the supplier trust each other and share their information and resources. Yang indicates that integration of supplier and the firm and quantity discount results in extra profit. Sensitivity analysis shows that deterioration of items and price sensitivity is significant for increasing the profit.

3. PROBLEM DEFINITION AND FORMULATION

3.1. The System

Our model consists of a warehouse and three stores with three different suppliers. Three types of product categories exist, which are books, music CDs and videos. The category of books includes literature, education and research books. The category of music CDs includes three groups: Turkish pop, pop/rock and others. Video category has two groups, namely Turkish and foreign video. There is one supplier for each of the categories. Each store has its own sales volume distribution for each group of products and the distributions of the stores are independent of each other. Inventory levels are reviewed periodically. Stores place the order of required quantity of each product to the warehouse to bring the inventory to a level, which is calculated from the sales data of the last three days. Stores place the orders to the warehouse at 21:00. Then, returns and transfers are made at 21:30. Shipment of the previous day's order is made at 22:00.

The orders coming from the stores are accumulated by the warehouse. If the inventory in the warehouse is not sufficient enough to satisfy all the orders, the entire on-hand inventory is shipped to the stores. The warehouse subsequently places its orders to the supplier, considering both the unsatisfied orders of the stores and the safety stock of the warehouse.

Backlogging is permitted for a single day, and thus orders older than one day are cancelled because suppliers have no information system to track previous orders properly. We assume that unsatisfied orders will be shipped the next day. When the stores place orders, they take the unsatisfied demand of the previous day into consideration. This assumption prevents repeating the same order twice. This policy may cause lost sales because sometimes suppliers cannot replenish the inventory of the warehouse. We assume that each supplier has a fill rate for each group of product, which is determined according to the examination of the historical data.

The incoming products from the suppliers are directed to the warehouse from where they are distributed according to the replenishment orders of the stores. Warehouse is managed by a third party logistics company. Shipments and returns are done by that firm. Shipment and return costs consist of handling and transportation costs which are equal for all groups of products. There is no capacity constraint for handling or transporting. Third Party Logistics Company charges shipment costs at the end of the day. Transfers are made by the employees of the stores.

The model is further complicated by the inclusion of pricing decisions. When determining prices, we must make trade-offs between charging higher margins to fewer customers and lower margins to more customers. We assume that sales quantity of group of products increases as the selling price of the stores decreases. Suppliers adjust purchasing prices according to company's discount option in four groups out of eight. Suppliers of the groups of video, pop/rock and others do not accept volume discount achieved during discount periods since these products are imported. Hence the discount option is independent of the suppliers.

3.2. Model Development

The assumptions of the model are given below.

- Sales are assumed to have the same distribution as the previous sales data.
- Each store has its own sales data.
- Each customer is assumed to buy one item because data set is collected according to that assumption.
- Prices are the same in all stores and the administration decides on the discount prices and then informs the store managers about these discounts.
- Inventory is being hold according to previous days' sales. Excess inventory is returned on the same day to the warehouse or can be transferred to other stores if they request.
- Information lead time between all agents is assumed to be zero.
- The selling price of an item is equal in all stores.
- Transportation and handling cost of every item are equal.
- Seasonal effect and effects of other sales are neglected.
- Returned products are used as the new products. There is no diversification between returned products and new products.
- Fixed costs except the rental cost for ERENKOY and NST stores are neglected.
- Holding costs are assumed to be same and fixed for each group of products.
- Markets are assumed to be independent; sales of a store do not affect those of others.
- All products' prices are assumed to be discounted during the campaign period.
- The warehouse is assumed to have infinite capacity.
- The warehouse does not return products to suppliers.
- Shipments and transfers have no capacity limitation.
- Payments are done after three months of the shipment of the product. Although it is hard to know the proportion of the inventory already paid at any time, we assume that already paid proportion of the inventory is fixed and valid during our application period for each group. We use this proportion in the calculation of holding cost of group of products.
- All unit costs are fixed and identical for each group.

- The shelf space on which the product is displayed has no effect on the sales.
- There is no shelf space allocation elasticity for groups. Safety stock and capacity of each store is constant.
- Demand is assumed to be linear with prices.

The following equations are used in the simulation model.

$$I_{ij}^{+t} I_{ij}^{-t} = 0$$

There is either excess inventory or shortage on a given day.

$$O_{i(j,1)}^t R_{ij}^t = 0$$

There is either return or order on a given day. We used $i \neq k$ to avoid transfer within a store.

Inventory level constraints are given below.

$$ss_{ij} \leq I_{ij}^t \leq cap_{ij}$$

$$ss_{wj} \leq I_{wj}^t$$

$t = 1, \dots, 360$

$i, k, m = 1, 2, 3$ are defined as set of stores.

$J = 11, 12, 13, 21, 22, 23, 31, 32$ is defined as set of product groups.

$z = 1, \dots, 11$ is defined as number of days.

If $X_{ij}^{0zt} - I_{ij}^t - O_{i(j,2)}^{t-1} \geq 0$, then $I_{ij}^{-t} = I_{ij}^t + O_{i(j,2)}^{t-1} - X_{ij}^{0zt} \leq 0$ and $I_{ij}^{+t} = 0$

If $X_{ij}^{0zt} - I_{ij}^t - O_{i(j,2)}^{t-1} < 0$, then $I_{ij}^{+t} = I_{ij}^t + O_{i(j,2)}^{t-1} - X_{ij}^{0zt} > 0$ and $I_{ij}^{-t} = 0$

There is no need to separate the notations of return orders and return shipments, transfer orders and transfer shipments. It is assumed that transfer and return orders are shipped from the related stores instantaneously and the shipment quantities are equal to the order quantities and therefore we use the same notation for them.

3.2.1. System with One Store

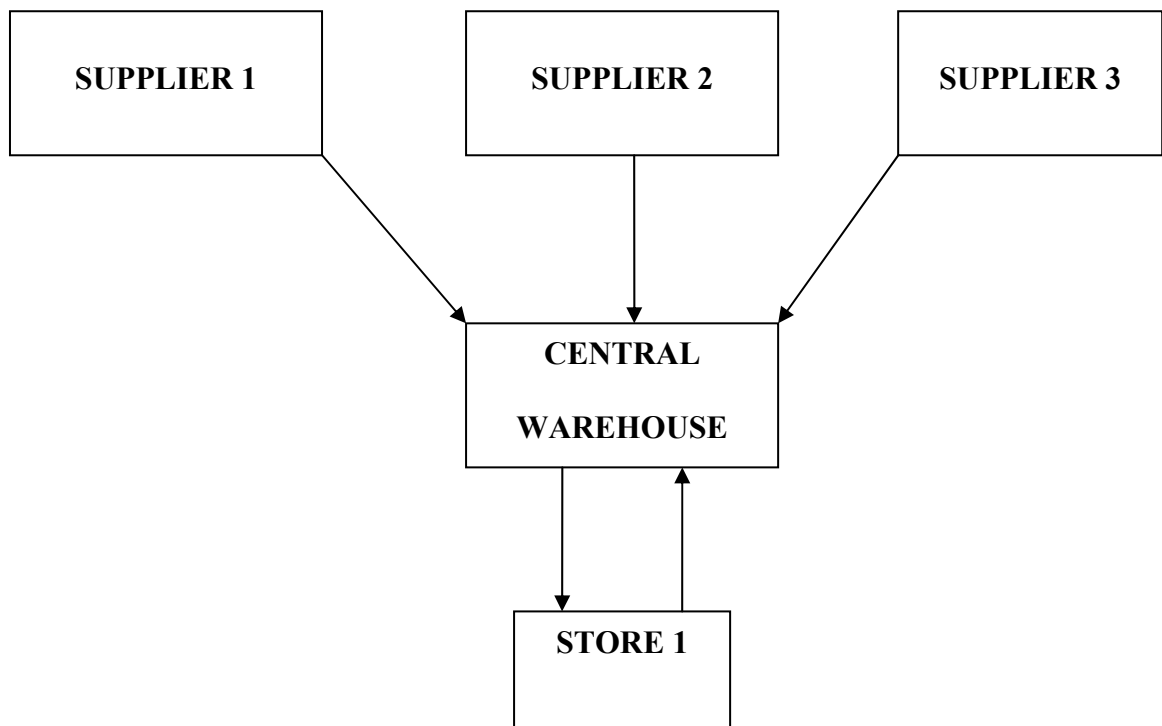


Figure 3.1. Structure of the distribution system with one store

Stores are open from 09:00 to 21:00. No product flow occurs during the working hours. After the stores are closed, store's manager orders $O_{i(j,1)}^t$ units from the warehouse in order to bring the inventory level up to X_{ij}^{0zt} . Stores have no additional storage to keep inventory except shelves therefore keeping inventory is inevitable so as not to have any lost sales. Safety stock of a store is the minimum number of products which would leave no empty space horizontally on the shelves. Capacity of a store, which is denoted as cap_{ij} , is the maximum number of products that could be placed in the display area that is

allocated for the related group of products. Safety stock and capacity levels are taken into account for determining $O_{i(j,1)}^t$.

$$O_{i(j,1)}^t = \max\left\{0, \min\left\{cap_{ij} - I_{ij}^t - O_{i(j,2)}^{t-1}, ss_{ij} - I_{ij}^t - O_{i(j,2)}^{t-1}, X_{ij}^{0zt} - I_{ij}^t - O_{i(j,2)}^{t-1}\right\}\right\}$$

Stores cannot simultaneously order and return products of the same group on day t . The lead time for returning products is zero, and thus they are added to the warehouse's inventory instantaneously. The corresponding equations are given as.

$$\text{If } O_{i(j,1)}^t > 0, \text{ then } R_{ij}^t = 0$$

$$\text{If } O_{i(j,1)}^t = 0, \text{ then}$$

$$R_{ij}^t = \min\left\{-\max\left\{ss_{ij} - I_{ij}^t - O_{i(j,2)}^{t-1}, X_{ij}^{0zt} - I_{ij}^t - O_{i(j,2)}^{t-1}\right\}, I_{ij}^t + O_{i(j,2)}^{t-1} - cap_{ij}\right\}$$

$$I_{ij}^t = I_{ij}^{t-1} + S_{ij}^t - R_{ij}^t$$

$$I_{wj}^t = I_{wj}^{t-1} + R_{ij}^t + S_{wj}^t - S_{ij}^t$$

Next day, S_{ij}^t units of product j arrive at store i from the warehouse if the latter has an available inventory. If I_{wj}^t is not sufficient for $O_{i(j,1)}^t + O_{i(j,2)}^{t-1}$, the warehouse places an order of O_{wj}^t units in order to bring the inventory level up to $O_{i(j,1)}^t + O_{i(j,2)}^{t-1} + ss_{wj}$.

$$\text{If } O_{i(j,1)}^t + O_{i(j,2)}^{t-1} \leq I_{wj}^t, \text{ then } S_{ij}^t = O_{i(j,1)}^t + O_{i(j,2)}^{t-1}$$

$$\text{If } O_{i(j,1)}^t + O_{i(j,2)}^{t-1} > I_{wj}^t, \text{ then } S_{ij}^t = I_{wj}^t$$

$$O_{wj}^t = \max\left\{0, O_{i(j,1)}^t + O_{i(j,2)}^{t-1} - I_{wj}^t + ss_{wj}\right\}$$

Backlogging is permitted only for one day. The unsatisfied orders placed by store i for product j , are denoted by $O_{i(j,2)}^t$. The warehouse's orders are satisfied by the suppliers with a proportion denoted as rr_j . Shipment of product j from the supplier to the warehouse

is denoted by S_{wj}^t . If warehouse's inventory is sufficient enough for the shipments from the warehouse to stores, the warehouse ships S_{ij}^t units, otherwise $O_{i(j,2)}$ is cancelled. Backlogging is not permitted for the warehouse's order because suppliers do not trace previous unsatisfied orders.

$$\text{If } O_{i(j,1)}^t + O_{i(j,2)}^{t-1} \leq I_{wj}^t, \text{ then } O_{i(j,2)}^t = 0$$

$$\text{If } O_{i(j,1)}^t + O_{i(j,2)}^{t-1} > I_{wj}^t, \text{ then } O_{i(j,2)}^t = O_{i(j,1)}^t + O_{i(j,2)}^{t-1} - S_{ij}^t$$

$$S_{wj}^t = O_{wj}^t rr_j$$

All the cost components, i.e., cost of shipment, cost of returns, cost of lost sales are taken into account and calculated daily. Other costs are neglected. Rental cost of the AHL store is not fixed. According to the contract, rental cost is determined at the rate of 10 % of the sales volume. Other stores' rental costs are fixed. Total cost for store i on day t is shown below.

$$C_i^{0t} = \sum_{j \in J} (S_{ij}^t c_s + R_{ij}^t (c_s + c_l) + Y_{ij}^{0t} c_{pj} + I_{ij}^t c_h pr_j) + c_{ir}^t$$

$$c_{1r}^t = (\sum_{j \in J} D_{1j}^{0t}) sp_j^0 * 0.1$$

$$c_{2r}^t = 1500$$

$$c_{3r}^t = 750$$

Shipments from the suppliers to the warehouse include transportation and handling operations. The unit shipment cost is denoted by c_s and unit handling cost is denoted by c_l . Handling operation, which includes operations of carrying products into the warehouse and therein arranging them on the shelves, is performed by the third party logistics firm. According to the contract handling cost is charged due to incoming products to the warehouse. Hence c_l is added to the cost function. The cost of returns of stores and shipments from the suppliers to the warehouse, however, is higher compared to the cost of shipment to stores due to the terms of the agreement.

Payments are done after three months' period following the shipment of the relevant products. The information system tracks the products and notifies the administration of the dates of payment. Unit holding cost for any product is denoted by c_h . We use past data to find proportions of paid products among entire on-hand inventory and assume that these proportions are valid for our application period as it is difficult to know the proportion of the paid products holding costs at any time. Proportion of each product's inventory that is already paid is denoted by pr_j . It is used to find the inventory holding costs in the warehouse and stores.

$$C_w^{0t} = \sum_{j \in J} (S_{wj}^t (c_s + c_l) + I_{wj}^t c_h pr_j)$$

The net profit of the company is the measure of performance we focus on. The objective function of the model is $A = \sum_{t=1}^{360} P^{0t} / 360$. We investigate the performance of the model for different z values and discount rates.

$$P_{ij}^{0t} = (D_{ij}^{0t})(sp_j^0 - pp_j^0)$$

$$P_i^{0t} = \sum_{j \in J} P_{ij}^{0t}$$

$$P^{0t} = P_i^{0t} - C_i^{0t} - C_w^{0t}$$

We are interested in price determination resulting from the interaction of costs and demand. Our aim is to find the best pricing option among all present scenarios. We have experimental data of the demand for each product group during a period of no discounts and also during a period of a discount of 12%. It is assumed that demand function is linear. We also consider 9% discount and 6% discount options. Selling prices and the total profit of a store per day during a campaign period is defined below.

$$sp_j^{12} = 88\% sp_j^0$$

$$sp_j^9 = 91\% sp_j^0$$

$$sp_j^6 = 94\% sp_j^0$$

$$D_{ij}^{9t} = D_{ij}^{0t} + 9(D_{ij}^{12t} - D_{ij}^{0t})/12$$

$$D_{ij}^{6t} = D_{ij}^{0t} + 6(D_{ij}^{12t} - D_{ij}^{0t})/12$$

$$P_{ij}^{12t} = (D_{ij}^{12t})(sp_j^{12} - pp_j^{12})$$

$$P_{ij}^{9t} = (D_{ij}^{9t})(sp_j^9 - pp_j^9)$$

$$P_{ij}^{6t} = (D_{ij}^{6t})(sp_j^6 - pp_j^6)$$

During the campaign periods variable costs also change because the number of products transferred or shipped increases as the sales increase. We will investigate all variable costs in the next section. In the following figures, the area between the selling price, the purchasing price and the daily sales represents the daily profit of product j at store i .

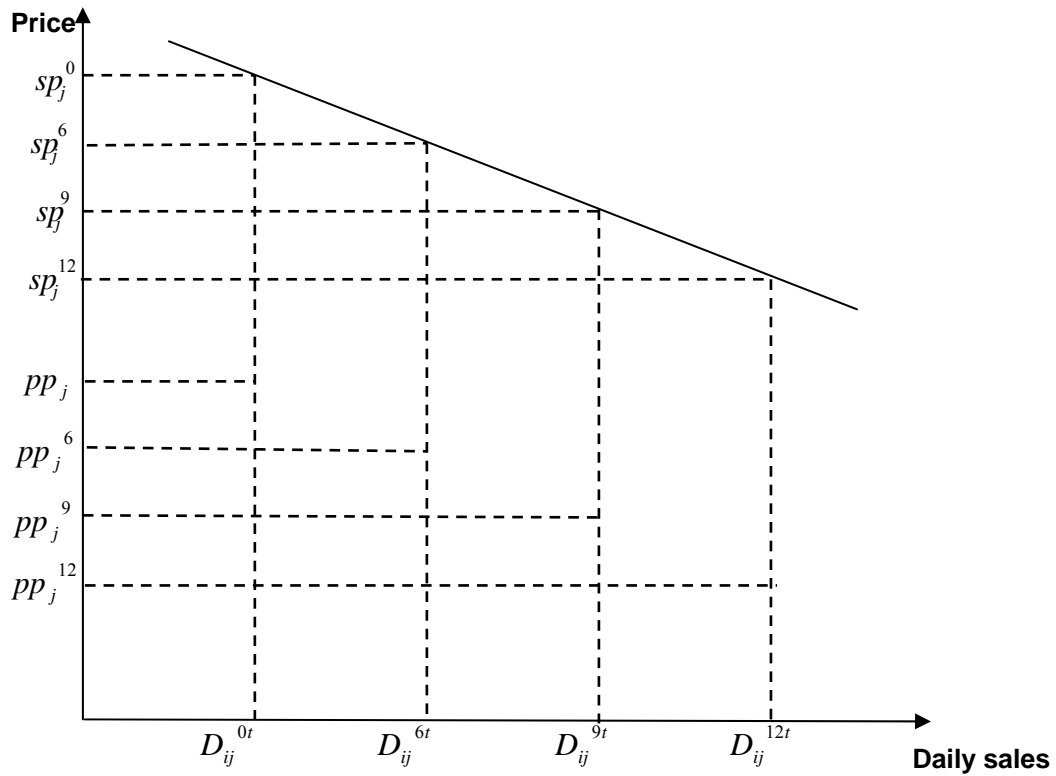


Figure 3.2. The relation of the selling price, purchasing price and the daily sales of literature, research, education book and Turkish pop music groups

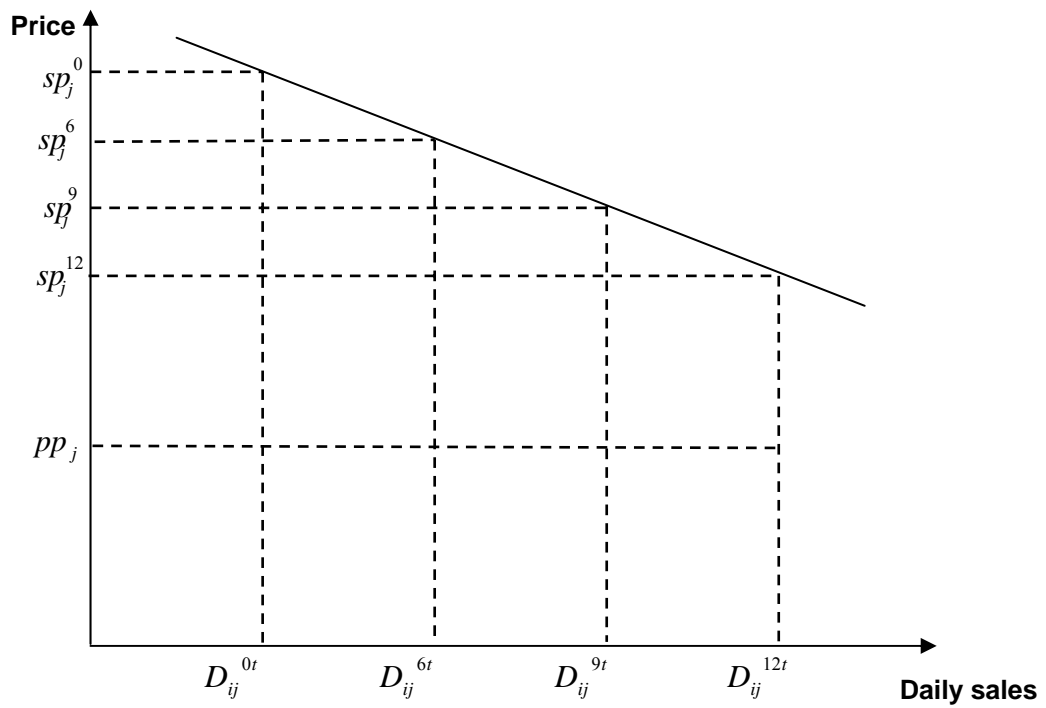


Figure 3.3. The relation of the selling price, purchasing price and the daily sales of pop / rock, other music and Turkish, foreign video groups

3.2.2. System with Two Stores

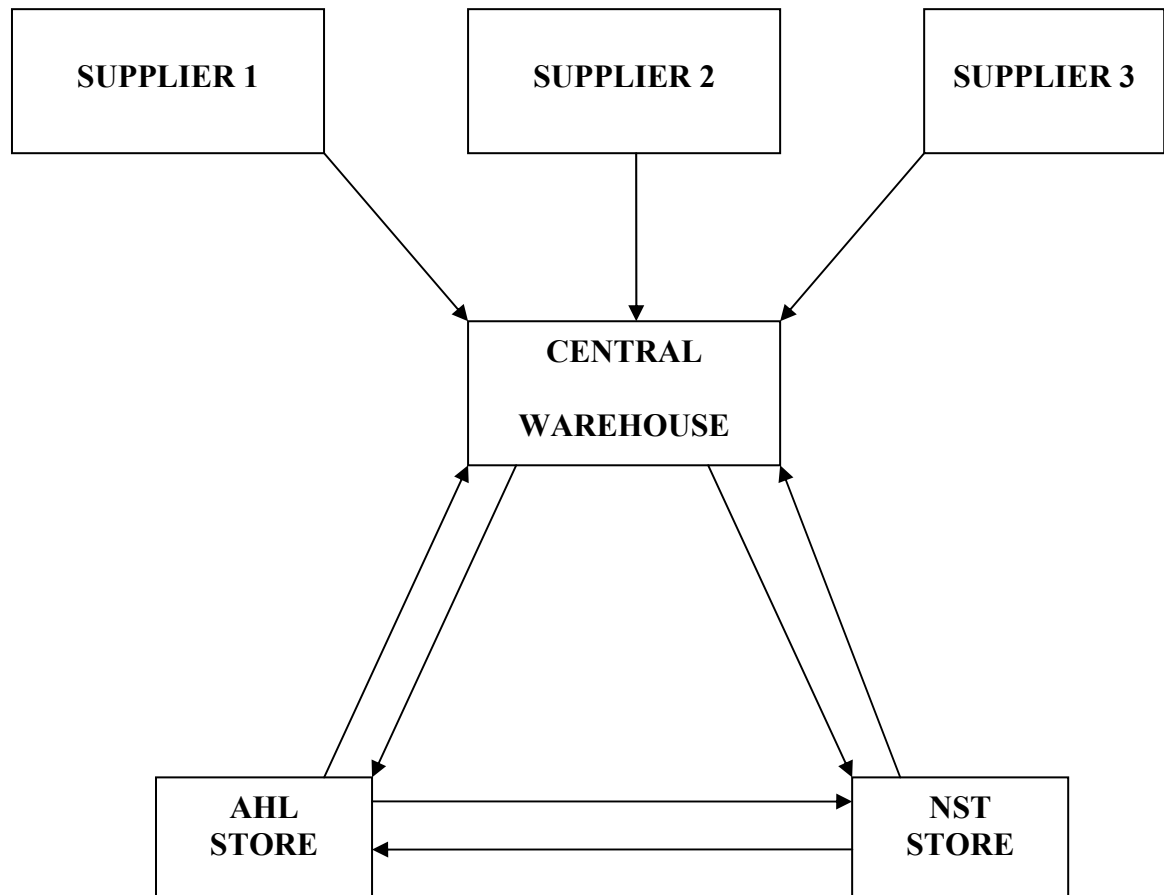


Figure 3.4. Structure of the distribution system with two stores

In this model, transfer option, which is denoted by T_{ikj}^t , is added to the model. A store can transfer its products to another one if it has excess inventory denoted by I_{ij}^{t+} . Also the receiving store should have shortage denoted by I_{ij}^{t-} . Transfers prior to shipments and returns are made by the company's own staff. Transfers have no lead time so they are added to the inventory of the receiving store instantaneously. A store cannot receive and send a transfer consisting the same group of products on day t . These assumptions can be explained by the following equations.

If, $I_{ij}^{t-} < 0$ then $T_{ikj}^t = 0$

If, $I_{ij}^{t+} > 0, I_{kj}^- < 0$

$$T_{ikj}^t = \max \left\{ 0, \min \left\{ I_{ij}^t + O_{i(j,2)}^{t-1} - X_{ij}^{0zt}, ss_{ij} - I_{ij}^t - O_{i(j,2)}^{t-1}, \right. \right. \\ \left. \left. cap_{kj} - I_{kj}^t - O_{k(j,2)}^{t-1}, \max \{ 0, ss_{kj} - I_{kj}^t - O_{k(j,2)}^{t-1}, -I_{kj}^{t-} \} \right\} \right\}$$

After calculation of transfer T_{ikj}^t , $O_{i(j,1)}^t$ order is determined by taking transfer quantities into account.

$$O_{i(j,1)}^t = \max \left\{ 0, \min \left\{ cap_{ij} - I_{ij}^t - O_{i(j,2)}^{t-1}, ss_{ij} - I_{ij}^t - O_{i(j,2)}^{t-1}, X_{ij}^{0zt} - I_{ij}^t - O_{i(j,2)}^{t-1} \right\} \right\} - T_{kij}^t$$

If a store transfers its excess inventory to another store or returns products to the warehouse, it cannot place an order to the warehouse for the same group of products. The opposite of this situation is invalid too. If a store receives a transfer or places an order of a certain group of products, it cannot return those items of the same group of product to the warehouse. These assumptions can be formulated by the following equations.

If $O_{i(j,1)}^t + T_{kij}^t > 0$ then $R_{ij}^t = 0$

If $O_{i(j,1)}^t = T_{kij}^t = 0$ then

$$R_{ij}^t = \max \left\{ 0, -\max \left\{ ss_{ij} - I_{ij}^t - O_{i(j,2)}^{t-1}, X_{ij}^{0zt} - I_{ij}^t - O_{i(j,2)}^{t-1} \right\}, I_{ij}^t + O_{i(j,2)}^{t-1} - cap_{ij} \right\} - T_{ikj}^t$$

$$I_{ij}^{+t} = T_{ikj}^t + R_{ij}^t$$

$$I_{ij}^{-t} = T_{kij}^t + O_{i(j,1)}^t$$

$$T_{ikj}^t T_{kij}^t = 0$$

$$I_{ij}^t = I_{ij}^{t-1} + S_{ij}^t - R_{ij}^t + T_{kij}^t - T_{ikj}^t$$

$$I_{wj}^t = I_{wj}^{t-1} + R_{ij}^t + R_{kj}^t + S_{wj}^t - S_{ij}^t - S_{kj}^t$$

If I_{wj}^t is sufficient S_{ij}^t is calculated as follows.

$$\text{If } O_{i(j,1)}^t + O_{k(j,1)}^t + O_{i(j,2)}^{t-1} + O_{k(j,2)}^{t-1} \leq I_{wj}^t, \text{ then } S_{ij}^t = O_{i(j,1)}^t + O_{i(j,2)}^{t-1}$$

If the warehouse's inventory is not sufficient enough to meet the order quantities, the warehouse ships its entire inventory to the stores in shares proportional to their order quantities and places orders at the quantity of O_{wj}^t to the suppliers.

$$\begin{aligned} &\text{If } O_{i(j,1)}^t + O_{k(j,1)}^t + O_{i(j,2)}^{t-1} + O_{k(j,2)}^{t-1} > I_{wj}^t, \text{ then } S_{ij}^t + S_{kj}^t = I_{wj}^t \\ S_{ij} &= \left[(O_{i(j,1)}^t + O_{i(j,2)}^{t-1}) * 0,5 * I_{wj}^t / \max\{1, (O_{i(j,1)}^t + O_{i(j,2)}^{t-1}) * 0,5 + (O_{k(j,1)}^t + O_{k(j,2)}^{t-1}) * 0,5\} \right] \\ S_{kj}^t &= I_{wj}^t - S_{ij}^t \\ O_{wj}^t &= \max\{0, O_{i(j,1)}^t + O_{i(j,2)}^{t-1} + O_{k(j,1)}^t + O_{k(j,2)}^{t-1} - I_{wj}^t + ss_{wj}\} \\ &\text{If } O_{i(j,1)}^t + O_{k(j,1)}^t + O_{i(j,2)}^{t-1} + O_{k(j,2)}^{t-1} \leq I_{wj}^t, \text{ then } O_{i(j,2)}^{t-1} = 0 \\ \text{If } O_{i(j,1)}^t + O_{k(j,1)}^t + O_{i(j,2)}^{t-1} + O_{k(j,2)}^{t-1} > I_{wj}^t, \text{ then } O_{i(j,2)}^t &= O_{i(j,1)}^t + O_{i(j,2)}^{t-1} - S_{ij}^t \\ S_{wj}^t &= O_{wj}^t rr_j \end{aligned}$$

Transfer cost, which is denoted by c_t is added to the total cost.

$$C_i^{0t} = \sum_{j \in J} (S_{ij}^t c_s + R_{ij}^t (c_s + c_l) + Y_{ij}^{0t} c_{pj} + I_{ij}^t c_h pr_j + T_{kij}^t c_t) + c_{ir}^t$$

$$C_w^{0t} = \sum_{j \in J} (S_{wj}^t (c_s + c_l) + I_{wj}^t c_h pr_j)$$

$$P_{ij}^{0t} = (D_{ij}^{0t})(sp_j^0 - pp_j^0)$$

$$P_i^{0t} = \sum_{j \in J} P_{ij}^{0t}$$

$$P^{0t} = \left(\sum_{i=1}^2 (P_i^{0t} - C_i^{0t}) \right) - C_w^{0t}$$

3.2.3. System with Three Stores

In this model all the stores share their available inventories in order to decrease transportation costs and those of the lost sales. This policy is called complete pooling (Tagaras and Cohen, 1992). First, orders and returns are calculated virtually for each store in order to define the excess and shortage in the inventory. Virtual $O_{i(j,1)}^t$ is denoted by $O_{i(j,1)}^{t*}$ and virtual R_{ij}^t is denoted by R_{ij}^{t*} . This step will help us to determine transfer quantities and then quantities of orders and returns will be calculated by taking these transfer quantities into account.

$$O_{i(j,1)}^{t*} = \max\left\{0, \min\left\{cap_{ij} - I_{ij}^t - O_{i(j,2)}^{t-1}, ss_{ij} - I_{ij}^t - O_{i(j,2)}^{t-1}, X_{ij}^{0zt} - I_{ij}^t - O_{i(j,2)}^{t-1}\right\}\right\}$$

$$\text{If } O_{i(j,1)}^{t*} > 0 \text{ then } R_{ij}^{t*} = 0$$

$$\text{If } O_{i(j,1)}^{t*} = 0 \text{ then}$$

$$R_{ij}^{t*} = \max\left\{0, -\max\left\{ss_{ij} - I_{ij}^t - O_{i(j,2)}^{t-1}, X_{ij}^{0zt} - I_{ij}^t - O_{i(j,2)}^{t-1}\right\}, I_{ij}^t + O_{i(j,2)}^{t-1} - cap_{ij}\right\}$$

Then transfers are calculated taking virtual orders and returns into account.

$$\text{If } R_{ij}^{t*} = 0, \text{ then } T_{ikj}^t = T_{imj}^t = 0$$

$$\text{If } R_{ij}^{t*} > 0, R_{mj}^{t*} = 0 \text{ and } R_{ij}^{t*} > O_{k(j,1)}^{t*}, \text{ then } T_{ikj}^t = O_{kj}^{t*}$$

$$\text{If } R_{ij}^{t*} > 0, R_{mj}^{t*} = 0 \text{ and } R_{ij}^{t*} \leq O_{k(j,1)}^{t*}, \text{ then } T_{ikj}^t = R_{ij}^{t*}$$

$$\text{If } R_{ij}^{t*} > 0, R_{mj}^{t*} > 0 \text{ and } R_{ij}^{t*} + R_{mj}^{t*} > O_{k(j,1)}^{t*}, \text{ then}$$

$$T_{ikj}^t = \left\lfloor O_{kj}^{t*} R_{ij}^{t*} / \max\{1, R_{ij}^{t*} + R_{mj}^{t*}\} \right\rfloor \text{ and } T_{mkj}^t = O_{k(j,1)}^{t*} - T_{ikj}^t$$

$$\text{If } R_{ij}^{t*} > 0, R_{mj}^{t*} > 0 \text{ and } R_{ij}^{t*} + R_{mj}^{t*} \leq O_{k(j,1)}^{t*}, \text{ then } T_{ikj}^t = R_{ij}^{t*}$$

$$\text{If } R_{ij}^{t*} > T_{ikj}^t, O_{m(j,1)}^{t*} > 0 \text{ then } T_{imj}^t \leq R_{ij}^{t*} - T_{ikj}^t$$

$$\text{If } R_{ij}^{t*} \leq T_{ikj}^t, O_{m(j,1)}^{t*} > 0 \text{ then } T_{imj}^t = 0$$

$$\text{If } T_{kij}^t = O_{i(j,1)}^{t*}, \text{ then } T_{mij}^t = 0$$

$$\begin{aligned} \text{If } T_{kij}^t < O_{i(j,1)}^{t*}, \text{ then } T_{mij}^t &\leq O_{i(j,1)}^{t*} - T_{kij}^t \\ i, k, m &= 1, 2, 3 \\ i &\neq k \neq m \end{aligned}$$

Transfers between three stores are done according to the following heuristics.

- If two stores have excess inventories then the transfers are shipped to the third store from these proportionately to their I_{ij}^{+t} units,
- If two stores have I_{ij}^{-t} units shortage inventory, then the priority order is considered. The priority order of the stores is; ERENKOY, NST, and AHL. If available inventory still remains in the source store; $I_{ij}^{+t} - I_{kj}^{-t}$ units is transferred to the second store. Considering the priority of the stores, we arrange transfers in the following order.
 - Transfer from AHL to ERENKOY
 - Transfer from AHL to NST
 - Transfer from ERENKOY to NST
 - Transfer from ERENKOY to AHL
 - Transfer from NST to ERENKOY
 - Transfer from NST to AHL

Transfers are made according to that order. Then $O_{i(j,1)}^t$ and R_{ij}^t are calculated considering O_{ij}^{t*}, R_{ij}^{t*} .

$$\begin{aligned} O_{i(j,1)}^t &= O_{i(j,1)}^{t*} - T_{kij}^t - T_{mij}^t \\ R_{ij}^t &= R_{ij}^{t*} - T_{ikj}^t - T_{imj}^t \end{aligned}$$

$$I_{ij}^t = I_{ij}^{t-1} + S_{ij}^t - R_{ij}^t + T_{kij}^t + T_{mij}^t - T_{ikj}^t - T_{imj}^t$$

$$I_{wj}^t = I_{wj}^{t-1} + S_{wj}^t - S_{ij}^t - S_{kj}^t - S_{mj}^t + R_{ij}^t + R_{kj}^t + R_{mj}^t$$

If $O_{i(j,1)}^t + O_{k(j,1)}^t + O_{m(j,1)}^t + O_{i(j,2)}^{t-1} + O_{k(j,2)}^{t-1} + O_{m(j,2)}^{t-1} \leq I_{wj}^t$, then

$$S_{ij}^t = O_{i(j,1)}^t + O_{i(j,2)}^{t-1}$$

If $O_{i(j,1)}^t + O_{k(j,1)}^t + O_{m(j,1)}^t + O_{i(j,2)}^{t-1} + O_{k(j,2)}^{t-1} + O_{m(j,2)}^{t-1} > I_{wj}^t$, then

$$S_{ij}^t = \left[(O_{i(j,1)}^t + O_{i(j,2)}^{t-1}) * 1/3 * I_{wj}^t / \max \left\{ (O_{i(j,1)}^t + O_{i(j,2)}^{t-1}) * 1/3 + (O_{k(j,1)}^t + O_{k(j,2)}^{t-1}) * 1/3 + (O_{m(j,1)}^t + O_{m(j,2)}^{t-1}) * 1/3 \right\} \right]$$

$$S_{ij}^t + S_{kj}^t + S_{mj}^t = I_{wj}^t$$

$$O_{wj}^t = \max \left\{ 0, O_{i(j,1)}^t + O_{k(j,1)}^t + O_{m(j,1)}^t + O_{i(j,2)}^{t-1} + O_{k(j,2)}^{t-1} + O_{m(j,2)}^{t-1} - I_{wj}^t + ss_{wj} \right\}$$

If $O_{i(j,1)}^t + O_{k(j,1)}^t + O_{m(j,1)}^t + O_{i(j,2)}^{t-1} + O_{k(j,2)}^{t-1} + O_{m(j,2)}^{t-1} \leq I_{wj}^t$, then $O_{i(j,2)}^t = 0$

If $O_{i(j,1)}^t + O_{k(j,1)}^t + O_{m(j,1)}^t + O_{i(j,2)}^{t-1} + O_{k(j,2)}^{t-1} + O_{m(j,2)}^{t-1} > I_{wj}^t$, then

$$O_{i(j,2)}^t = O_{i(j,1)}^t + O_{i(j,2)}^{t-1} - S_{ij}^t$$

$$S_{wj}^t = O_{wj}^t rr_j$$

$$C_i^{0t} = \sum_{j \in J} (S_{ij}^t c_s + R_{ij}^t (c_s + c_l) + Y_{ij}^{0t} c_{pj} + I_{ij}^t c_h pr_j + T_{kij}^t c_t + T_{mij}^t c_t) + c_{ir}^t$$

$$C_w^{0t} = \sum_{j \in J} (S_{wj}^t (c_s + c_l) + I_{wj}^t c_h pr_j)$$

$$P_{ij}^{0t} = (D_{ij}^{0t})(sp_j^0 - pp_j^0)$$

$$P_i^{0t} = \sum_{j \in J} P_{ij}^{0t}$$

$$P^{0t} = \left(\sum_{i=1}^3 (P_i^{0t} - C_i^{0t}) \right) - C_w^{0t}$$

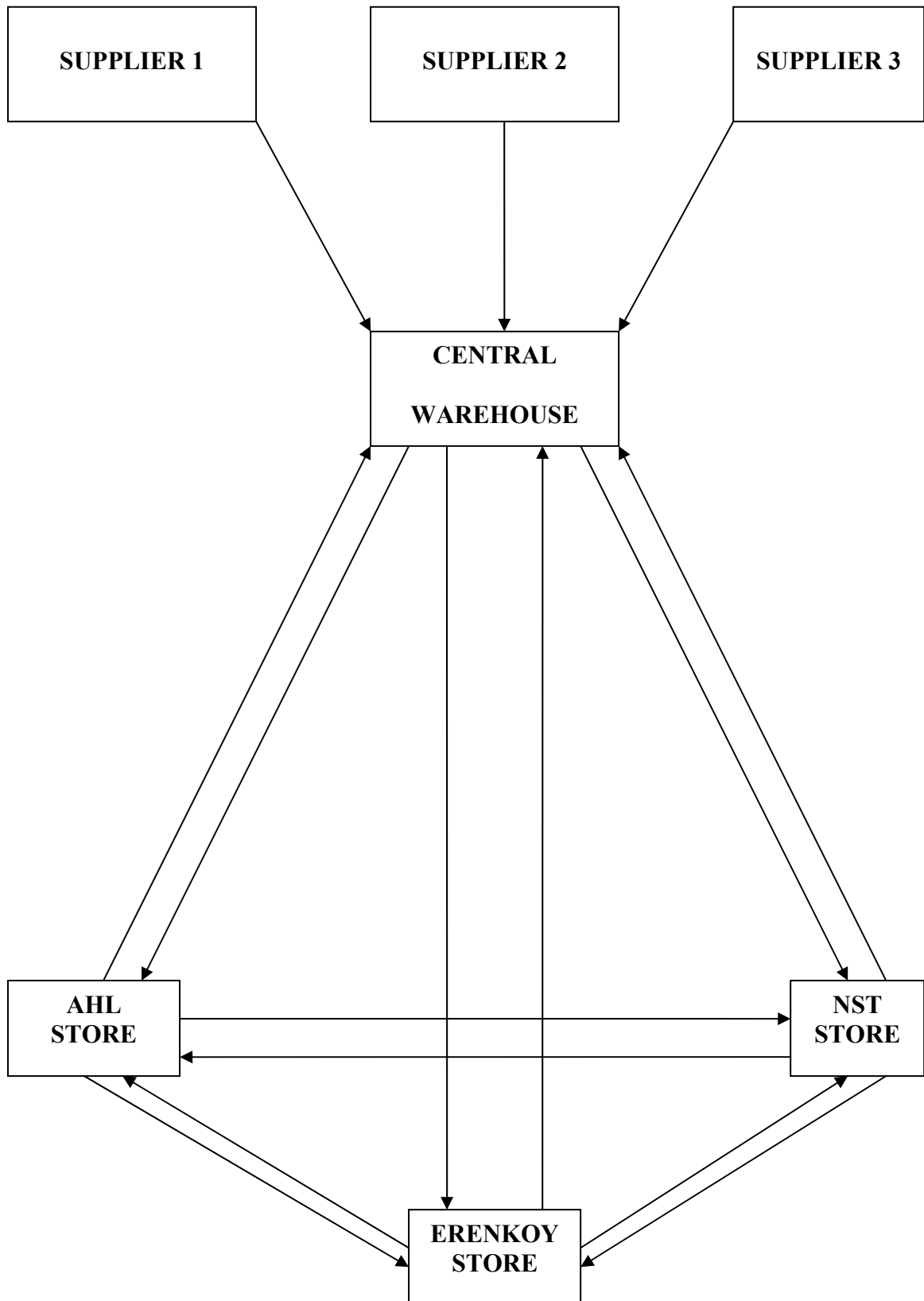


Figure 3.5. Structure of the distribution system with three stores

4. EXPERIMENTAL STUDY

4.1. Sales Data Fitting

The distribution of the sales will be determined according to the past two years' sales data for each group. We wish to test, whether there is a significant difference between the mean sales of the days. Performing t-test for each pair would increase the error. Thus, comparing two treatment means using the t-test would not be appropriate. The appropriate method of testing the equality of several means is by analysis of variance. We have seven treatments we want to compare. Only the day effect will be investigated. For hypothesis testing, the model errors are assumed to be normally and independently distributed random variables with mean zero and variance σ^2 . The variance σ^2 is assumed to be constant for all levels of the factor. The observations are mutually independent. Notations in the tests are given below.

y_{ij}	Observation of quantity of daily sales
\overline{y}_i	Average of the observations of quantity of daily sales under i th treatment
$y_{..}$	Grand total of all the observations of quantity of daily sales under the i th treatment
$\overline{y}_{..}$	Grand average of all the observations of quantity of daily sales
μ_i	Mean of the i th factor level
ε_{ij}	Random error component that incorporates all other sources of variability in the experiment including measurement

N Total number of observations of quantity of daily sales

$$y_{ij} = \mu_i + \varepsilon_{ij} \begin{cases} i = 1, 2, \dots, a \\ j = 1, 2, \dots, n \end{cases}$$

a Levels of week days

$$y_{i.} = \sum_{j=1}^n y_{ij}$$

$$\bar{y}_{i.} = y_{i.} / n \quad i = 1, 2, \dots, a$$

$$y_{..} = \sum_{i=1}^a \sum_{j=1}^n y_{ij}$$

$$\bar{y}_{..} = y_{..} / N$$

$$N = an$$

$$H_0 : \mu_1 = \mu_2 = \mu_3 = \mu_4 = \mu_5 = \mu_6 = \mu_7$$

$$H_1 : \mu_i \neq \mu_j \text{ for at least one pair } (i, j)$$

$$SS_T = \sum_{i=1}^a \sum_{j=1}^n (y_{ij} - \bar{y}_{..})^2$$

$$SS_T = SS_{Treatments} + SS_E$$

$$MS_{Treatments} = SS_{Treatments} / (a - 1)$$

$$MS_E = SS_E / (N - a)$$

$$F_0 = MS_{Treatments} / MS_E$$

We should reject H_0 if $F_0 > F_{\alpha, a-1, N-a}$ and conclude that there are differences in the treatment means.

n_i = Observations to be taken under treatment i

$$N = \sum_{i=1}^a n_i$$

$$SS_T = \sum_{i=1}^a \sum_{j=1}^{n_i} y_{ij}^2 - y_{..}^2 / N$$

$$SS_{Treatments} = \sum_{i=1}^a y_{i.}^2 / n_i - y_{..}^2 / N$$

Our design is unbalanced. The tables of F test of no discount and campaign periods are given in Appendix A. The results of F test show that all treatment means differ, excepting foreign video in AHL store's no discount period and pop/rock music and Turkish video in AHL store's campaign period.

H_0 hypothesis is rejected, so there are differences between the treatment means. Multiple comparison methods will be implemented for grouping treatment means. F test from the analysis of variance does not consider pair-wise comparisons. We used Tukey's test for grouping days.

4.1.1. Tukey's Test

Tukey's method uses the distribution of the studentized range statistic.

$$q = (\overline{y_{\max}} - \overline{y_{\min}}) / \sqrt{MS_E / n}$$

$\overline{y_{\max}}$ Largest sample means

$\overline{y_{\min}}$ Smallest sample means

α Upper percentage points of q

f Number of degrees of freedom of MS_E

$$T_\alpha = \frac{q_\alpha(a, f)}{\sqrt{2}} \sqrt{MS_E (1/n_i + 1/n_j)}$$

$$\overline{y_i} - \overline{y_j} - \frac{q_\alpha(a, f)}{\sqrt{2}} \sqrt{MS_E (1/n_i + 1/n_j)} \leq \mu_i - \mu_j \leq \overline{y_i} - \overline{y_j} + \frac{q_\alpha(a, f)}{\sqrt{2}} \sqrt{MS_E (1/n_i + 1/n_j)} \quad \text{for } i \neq j$$

If $|\overline{y_i} - \overline{y_j}| > T_\alpha$ the corresponding pair of means are significantly different.

The tables of Tukey's test of no discount and campaign periods are given in Appendix A. The results of Tukey's test are shown below.

No discount period								Campaign period							
GROUP								GROUP							
Research Book	y_4	y_2	y_3	y_6	y_5	y_1	y_7	Research Book	y_3	y_6	y_4	y_5	y_2	y_1	y_7
	14.45	15.57	15.73	16.30	16.83	17.43	23.27		16.14	16.19	17.38	17.90	18.35	19.95	26.86
Education Book	y_2	y_3	y_1	y_4	y_5	y_6	y_7	Education Book	y_5	y_3	y_1	y_6	y_2	y_4	y_7
	15.35	16.30	16.46	16.97	17.03	17.59	22.00		16.00	16.29	16.33	16.38	16.70	18.05	21.52
Literature Book	y_2	y_4	y_3	y_5	y_6	y_1	y_7	Literature Book	y_2	y_3	y_4	y_5	y_6	y_1	y_7
	50.62	52.08	53.35	54.13	55.89	58.65	74.77		59.05	59.10	60.05	65.90	67.62	71.38	95.19
Pop / Rock Music	y_2	y_3	y_4	y_5	y_6	y_1	y_7	Turkish Pop Music	y_2	y_3	y_4	y_5	y_1	y_6	y_7
	5.88	6.17	6.52	6.73	6.79	7.13	8.97		56.80	57.19	59.33	60.57	65.05	66.90	90.81
Turkish Pop Music	y_2	y_4	y_3	y_5	y_6	y_1	y_7	Other Music	y_2	y_3	y_4	y_6	y_5	y_1	y_7
	46.88	51.18	51.20	53.01	55.72	59.97	81.30		22.25	23.90	24.86	25.10	25.57	27.33	36.90
Other Music	y_2	y_6	y_3	y_4	y_5	y_1	y_7	Foreign Video	y_2	y_3	y_4	y_5	y_6	y_1	y_7
	18.96	21.02	21.12	21.26	21.32	23.78	33.63		2.25	2.71	3.24	3.29	3.29	4.48	6.00
Turkish Video	y_3	y_5	y_4	y_2	y_6	y_1	y_7								
	4.45	5.22	5.89	6.00	6.20	6.48	9.67								

Figure 4.1. Tukey's test results of AHL store

	No discount period							Campaign period							
GROUP								GROUP							
Research Book	y_1	y_2	y_3	y_4	y_5	y_7	y_6	Research Book	y_1	y_3	y_4	y_2	y_5	y_7	y_6
	15.81	16.70	16.96	17.38	22.00	37.66	40.88		16.77	16.85	19.26	19.58	22.67	39.23	40.31
Education Book	y_2	y_4	y_3	y_1	y_5	y_7	y_6	Education Book	y_3	y_1	y_2	y_4	y_5	y_7	y_6
	31.44	32.43	32.59	32.77	39.68	68.76	71.05		31.00	31.46	31.88	33.37	39.96	67.42	69.50
Literature Book	y_1	y_4	y_3	y_2	y_5	y_7	y_6	Literature Book	y_3	y_1	y_4	y_2	y_5	y_7	y_6
	89.82	90.14	91.04	91.60	114.32	188.40	208.64		99.26	104.81	105.96	109.19	138.22	214.38	231.27
Pop / Rock Music	y_1	y_2	y_3	y_4	y_5	y_7	y_6	Pop / Rock Music	y_1	y_3	y_2	y_4	y_5	y_7	y_6
	24.87	24.89	26.05	26.86	34.81	56.05	67.79		21.35	22.52	24.23	24.59	32.74	52.15	56.62
Turkish Pop Music	y_2	y_3	y_1	y_4	y_5	y_7	y_6	Turkish Pop Music	y_3	y_2	y_1	y_4	y_5	y_7	y_6
	96.12	99.96	100.93	103.95	124.45	188.31	224.12		124.52	131.77	133.62	144.00	154.26	238.00	271.85
Other Music	y_2	y_4	y_1	y_3	y_5	y_7	y_6	Other Music	y_3	y_1	y_2	y_4	y_5	y_7	y_6
	19.89	20.06	20.37	20.50	26.30	37.81	43.46		19.52	20.58	22.00	23.52	27.67	37.62	41.08
Turkish Video	y_3	y_1	y_2	y_4	y_5	y_7	y_6	Turkish Video	y_3	y_5	y_4	y_2	y_1	y_6	y_7
	7.61	7.90	8.67	9.31	10.38	15.77	16.70		10.89	12.37	12.44	12.88	13.85	20.23	20.65
Foreign Video	y_4	y_1	y_3	y_2	y_5	y_7	y_6	Foreign Video	y_3	y_4	y_1	y_2	y_5	y_7	y_6
	78.32	80.20	81.56	84.37	105.55	175.75	203.61		90.19	94.30	99.04	106.58	122.07	205.96	233.92

Figure 4.2. Tukey's test results of ERENKOY store

No discount period		Campaign period	
GROUP		GROUP	
Research Book	y_7 13.31 y_1 16.12 y_4 16.80 y_3 16.85 y_2 17.43 y_5 18.87 y_6 26.22	Research Book	y_7 12.00 y_1 13.54 y_2 16.65 y_3 17.85 y_4 18.59 y_5 19.78 y_6 25.69
Education Book	y_7 19.13 y_1 30.54 y_4 31.26 y_3 32.10 y_5 32.33 y_2 32.38 y_6 40.30	Education Book	y_7 21.88 y_1 27.00 y_4 32.04 y_3 32.74 y_2 32.96 y_5 33.63 y_6 41.42
Literature Book	y_7 52.59 y_3 83.56 y_1 85.73 y_2 86.28 y_4 86.51 y_5 97.73 y_6 122.70	Literature Book	y_7 60.62 y_1 94.31 y_2 98.77 y_3 102.22 y_4 107.67 y_5 113.44 y_6 132.46
Pop / Rock Music	y_7 10.85 y_2 15.66 y_4 16.10 y_1 16.15 y_3 16.21 y_5 18.05 y_6 27.89	Pop / Rock Music	y_7 8.65 y_2 13.15 y_4 14.19 y_1 15.12 y_3 16.81 y_5 16.81 y_6 22.38
Turkish Pop Music	y_7 29.10 y_2 50.44 y_3 53.18 y_1 54.52 y_4 55.52 y_5 62.30 y_6 73.12	Turkish Pop Music	y_7 36.35 y_2 66.62 y_1 71.19 y_3 75.00 y_4 77.33 y_5 80.04 y_6 93.46
Other Music	y_7 6.22 y_2 9.87 y_1 9.91 y_3 10.60 y_4 10.73 y_5 12.49 y_6 13.75	Other Music	y_7 5.77 y_1 9.58 y_2 9.77 y_4 11.26 y_3 12.70 y_6 13.08 y_5 13.70
Turkish Video	y_3 4.55 y_7 4.84 y_2 5.06 y_4 5.28 y_1 5.96 y_5 6.49 y_6 8.10	Turkish Video	y_7 5.31 y_2 6.77 y_4 7.22 y_3 7.70 y_5 8.52 y_1 8.58 y_6 11.65
Foreign Video	y_4 62.45 y_7 64.31 y_3 64.40 y_1 64.74 y_2 66.55 y_5 79.11 y_6 117.13	Foreign Video	y_3 61.70 y_2 61.85 y_1 63.15 y_7 65.19 y_4 67.19 y_5 76.33 y_6 110.81

Figure 4.3. Tukey's test results of NST store

These graphs indicate that the treatment means form groups, although, some groups in pop/rock, Turkish pop music and Turkish video categories are not completely distinct. We will use Fisher's Least Significant Difference (LSD) Method to ensure these groups.

4.1.2. Fisher Least Significant Difference (LSD) Method

$$t_0 = \frac{\bar{y}_i - \bar{y}_j}{\sqrt{MS_E \left(\frac{1}{n_i} + \frac{1}{n_j} \right)}}$$

$$LSD = t_{\alpha/2, N-a} \sqrt{\frac{2MS_E}{n}}$$

If $|\bar{y}_i - \bar{y}_j| > LSD$; μ_i and μ_j differs

LSD method tables are given in Appendix A. The results are given below. Weekdays are grouped using the statistical tests for each group and store. After the data files have been arranged, we use the input analyzer. The best applicable probability distribution functions are fitted to the past sales data. The results are presented in the form of p -values; the p -value is the largest value of the type-I error probability that allows the distribution to fit the data. In general, the higher the p -value, the better the fit. The threshold value of p is 0.05 and we reject the null hypothesis under threshold value. The summary of all distributions in no discount and 12 % discount period fitted to data file are shown below.

No discount period								Campaign period							
GROUP	y_2	y_3	y_4	y_5	y_6	y_1	y_7	GROUP	y_5	y_3	y_6	y_1	y_2	y_4	y_7
Pop / Rock Music	5.88	6.17	6.52	6.73	6.79	7.13	8.97	Education Book	16.00	16.29	16.33	16.38	16.70	18.05	21.52
Turkish Pop Music	46.88	51.18	51.20	53.01	55.72	59.97	81.30	Foreign Video	2.25	2.71	3.24	3.29	3.29	4.48	6.00
Turkish Video	4.45	5.22	5.89	6.00	6.20	6.48	9.67								

Figure 4.4. LSD test results of AHL store

No discount period								Campaign period							
GROUP	y_2	y_3	y_1	y_4	y_5	y_7	y_6	GROUP	y_3	y_1	y_4	y_2	y_5	y_7	y_6
Turkish Pop Music	96.12	99.96	100.93	103.95	124.45	188.31	224.12	Literature Book	99.26	104.81	105.96	109.19	138.22	214.38	231.27
								Pop / Rock Music	21.35	22.52	24.23	24.59	32.74	52.15	56.62
								Turkish Video	10.89	12.37	12.44	12.88	13.85	20.23	20.65

Figure 4.5. LSD test results of ERENKOY store

No discount period								Campaign period							
GROUP	—	—	—	—	—	—	—	GROUP	—	—	—	—	—	—	—
Research Book	y ₇	y ₁	y ₄	y ₃	y ₂	y ₅	y ₆	Research Book	y ₇	y ₁	y ₂	y ₃	y ₄	y ₅	y ₆
	13.31	16.12	16.80	16.85	17.43	18.87	26.22		12.00	13.54	16.65	17.85	18.59	19.78	25.69
	—————								—————		—————				
Turkish Pop Music	y ₇	y ₂	y ₃	y ₁	y ₄	y ₅	y ₆	Literature Book	y ₇	y ₁	y ₂	y ₃	y ₄	y ₅	y ₆
	29.10	50.44	53.18	54.52	55.52	62.30	73.12		60.62	94.31	98.77	102.22	107.67	113.44	132.46
	—————				—————				—————		—————				
Other Music	y ₇	y ₂	y ₁	y ₃	y ₄	y ₅	y ₆	Education Book	y ₇	y ₁	y ₄	y ₃	y ₂	y ₅	y ₆
	6.22	9.87	9.91	10.60	10.73	12.49	13.75		21.88	27.00	32.04	32.74	32.96	33.63	41.42
	—————				—————				—————		—————				
Turkish Video	y ₃	y ₇	y ₂	y ₄	y ₁	y ₅	y ₆	Pop / Rock Music	y ₇	y ₂	y ₄	y ₁	y ₃	y ₅	y ₆
	4.55	4.84	5.06	5.28	5.96	6.49	8.10		8.65	13.15	14.19	15.12	16.81	16.81	22.38
	—————		—————			—————			—————		—————				
	—————								—————		—————				
								Other Music	y ₇	y ₁	y ₂	y ₄	y ₃	y ₅	y ₆
									5.77	9.58	9.77	11.26	12.70	13.08	13.70
									—————		—————				
								Turkish Video	y ₇	y ₂	y ₄	y ₃	y ₅	y ₁	y ₆
									5.31	6.77	7.22	7.70	8.52	8.58	11.65
									—————		—————				

Figure 4.6. LSD test results of NST store

Table 4.3. Summary of ERENKOY store's sales distributions in no discount period

GROUP	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Research Book	10.5 + WEIB(32.5, 2.11)	0.5 + ERLA(4.05, 4)	0.5 + ERLA(4.05, 4)	0.5 + ERLA(4.05, 4)	0.5 + ERLA(4.05, 4)	2.5 + ERLA(6.5, 3)	10.5 + WEIB(32.5, 2.11)
Literature Book	NORM(69.9, 16.6)	8.5 + GAMM(5.74, 4.15)	8.5 + GAMM(5.74, 4.15)	8.5 + GAMM(5.74, 4.15)	8.5 + GAMM(5.74, 4.15)	16.5 + WEIB(25.9, 1.62)	NORM(69.9, 16.6)
Education Book	TRIA(68, 145, 352)	32 + GAMM(27.6, 2.13)	32 + GAMM(27.6, 2.13)	32 + GAMM(27.6, 2.13)	32 + GAMM(27.6, 2.13)	52 + ERLA(31.2, 2)	109 + WEIB(110, 1.77)
Turkish Pop Music	60 + 510 * BETA(1.51, 4.51)	21 + ERLA(39.6, 2)	21 + ERLA(39.6, 2)	21 + ERLA(39.6, 2)	21 + ERLA(39.6, 2)	40 + WEIB(89.3, 1.21)	83 + ERLA(70.6, 2)
Pop / Rock Music	29.5 + WEIB(29.7, 1.67)	4.5 + GAMM(6.38, 3.32)	4.5 + GAMM(6.38, 3.32)	4.5 + GAMM(6.38, 3.32)	4.5 + GAMM(6.38, 3.32)	15.5 + WEIB(21.6, 1.63)	26 + 122 * BETA(2.77, 5.31)
Other Music	11.5 + GAMM(12.3, 2.14)	0.5 + ERLA(4.93, 4)	0.5 + ERLA(4.93, 4)	0.5 + ERLA(4.93, 4)	0.5 + ERLA(4.93, 4)	5.5 + WEIB(23.3, 1.65)	12 + GAMM(14.6, 2.15)
Turkish Video	1.5 + GAMM(6.16, 2.39)	-0.5 + GAMM(5.33, 1.74)	-0.5 + GAMM(5.33, 1.74)	-0.5 + GAMM(5.33, 1.74)	-0.5 + GAMM(5.33, 1.74)	-0.5 + GAMM(5.33, 1.74)	1.5 + GAMM(6.16, 2.39)
Foreign Video	73 + 277 * BETA(1.61, 2.73)	16 + ERLA(21.7, 3)	16 + ERLA(21.7, 3)	16 + ERLA(21.7, 3)	16 + ERLA(21.7, 3)	40 + WEIB(72, 1.58)	97 + 264 * BETA(1.53, 2.26)

Table 4.4. Summary of ERENKOY store's sales distributions in campaign period

GROUP	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Research Book	20.5 + WEIB(21.5, 1.79)	3.5 + WEIB(17.5, 1.99)	3.5 + WEIB(17.5, 1.99)	3.5 + WEIB(17.5, 1.99)	3.5 + WEIB(17.5, 1.99)	3.5 + WEIB(17.5, 1.99)	20.5 + WEIB(21.5, 1.79)
Literature Book	TRIA(125, 204, 346)	NORM(105, 28)	NORM(105, 28)	NORM(105, 28)	NORM(105, 28)	NORM(138, 41)	TRIA(125, 204, 346)
Education Book	NORM(68.5, 20.3)	NORM(33.6, 12)	NORM(33.6, 12)	NORM(33.6, 12)	NORM(33.6, 12)	NORM(33.6, 12)	NORM(68.5, 20.3)
Turkish Pop Music	NORM(255, 105)	TRIA(31, 84.1, 298)	TRIA(31, 84.1, 298)	TRIA(31, 84.1, 298)	TRIA(31, 84.1, 298)	TRIA(31, 84.1, 298)	NORM(255, 105)
Pop / Rock Music	TRIA(27.5, 46, 93.5)	NORM(23.2, 8.22)	NORM(23.2, 8.22)	NORM(23.2, 8.22)	NORM(23.2, 8.22)	POIS(32.7)	TRIA(27.5, 46, 93.5)
Other Music	19.5 + GAMM(9.65, 2.06)	6.5 + WEIB(18.2, 1.86)	6.5 + WEIB(18.2, 1.86)	6.5 + WEIB(18.2, 1.86)	6.5 + WEIB(18.2, 1.86)	6.5 + WEIB(18.2, 1.86)	19.5 + GAMM(9.65, 2.06)
Turkish Video	5.5 + WEIB(16.6, 1.59)	1.5 + WEIB(12.3, 1.63)	1.5 + WEIB(12.3, 1.63)	1.5 + WEIB(12.3, 1.63)	1.5 + WEIB(12.3, 1.63)	1.5 + WEIB(12.3, 1.63)	5.5 + WEIB(16.6, 1.59)
Foreign Video	TRIA(119, 171, 364)	38 + ERLA(21.5, 3)	38 + ERLA(21.5, 3)	38 + ERLA(21.5, 3)	38 + ERLA(21.5, 3)	38 + ERLA(21.5, 3)	TRIA(119, 171, 364)

Table 4.5. Summary of NST store's sales distributions in no discount period

GROUP	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Research Book	1.5 + ERLA(3.94, 3)	1.5 + GAMM(4.97, 3.16)	1.5 + GAMM(4.97, 3.16)	1.5 + GAMM(4.97, 3.16)	1.5 + GAMM(4.97, 3.16)	1.5 + GAMM(4.97, 3.16)	8.5 + WEIB(19.9, 1.78)
Literature Book	21 + 105 * BETA(1.47, 3.42)	21 + 168 * BETA(2.95, 4.73)	21 + 168 * BETA(2.95, 4.73)	21 + 168 * BETA(2.95, 4.73)	21 + 168 * BETA(2.95, 4.73)	NORM(97.7, 24.7)	NORM(123, 34.1)
Education Book	3.5 + WEIB(17.6, 1.9)	5.5 + 65 * BETA(4.75, 6.95)	5.5 + 65 * BETA(4.75, 6.95)	5.5 + 65 * BETA(4.75, 6.95)	5.5 + 65 * BETA(4.75, 6.95)	5.5 + 65 * BETA(4.75, 6.95)	TRIA(10.5, 38, 71.5)
Turkish Pop Music	4.5 + WEIB(27.5, 1.67)	5 + ERLA(16.7, 3)	5 + ERLA(16.7, 3)	5 + ERLA(16.7, 3)	5 + ERLA(16.7, 3)	5 + ERLA(16.7, 3)	26 + WEIB(50.8, 1.35)
Pop / Rock Music	0.5 + ERLA(2.59, 4)	1.5 + 69 * BETA(4.71, 17.2)	1.5 + 69 * BETA(4.71, 17.2)	1.5 + 69 * BETA(4.71, 17.2)	1.5 + 69 * BETA(4.71, 17.2)	1.5 + 69 * BETA(4.71, 17.2)	7.5 + WEIB(22.9, 2.28)
Other Music	-1.5 + LOGN(7.83, 5.35)	-0.5 + ERLA(3.74, 3)	-0.5 + ERLA(3.74, 3)	-0.5 + ERLA(3.74, 3)	-0.5 + ERLA(3.74, 3)	-0.5 + ERLA(3.74, 3)	0.5 + GAMM(5.69, 2.33)
Turkish Video	-1.5 + LOGN(6.93, 5.55)	-1.5 + LOGN(6.93, 5.55)	-1.5 + LOGN(6.93, 5.55)	-1.5 + LOGN(6.93, 5.55)	-1.5 + LOGN(6.93, 5.55)	-1.5 + LOGN(6.93, 5.55)	-0.5 + GAMM(4.64, 1.85)
Foreign Video	18 + WEIB(51.9, 1.88)	18 + WEIB(51.9, 1.88)	18 + WEIB(51.9, 1.88)	18 + WEIB(51.9, 1.88)	18 + WEIB(51.9, 1.88)	22 + WEIB(63.4, 1.83)	NORM(117, 36.1)

Table 4.6. Summary of NST store's sales distributions in campaign period

GROUP	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Research Book	4.5 + 21 * BETA(1.08, 1.94)	1.5 + WEIB(17.8, 2.36)	1.5 + WEIB(17.8, 2.36)	1.5 + WEIB(17.8, 2.36)	1.5 + WEIB(17.8, 2.36)	1.5 + WEIB(17.8, 2.36)	9.5 + WEIB(17.9, 1.53)
Literature Book	28.5 + 98 * BETA(0.788, 1.44)	NORM(103, 22.8)	NORM(103, 22.8)	NORM(103, 22.8)	NORM(103, 22.8)	NORM(103, 22.8)	96 + EXPO(36.5)
Education Book	POIS(21.9)	TRIA(10.5, 28.1, 56.5)	TRIA(10.5, 28.1, 56.5)	TRIA(10.5, 28.1, 56.5)	TRIA(10.5, 28.1, 56.5)	TRIA(10.5, 28.1, 56.5)	14.5 + 51 * BETA(1.13, 1.02)
Turkish Pop Music	NORM(36.3, 16.4)	14 + WEIB(70.1, 1.61)	14 + WEIB(70.1, 1.61)	14 + WEIB(70.1, 1.61)	14 + WEIB(70.1, 1.61)	14 + WEIB(70.1, 1.61)	14 + WEIB(70.1, 1.61)
Pop / Rock Music	2.5 + 18 * BETA(1.02, 1.81)	3.5 + WEIB(13.2, 2.17)	3.5 + WEIB(13.2, 2.17)	3.5 + WEIB(13.2, 2.17)	3.5 + WEIB(13.2, 2.17)	3.5 + WEIB(13.2, 2.17)	6.5 + 29 * BETA(1.5, 1.24)
Other Music	-0.5 + GAMM(2.68, 2.34)	1.5 + GAMM(4.35, 2.34)	1.5 + GAMM(4.35, 2.34)	1.5 + GAMM(4.35, 2.34)	1.5 + GAMM(4.35, 2.34)	1.5 + GAMM(4.35, 2.34)	1.5 + GAMM(4.35, 2.34)
Turkish Video	-0.5 + WEIB(8.87, 1.87)	-0.5 + WEIB(8.87, 1.87)	-0.5 + WEIB(8.87, 1.87)	-0.5 + WEIB(8.87, 1.87)	-0.5 + WEIB(8.87, 1.87)	-0.5 + WEIB(8.87, 1.87)	2.5 + WEIB(10, 1.44)
Foreign Video	34 + 110 * BETA(2.15, 5.25)	34 + 110 * BETA(2.15, 5.25)	34 + 110 * BETA(2.15, 5.25)	34 + 110 * BETA(2.15, 5.25)	34 + 110 * BETA(2.15, 5.25)	34 + 110 * BETA(2.15, 5.25)	82.5 + EXPO(28.3)

4.2. Seeding

We use seed elements to define seed values for random number streams and to determine how the stream should be reinitialized between replications. We modify the seed values for the existing streams. As a new replication begins, it uses the final seed value from the previous replication as the new initial seed. New seed values are given below.

Table 4.7. Seed elements

GROUP	AHL	ERENKOY	NST
Research Book	213569	12345	1254879
Education Book	764954	65436	4578965
Literature Book	568795	45324	3248795
Pop / Rock Music	458767	89754	5479682
Turkish Pop Music	548799	54332	8569974
Other Music	152572	46524	2468755
Turkish Video	658973	42341	6245866
Foreign Video	942364	54332	7531595

Customer arrivals are created by considering the sales distributions and seed elements. The number of customers arriving in a store is taken into consideration. We are not interested in customers' arrival times. Every arriving customer matches with his product if it is available, and leaves after purchasing. If he cannot find his product, he leaves the store and is recorded as a lost sale. All transportation and ordering are done at the end of the day. After the stores are closed, orders are placed to the warehouse considering present inventory level. Transfers and returns are done instantaneously after shipments. Lastly, the shipments of the orders placed on the previous day are done.

The simulations were executed on an AMD Athlon 2500 MHz personal computer, and the computation time needed to run the simulation for a model was always less than one hour. The planning horizon of one year is sufficiently long to estimate the long term average effectiveness within the range of accuracy. To compare the different policies, 156 examples are run by ARENA simulation software. ARENA models for each scenario and their outputs are given in the accompanied CD.

All costs and prices shown below are in YTL. All transportation costs are determined according to the contract with Third Party Logistics Company. The capacities and safety stocks of each store and warehouse and unit costs are according to the following.

Table 4.8. Safety stocks and capacities

	Warehouse	AHL store		ERENKOY store		NST store	
GROUP	safety stock	safety stock	capacity	safety stock	capacity	safety stock	capacity
Research book	200	100	400	250	1000	190	760
Education book	200	50	200	125	500	95	380
Literature book	200	75	300	100	400	75	300
Pop / rock music	200	70	420	150	900	160	960
Turkish pop music	200	90	540	100	600	110	660
Other music	200	40	240	40	240	45	270
Turkish video	200	40	200	40	200	30	150
Foreign video	200	40	200	150	750	75	375

Table 4.9. Unit costs

Unit transportation cost from the warehouse to the stores	0.2
Unit transportation cost from the suppliers to the warehouse	0.3
Unit transportation cost from the stores to stores	0.1
Unit penalty cost	$sp_j^0 - pp_j^0$
Unit holding cost	$pr_j * 0.1$
AHL store rental cost on day t	$(sp_j^0 D_{1j}^{0t}) * 0.1$
ERENKOY store rental cost per day	1,500
NST store rental cost per day	750

The proportion of the warehouse's order satisfied by the supplier of product j is denoted by rr_j and the values are as follows: 0.8 for book category, 0.7 for music category and 0.9 for video category. pr_j is used for the calculation of holding costs and assume the following values: 0.6 for book category, 0.5 for music category and 0.4 for video category.

p_j is the penalty cost and is equal to the profit of product j ; it is obvious that penalty cost decreases in discount periods.

Table 4.10. No discount prices

GROUP	purchasing price	selling price	net profit	% margin
Research Book	7.20	12.00	4.80	40.00%
Education Book	8.22	13.70	5.48	40.00%
Literature Book	6.72	11.20	4.48	40.00%
Pop / Rock Music	7.00	10.00	3.00	30.00%
Turkish Pop Music	16.10	23.00	6.90	30.00%
Other Music	12.60	18.00	5.40	30.00%
Turkish Video	15.60	24.00	8.40	35.00%
Foreign Video	21.10	32.50	11.40	35.08%

4.3. Welch Procedure

While making a large number of replications, and observing the stochastic process Y on each replication the histogram will be like the density f_Y . If $F_i(y/l) \approx F(y)$ as i for all y and any initial conditions l , then $F(y)$ is called the steady state distribution of the output process Y . There is a finite time index $k+1$ such that from this point the distributions will be approximately the same.

Our simulation is a non-terminating simulation such that there is no natural event E to specify the length of a run. We are interested in the behaviors of the system in the long run when it is operating normally. If Y has the steady state distribution, the steady state means $E(Y)$ can be estimated.

For real systems there are no steady state distributions because the system changes over time. We assume that the model does not change over time. We made 10 replications to assess the variability of the X_j s.

Estimating steady state means $v = \lim_{i \rightarrow \infty} E(Y_i)$. The transient means converge to the steady state mean. The most serious inference of the problem of the initial transient is probably that $E[\bar{Y}(m)] \neq v$ for any m . We use the warming-up technique to cope with this problem. The warm-up period is the time period after the beginning of the run during which statistics are to be cleared. The aim is to estimate v accurately by excluding some number of observations from the beginning of a run.

$$\bar{Y}(m, l) = \sum_{i=l+1}^m Y_i / (m - l) \quad 1 \leq l \leq m - 1$$

l Number of observations from the beginning of the simulation may not represent steady state behaviors. We use the Welch procedure to determine the time index l .

$E(Y_i) \approx v$ For $i > 1$, l is the warm-up period. The Welch procedure is based on four steps, using $n \geq 5$ independent replications, each of length m .

- $Y_{ji} = i^{\text{th}}$ Observation from the j^{th} replication.
- $\bar{Y}_i = \sum_{j=1}^n Y_{ji} / n$ for $i = 1, 2, \dots, m$ $E(\bar{Y}_i) = E(Y_i)$ and $Var(\bar{Y}_i) = Var(Y_i) / n$

- Moving average $\bar{Y}_i(w) = \begin{cases} \sum_{s=-w}^w \bar{Y}_{i+s} / (2w + 1) & i = w + 1, \dots, m - w \\ \sum_{s=-(i-1)}^{i-1} \bar{Y}_{i+s} / (2i - 1) & i = 1, \dots, w \end{cases}$

w is the window $0 < w \leq (m / 4)$

- After plotting $\bar{Y}_i(w)$, for $i = 1, 2, \dots, m - w$, we choose l to be the value of i , beyond which $\bar{Y}_1(w), \bar{Y}_2(w)$ appears to have converged.

We make 10 independent replications of the simulation each of length 360 days. We plot the averaged process \bar{N}_i for $i = 1, 2, \dots, 360$. It is obvious that further smoothing is necessary. A window size of 90 is required to obtain a reasonably smooth line. Plotting the moving averages \bar{N}_i $w = 90$ is smoother than other w values. After plotting we choose the warm-up period of $l = 30$ days. The graphs of the daily inventory and profit of the warehouse and AHL store are given in Appendix B.

4.4. System with One Store

It is not possible to make a direct comparison between the system with one store and the system with two stores. We start by comparing the profits of z values and the 12 % discount option for one store systems. We simulate a warehouse with a store. The characteristics of each store are considered. ERENKOY store has the highest demand. The outputs of simulation for z values in no discount and discounted periods are given below. Remaining product flows for each product group can be seen in Appendix C.

Table 4.11. Daily outputs of AHL store in no discount period

	$z =$ 11 days	10 days	9 days	8 days	7 days	6 days	5 days	4 days	3 days	2 days	1 day
shipment cost AHL	41.43	41.98	42.64	43.82	44.84	45.89	46.44	46.06	43.10	37.17	33.37
shipment cost WH	51.07	51.04	51.03	51.04	51.01	51.01	50.63	50.00	48.59	46.49	45.61
return cost AHL	11.14	11.99	12.96	14.73	16.28	17.91	19.05	19.13	16.11	9.31	4.47
purchasing cost AHL	1,508.35	1,507.99	1,507.49	1,507.14	1,506.14	1,504.00	1,494.65	1,475.43	1,435.57	1,380.89	1,359.29
penalty cost AHL	2.67	2.86	3.13	3.31	3.79	4.81	9.23	18.27	37.98	64.95	74.58
holding cost AHL	79.76	77.99	75.63	72.25	67.16	60.24	52.04	43.50	35.39	29.04	26.84
holding cost WH	93.11	93.26	93.58	94.12	95.09	96.52	97.63	97.18	93.79	88.40	85.43
rent cost AHL	230.63	230.57	230.49	230.44	230.29	229.98	228.60	225.77	219.82	211.65	208.53
revenue AHL	2,306.25	2,305.71	2,304.94	2,304.40	2,302.93	2,299.78	2,286.00	2,257.74	2,198.17	2,116.52	2,085.29
total cost	2,018.15	2,017.69	2,016.95	2,016.85	2,014.59	2,010.36	1,998.28	1,975.36	1,930.35	1,867.90	1,838.12
profit	288.10	288.01	287.99	287.56	288.33	289.42	287.72	282.38	267.82	248.62	247.17

Table 4.12. Daily outputs of AHL store in 12 % discount period

	$z =$ 11 days	10 days	9 days	8 days	7 days	6 days	5 days	4 days	3 days	2 days	1 day
shipment cost AHL	53.86	53.85	54.16	54.26	54.03	54.52	57.39	59.82	58.01	51.68	45.50
shipment cost WH	74.28	74.27	74.24	74.25	74.29	74.44	74.43	74.19	73.17	70.48	66.42
return cost AHL	6.52	6.52	6.97	7.13	6.76	7.50	11.80	15.64	13.97	7.01	1.77
purchasing cost AHL	1,954.08	1,954.08	1,954.06	1,954.03	1,954.05	1,954.04	1,953.81	1,950.14	1,924.39	1,860.15	1,773.26
penalty cost AHL	0.00	0.00	0.01	0.02	0.01	0.01	0.09	1.60	12.51	41.64	76.43
holding cost AHL	89.27	87.53	85.54	83.19	80.41	76.01	67.73	56.26	44.22	33.25	26.93
holding cost WH	85.46	85.50	85.63	85.42	85.25	86.13	89.16	91.04	89.06	84.76	81.19
rent cost AHL	283.82	283.82	283.82	283.82	283.82	283.82	283.79	283.27	279.60	270.26	258.10
revenue AHL	2,838.22	2,838.22	2,838.19	2,838.16	2,838.18	2,838.17	2,837.86	2,832.68	2,796.03	2,702.65	2,580.97
total cost	2,547.29	2,545.57	2,544.41	2,542.11	2,538.61	2,536.47	2,538.18	2,531.97	2,494.93	2,419.24	2,329.59
profit	290.93	292.65	293.78	296.05	299.57	301.70	299.68	300.71	301.10	283.41	251.38

Table 4.13. Daily outputs of ERENKOY store in no discount period

	$z = 11$ days	10 days	9 days	8 days	7 days	6 days	5 days	4 days	3 days	2 days	1 day
shipment cost ERENKOY	134.96	134.85	131.58	130.58	128.32	140.24	147.41	138.49	121.31	96.81	84.32
shipment cost WH	151.73	151.72	151.71	151.66	151.74	151.21	147.34	140.88	131.95	122.82	118.18
return cost ERENKOY	50.52	50.34	45.28	43.74	40.43	58.93	73.98	67.01	50.14	22.22	8.05
purchasing cost ERENKOY	5,726.67	5,726.01	5,725.72	5,724.60	5,721.41	5,700.40	5,535.93	5,286.79	4,965.84	4,644.69	4,516.21
penalty cost ERENKOY	17.10	17.50	17.65	18.25	19.79	29.95	112.17	243.44	415.04	587.84	664.18
holding cost ERENKOY	170.97	164.37	156.51	149.08	138.89	124.57	107.43	89.91	71.58	55.93	49.79
holding cost WH	110.34	110.49	106.70	105.16	104.11	111.59	117.28	116.59	111.54	97.42	86.49
rent cost ERENKOY	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00
revenue ERENKOY	8,780.23	8,779.17	8,778.73	8,777.00	8,772.27	8,741.10	8,494.41	8,114.00	7,621.45	7,127.51	6,922.68
total cost	7,862.30	7,855.27	7,835.15	7,823.07	7,804.68	7,816.88	7,741.54	7,583.10	7,367.39	7,127.72	7,027.21
profit	917.93	923.91	943.58	953.93	967.60	924.22	752.87	530.90	254.06	-0.22	-104.53

Table 4.14. Daily outputs of ERENKOY store in 12 % discount period

	$z = 11$ days	10 days	9 days	8 days	7 days	6 days	5 days	4 days	3 days	2 days	1 day
shipment cost ERENKOY	144.33	144.99	144.72	142.86	140.89	155.33	182.05	168.54	140.09	109.41	98.69
shipment cost WH	176.71	176.67	176.69	176.69	176.78	176.72	173.94	166.55	154.31	141.17	139.12
return cost ERENKOY	39.41	40.38	39.86	36.97	33.96	55.96	98.65	85.91	55.52	22.57	8.52
purchasing cost ERENKOY	6,363.84	6,363.84	6,363.84	6,363.83	6,363.28	6,357.52	6,267.13	6,003.41	5,585.79	5,125.17	5,021.30
penalty cost ERENKOY	0.27	0.27	0.27	0.27	0.47	2.66	37.01	143.63	321.04	510.07	537.28
holding cost ERENKOY	200.50	196.21	190.93	184.15	174.46	156.66	130.99	101.04	72.42	53.03	47.84
holding cost WH	103.30	103.93	103.31	101.16	100.07	110.67	124.58	126.94	116.12	95.86	85.45
rent cost ERENKOY	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00
revenue ERENKOY	8,959.05	8,959.05	8,959.06	8,959.04	8,958.29	8,950.35	8,825.62	8,455.26	7,860.24	7,210.59	7,079.51
total cost	8,528.35	8,526.30	8,519.62	8,505.92	8,489.91	8,515.52	8,514.36	8,296.03	7,945.30	7,557.27	7,438.20
profit	430.70	432.76	439.44	453.12	468.38	434.83	311.26	159.24	-85.06	-346.68	-358.69

Table 4.15. Daily outputs of NST store in no discount period

	$z = 11$ days	10 days	9 days	8 days	7 days	6 days	5 days	4 days	3 days	2 days	1 day
shipment cost NST	70.51	71.05	72.16	72.64	71.65	72.34	75.35	75.77	71.11	62.18	58.14
shipment cost WH	87.68	87.70	87.73	87.78	87.72	87.58	87.28	86.64	85.15	83.48	82.08
return cost NST	17.92	18.67	20.27	21.10	19.66	20.75	25.50	26.83	21.29	9.58	4.98
purchasing cost NST	3,349.99	3,349.79	3,349.67	3,349.51	3,349.05	3,348.07	3,340.16	3,308.26	3,231.48	3,111.26	2,999.84
penalty cost NST	0.08	0.18	0.25	0.33	0.54	1.05	5.23	22.53	65.46	130.89	190.67
holding cost NST	133.88	127.87	120.24	110.36	98.80	86.94	74.59	61.88	50.08	42.83	40.71
holding cost WH	93.07	93.45	94.30	94.71	94.62	94.99	96.76	97.45	93.92	86.78	83.69
rent cost NST	750.00	750.00	750.00	750.00	750.00	750.00	750.00	750.00	750.00	750.00	750.00
revenue NST	5,197.39	5,197.09	5,196.91	5,196.66	5,195.99	5,194.50	5,182.42	5,133.21	5,013.50	4,827.85	4,656.66
total cost	4,503.13	4,498.73	4,494.62	4,486.43	4,472.03	4,461.72	4,454.87	4,429.36	4,368.49	4,277.00	4,210.11
Profit	694.26	698.37	702.28	710.24	723.96	732.78	727.55	703.85	645.01	550.85	446.55

Table 4.16. Daily outputs of NST store in 12 % discount period

	$z =$ 11 days	10 days	9 days	8 days	7 days	6 days	5 days	4 days	3 days	2 days	1 day
shipment cost NST	76.62	77.33	77.57	77.87	77.14	77.70	80.26	80.91	77.02	67.89	63.87
shipment cost WH	97.26	97.33	97.29	97.23	97.08	97.00	96.88	96.28	94.61	93.01	91.82
return cost NST	17.44	18.44	18.81	19.36	18.47	19.27	23.28	24.85	20.61	8.71	3.88
purchasing cost NST	3,417.85	3,417.85	3,417.83	3,417.68	3,417.22	3,416.59	3,411.44	3,394.72	3,337.76	3,243.73	3,144.05
penalty cost NST	0.00	0.00	0.01	0.06	0.24	0.49	2.52	9.25	34.10	71.00	104.95
holding cost NST	142.35	136.02	128.91	120.48	109.70	96.71	82.72	67.84	53.49	43.40	40.45
holding cost WH	91.12	91.82	92.30	92.55	93.20	94.06	95.57	95.67	92.77	85.76	82.33
rent cost NST	750.00	750.00	750.00	750.00	750.00	750.00	750.00	750.00	750.00	750.00	750.00
revenue NST	4,880.08	4,880.08	4,880.05	4,879.85	4,879.21	4,878.33	4,871.15	4,847.71	4,765.89	4,634.97	4,501.33
total cost	4,592.64	4,588.78	4,582.72	4,575.23	4,563.05	4,551.81	4,542.67	4,519.53	4,460.36	4,363.50	4,281.35
profit	287.44	291.30	297.33	304.62	316.16	326.52	328.49	328.18	305.53	271.47	219.98

The aim is to find out the best scenario for each store and to interpret the effects of the parameters on the profit. We separate each store's graph so as to analyze the results and plot the profit of each store. In these graphs it is obvious that the performance of the no discount case outperforms for all z values for ERENKOY and NST stores. ERENKOY store's profit decreases by 51.5% and NST store's profit decreases by 55.1% in the 12% discount period. AHL store has lower demand than the others and its profit does not fluctuate more than 0.5% for z values greater than six days. ERENKOY store's profit peaks for seven days and then begins to reduce for greater z values. NST stores peak point of z value is six days. For determining appropriate inventory levels for the highest profit, we investigate z values from one to 11 days. We do not require further research for z values because profits of stores do not increase any more for other z values. For AHL store the 12% discount period's profit is 4.2% higher than the no discount period. The best z value for AHL store is six days, while for ERENKOY store the best z value is seven days in the no discount and the 12 % discount periods. For NST store the best z value is six days for the no discount period and five days for the 12 % discount period. As z value increases, stores start to hold larger inventory, so both the holding cost of stores and the purchasing cost increase; furthermore, lost sales decrease due to larger inventory. In the discount period, the demand for most products increases, but costs also increase more than the profit of additional sales.

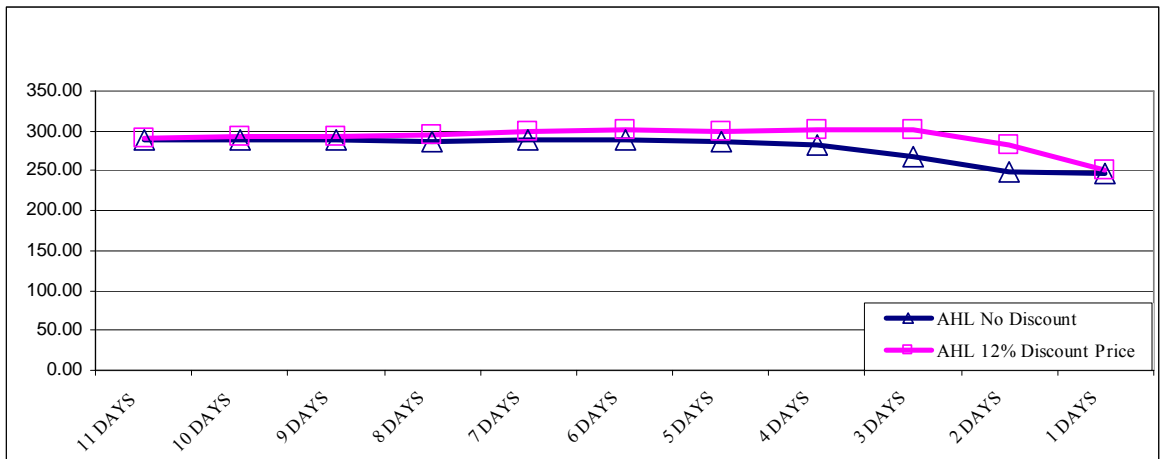


Figure 4.7. Daily profit of AHL store

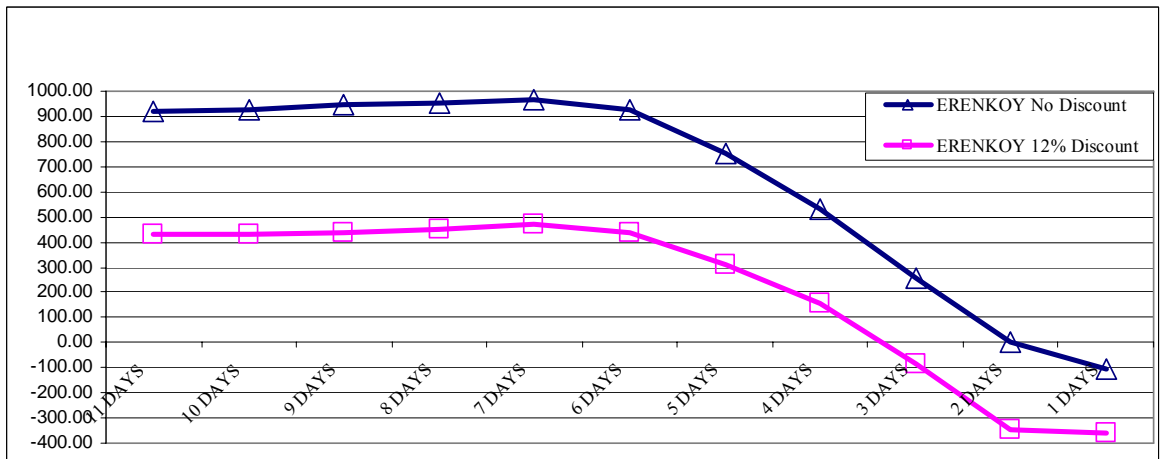


Figure 4.8. Daily profit of ERENKOY store

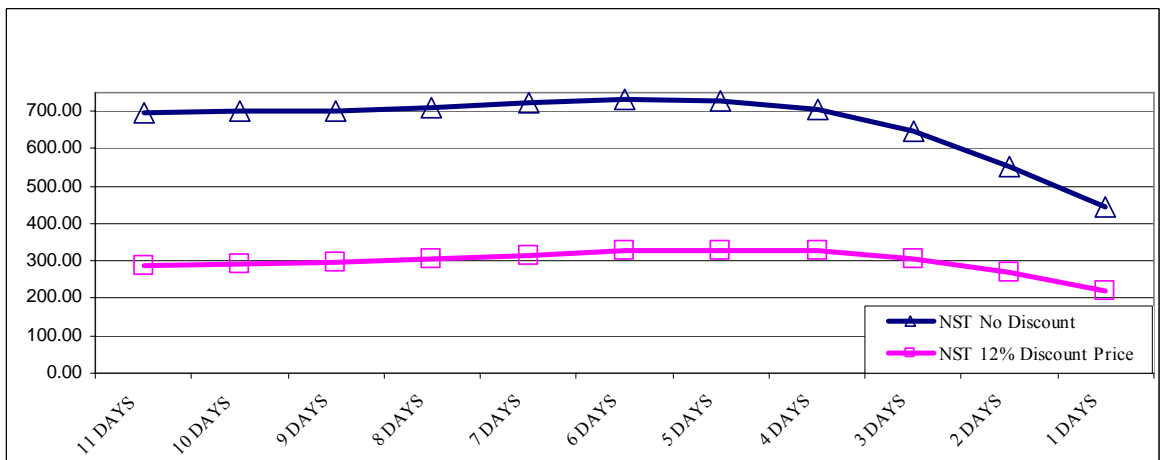


Figure 4.9. Daily profit of NST store

4.5. Pricing Options

Discounts on selling prices generate higher demand for products. The suppliers' aim is to sell more products to the company so they would like to help the company increase the sales volume through campaigns. They offer discounts for the company. Discount options are offered for domestic products only. Since other groups of products are imported and their prices are predetermined according to contracts with foreign suppliers, discounts are not possible for them.

The percent margin of a product is calculated as $(sp_{ij}^0 - pp_{ij}^0) / sp_{ij}^0$.

The discount percentages on the purchasing price as given by the domestic suppliers as well as the margins and the prices of products are given in the following tables.

Table 4.17. Prices and discount rates of domestic products

GROUP	Selling price discount rate %	Purchasing price discount rate %	Selling price	Purchasing price
Literature book	12%	10%	10.56	6.48
Research book	12%	10%	12.06	7.40
Education book	12%	10%	9.86	6.05
Turkish pop music	12%	10%	8.80	6.30
Literature book	9%	8%	10.92	6.62
Research book	9%	8%	12.47	7.56
Education book	9%	8%	10.19	6.18
Turkish pop music	9%	8%	9.10	6.44
Literature book	6%	5%	11.28	6.84
Research book	6%	5%	12.88	7.81
Education book	6%	5%	10.53	6.38
Turkish pop music	6%	5%	9.40	6.65

Table 4.18. 12% discount prices

GROUP	12% discount purchasing price	12% discount selling price	12% discount net profit	12% discount margin percentage
Research book	6.48	10.56	4.08	38.64%
Education book	7.40	12.06	4.66	38.64%
Literature book	6.05	9.86	3.81	38.64%
Pop / rock music	6.30	8.80	2.50	28.41%
Turkish pop music	16.10	20.24	4.14	20.45%
Other music	12.60	15.84	3.24	20.45%
Turkish video	15.60	21.12	5.52	26.14%
Foreign video	21.10	28.60	7.50	26.23%

Table 4.19. 9% discount prices

GROUP	9% discount purchasing price	9% discount selling price	9% discount net profit	9% discount margin percentage
Research book	6.62	10.92	4.30	39.34%
Education book	7.56	12.47	4.90	39.34%
Literature book	6.18	10.19	4.01	39.34%
Pop / rock music	6.44	9.10	2.66	29.23%
Turkish pop music	16.10	20.93	4.83	23.08%
Other music	12.60	16.38	3.78	23.08%
Turkish video	15.60	21.84	6.24	28.57%
Foreign video	21.10	29.58	8.48	28.66%

Table 4.20. 6% discount prices

GROUP	6% discount purchasing price	6% discount selling price	6% discount net profit	6% discount margin percentage
Research book	6.84	11.28	4.44	39.36%
Education book	7.81	12.88	5.07	39.36%
Literature book	6.38	10.53	4.14	39.36%
Pop / rock music	6.65	9.40	2.75	29.26%
Turkish pop music	16.10	21.62	5.52	25.53%
Other music	12.60	16.92	4.32	25.53%
Turkish video	15.60	22.56	6.96	30.85%
Foreign video	21.10	30.55	9.45	30.94%

We perform simulation runs for 9% and 6% discounts in an attempt to discover which pricing option enables us to receive the highest level of profit for the entire system.

The 9% and 6% discount sales distributions are derived from the no discount and 12% discount sales data. Prices and demand are assumed to be linear, and the sales data are shifted according to the following formulae and tested for differences between the mean sales at all $a = 7$ levels for weekdays, using Tukey's test and LSD test.

$$D_{ij}^{9t} = D_{ij}^{0t} + 9(D_{ij}^{12t} - D_{ij}^{0t})/12$$

$$D_{ij}^{6t} = D_{ij}^{0t} + 6(D_{ij}^{12t} - D_{ij}^{0t})/12$$

The percent changes of the sales volume for the 9% and 6% discounts are given below for product groups.

Table 4.21. AHL store's % change in 9 % and 6 % discount period

GROUP	9% discount	%6 discount
Education book	-0.24%	-0.16%
Literature book	14.90%	9.93%
Research book	8.32%	5.55%
Turkish pop music	10.89%	7.26%
Foreign pop music	19.87%	13.25%
Other music	11.67%	7.78%
Turkish video	10.47%	6.98%
Foreign video	-8.78%	-5.85%

Table 4.22. ERENKOY store's % change in 9 % and 6 % discount period

GROUP	% 9 discount	% 6 discount
Education book	-1.18%	-0.78%
Literature book	10.88%	7.25%
Research book	3.05%	2.04%
Turkish pop music	20.60%	13.74%
Foreign pop music	-7.94%	-5.30%
Other music	1.31%	0.87%
Turkish video	26.24%	17.49%
Foreign video	12.95%	8.63%

Education book and foreign video sales at AHL store and education book and foreign pop music sales at ERENKOY store are affected adversely during discount periods. This is despite the fact that we base our calculations on the assumption that discounts are valid for all groups.

Again, we use the input analyzer to find the best applicable probability distribution function for each group. The summary of the sales distributions in the 9% discount and 6% discount periods are given below.

Table 4.25. Summary of ERENKOY store's sales distributions in 9% discount period

GROUP	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Research Book	10.5 + ERLA(7.5, 4)	0.5 + ERLA(4.16, 4)	0.5 + ERLA(4.16, 4)	0.5 + ERLA(4.16, 4)	0.5 + ERLA(4.16, 4)	2.5 + ERLA(6.73, 3)	10.5 + ERLA(7.5, 4)
Literature Book	TRIA(75, 162, 390)	35 + GAMM(30.2, 2.17)	35 + GAMM(30.2, 2.17)	35 + GAMM(30.2, 2.17)	35 + GAMM(30.2, 2.17)	58 + ERLA(34.4, 2)	121 + WEIB(122, 1.77)
Education Book	NORM(69, 16.5)	8.5 + GAMM(5.59, 4.23)	8.5 + GAMM(5.59, 4.23)	8.5 + GAMM(5.59, 4.23)	8.5 + GAMM(5.59, 4.23)	16.5 + WEIB(25.5, 1.64)	NORM(69, 16.5)
Turkish Pop Music	72 + 615 * BETA(1.52, 4.51)	25 + ERLA(47.9, 2)	25 + ERLA(47.9, 2)	25 + ERLA(47.9, 2)	25 + ERLA(47.9, 2)	48 + WEIB(108, 1.21)	100 + ERLA(85.1, 2)
Pop / Rock Music	27.5 + WEIB(26.9, 1.63)	24 + 112 * BETA(2.76, 5.28)	24 + 112 * BETA(2.76, 5.28)	24 + 112 * BETA(2.76, 5.28)	24 + 112 * BETA(2.76, 5.28)	24 + 112 * BETA(2.76, 5.28)	24 + 112 * BETA(2.76, 5.28)
Other Music	11.5 + GAMM(12.7, 2.1)	0.5 + 88 * BETA(3.14, 10.9)	0.5 + 88 * BETA(3.14, 10.9)	0.5 + 88 * BETA(3.14, 10.9)	0.5 + 88 * BETA(3.14, 10.9)	5.5 + WEIB(23.4, 1.63)	12 + GAMM(15.1, 2.13)
Turkish Video	2.5 + GAMM(8.26, 2.18)	-0.5 + WEIB(12.2, 1.36)	-0.5 + WEIB(12.2, 1.36)	-0.5 + WEIB(12.2, 1.36)	-0.5 + WEIB(12.2, 1.36)	-0.5 + WEIB(12.2, 1.36)	2.5 + GAMM(8.26, 2.18)
Foreign Video	82 + 313 * BETA(1.62, 2.73)	18 + ERLA(24.5, 3)	18 + ERLA(24.5, 3)	18 + ERLA(24.5, 3)	18 + ERLA(24.5, 3)	45 + WEIB(81.6, 1.58)	110 + 298 * BETA(1.52, 2.26)

Table 4.26. Summary of ERENKOY store's sales distributions in 6% discount period

GROUP	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Research Book	10.5 + WEIB(33.4, 2.12)	0.5 + ERLA(4.09, 4)	0.5 + ERLA(4.09, 4)	0.5 + ERLA(4.09, 4)	0.5 + ERLA(4.09, 4)	2.5 + ERLA(6.6, 3)	10.5 + WEIB(33.4, 2.12)
Literature Book	TRIA(73, 155, 378)	34 + GAMM(29.3, 2.15)	34 + GAMM(29.3, 2.15)	34 + GAMM(29.3, 2.15)	34 + GAMM(29.3, 2.15)	56 + ERLA(33.3, 2)	117 + WEIB(118, 1.77)
Education Book	NORM(69.3, 16.2)	8.5 + GAMM(5.72, 4.16)	8.5 + GAMM(5.72, 4.16)	8.5 + GAMM(5.72, 4.16)	8.5 + GAMM(5.72, 4.16)	16.5 + WEIB(25.8, 1.63)	NORM(69.3, 16.2)
Turkish Pop Music	68 + 580 * BETA(1.52, 4.51)	24 + ERLA(45, 2)	24 + ERLA(45, 2)	24 + ERLA(45, 2)	24 + ERLA(45, 2)	45 + WEIB(102, 1.22)	94 + ERLA(80.4, 2)
Pop / Rock Music	27.5 + WEIB(28.6, 1.7)	4.5 + GAMM(6.16, 3.22)	4.5 + GAMM(6.16, 3.22)	4.5 + GAMM(6.16, 3.22)	4.5 + GAMM(6.16, 3.22)	14.5 + WEIB(20.7, 1.65)	NORM(64.2, 18.1)
Other Music	11.5 + GAMM(12.5, 2.12)	0.5 + 88 * BETA(3.22, 11.2)	0.5 + 88 * BETA(3.22, 11.2)	0.5 + 88 * BETA(3.22, 11.2)	0.5 + 88 * BETA(3.22, 11.2)	5.5 + WEIB(23.3, 1.65)	12 + GAMM(14.9, 2.13)
Turkish Video	1.5 + GAMM(7.11, 2.47)	-0.5 + WEIB(11.4, 1.36)	-0.5 + WEIB(11.4, 1.36)	-0.5 + WEIB(11.4, 1.36)	-0.5 + WEIB(11.4, 1.36)	-0.5 + WEIB(11.4, 1.36)	1.5 + GAMM(7.11, 2.47)
Foreign Video	79 + 301 * BETA(1.62, 2.73)	17 + GAMM(23.3, 3.05)	17 + GAMM(23.3, 3.05)	17 + GAMM(23.3, 3.05)	17 + GAMM(23.3, 3.05)	43 + WEIB(78.8, 1.59)	105 + 287 * BETA(1.54, 2.26)

It is obvious that standard deviation of a discount period is smaller than a no discount period. This reduces fluctuation in demand as well as reducing lost sales. If customer satisfaction is crucial for the company, or if penalty costs are higher than the profit of the products, affecting a discount should be preferred. Moreover, a discount should be done in the short term so as to quickly sell off old products or reduce excess inventory in the warehouse. Thus, these results aid administration in determining the best combination.

4.6. System with Two Stores

We considered AHL and ERENKOY stores with transfer and discount options. Transfers decrease as z value increases. Allowing transfers between stores decreases lost sales because transfers have no lead time and stores prefer transfers to placing orders to the warehouse. Best z value for AHL store is six days and seven days for ERENKOY store discount which are same for system with one store in all periods except the 9 % discount period without transfers. Best z value for AHL store is seven days and seven days for ERENKOY store in the 9 % discount period without transfers. The simulation outputs of the system with two stores for z values in the no discount and the discounted periods are given below.

Table 4.27. Daily outputs of two stores without transfer in no discount period

z values of AHL store	7 days	7 days	7 days	6 days	6 days	6 days	5 days	5 days	5 days
z values of ERENKOY store	8 days	7 days	6 days	8 days	7 days	6 days	8 days	7 days	6 days
shipment cost AHL	44.79	44.76	45.25	46.20	46.08	46.55	46.76	46.67	46.95
shipment cost ERENKOY	128.72	126.56	139.18	128.90	126.45	138.99	129.00	126.71	139.17
shipment cost WH	202.77	202.86	202.30	202.71	202.72	202.10	202.23	202.28	201.62
return cost AHL	16.03	15.98	16.69	18.26	18.05	18.74	19.49	19.34	19.77
return cost ERENKOY	40.85	37.63	57.18	41.12	37.46	56.90	41.24	37.83	57.17
purchasing cost AHL	1505.68	1505.64	1505.26	1502.41	1502.63	1501.84	1490.24	1490.44	1489.41
purchasing cost ERENKOY	5726.76	5723.58	5702.19	5726.54	5723.73	5701.40	5726.37	5723.16	5700.88
penalty cost AHL	4.02	4.06	4.25	5.56	5.47	5.86	11.28	11.15	11.65
penalty cost ERENKOY	16.82	18.33	28.64	16.91	18.24	28.98	16.99	18.50	29.22
holding cost AHL	65.13	65.18	65.24	58.05	58.12	58.16	49.70	49.81	49.82
holding cost ERENKOY	147.40	137.29	122.59	147.49	137.35	122.63	147.55	137.34	122.61
holding cost WH	102.35	101.82	108.54	103.35	102.94	109.99	104.26	103.95	110.97
rent cost AHL	230.22	230.22	230.16	229.74	229.77	229.66	227.95	227.99	227.83
rent cost ERENKOY	1500.00	1500.00	1500.00	1500.00	1500.00	1500.00	1500.00	1500.00	1500.00
revenue AHL	2302.24	2302.16	2301.58	2297.42	2297.75	2296.56	2279.53	2279.87	2278.34
revenue ERENKOY	8780.59	8775.90	8744.20	8780.27	8776.14	8743.07	8780.04	8775.31	8742.31
total cost	9731.55	9713.90	9727.47	9727.25	9709.02	9721.78	9713.06	9695.16	9707.07
profit	1351.29	1364.17	1318.32	1350.45	1364.86	1317.85	1346.51	1360.02	1313.58

Table 4.28. Daily outputs of system with two stores without transfer in 12 % discount period

z values of AHL store	7 days	7 days	7 days	6 days	6 days	6 days	5 days	5 days	5 days
z values of ERENKOY store	8 days	7 days	6 days	8 days	7 days	6 days	8 days	7 days	6 days
shipment cost AHL	54.54	54.52	54.87	55.30	55.29	55.79	57.93	57.96	58.41
shipment cost ERENKOY	138.64	136.49	151.54	138.83	136.42	151.62	139.58	137.38	152.29
shipment cost WH	250.99	251.12	251.11	251.05	251.19	251.10	251.06	251.17	251.06
return cost AHL	7.24	7.19	7.73	8.36	8.33	9.09	12.29	12.37	13.01
return cost ERENKOY	30.62	27.33	50.06	30.89	27.23	50.22	31.96	28.65	51.21
purchasing cost AHL	1954.04	1954.04	1954.04	1954.04	1954.03	1954.03	1953.62	1953.56	1953.66
purchasing cost ERENKOY	6364.12	6363.60	6357.36	6364.13	6363.68	6357.36	6364.24	6363.95	6357.23
penalty cost AHL	0.01	0.01	0.01	0.01	0.02	0.02	0.15	0.22	0.16
penalty cost ERENKOY	0.15	0.35	2.71	0.15	0.32	2.70	0.11	0.21	2.75
holding cost AHL	76.39	76.44	76.54	71.93	72.00	72.11	63.51	63.61	63.77
holding cost ERENKOY	180.45	170.85	152.57	180.56	170.95	152.70	180.67	171.09	152.82
holding cost WH	100.43	99.52	107.71	100.84	100.13	108.64	102.52	101.88	110.72
rent cost AHL	283.82	283.82	283.82	283.82	283.82	283.82	283.76	283.75	283.76
rent cost ERENKOY	1500.00	1500.00	1500.00	1500.00	1500.00	1500.00	1500.00	1500.00	1500.00
revenue AHL	2838.16	2838.16	2838.17	2838.16	2838.15	2838.16	2837.61	2837.49	2837.64
revenue ERENKOY	8959.45	8958.74	8950.14	8959.47	8958.85	8950.16	8959.62	8959.23	8949.96
total cost	10941.43	10925.27	10950.07	10939.90	10923.40	10949.20	10941.38	10925.80	10950.87
profit	856.19	871.64	838.24	857.73	873.60	839.12	855.85	870.91	836.73

Table 4.29. Daily outputs of system with two stores without transfer in 9 % discount period

z values of AHL store	7 days	7 days	7 days	6 days	6 days	6 days	5 days	5 days	5 days
z values of ERENKOY store	8 days	7 days	6 days	8 days	7 days	6 days	8 days	7 days	6 days
shipment cost AHL	51.75	51.47	52.15	53.05	53.08	53.61	54.64	54.39	54.98
shipment cost ERENKOY	144.46	142.82	158.89	144.66	143.56	158.69	145.04	143.75	159.17
shipment cost WH	238.96	239.04	238.05	238.89	238.88	237.91	238.26	238.34	237.40
return cost AHL	16.18	15.76	16.79	18.23	18.29	19.10	21.19	20.80	21.66
return cost ERENKOY	38.61	36.21	61.17	38.88	37.30	60.86	39.44	37.54	61.55
purchasing cost AHL	1678.05	1677.79	1677.91	1673.90	1673.86	1673.96	1659.28	1659.89	1660.41
purchasing cost ERENKOY	6608.14	6605.49	6575.57	6608.37	6605.45	6575.72	6608.45	6605.65	6575.20
penalty cost AHL	2.83	2.91	2.89	4.32	4.36	4.45	10.49	10.18	9.95
penalty cost ERENKOY	2.03	3.07	15.49	1.94	3.17	15.45	1.93	3.01	15.68
holding cost AHL	70.02	70.14	70.32	62.81	62.88	63.12	53.41	53.53	53.86
holding cost ERENKOY	189.59	176.88	155.96	189.84	177.05	156.21	190.04	177.27	156.39
holding cost WH	104.46	104.49	113.47	105.34	105.59	114.30	106.40	106.62	115.63
rent cost AHL	247.56	247.53	247.54	247.00	246.99	246.99	244.92	245.01	245.08
rent cost ERENKOY	1500.00	1500.00	1500.00	1500.00	1500.00	1500.00	1500.00	1500.00	1500.00
revenue AHL	2475.61	2475.28	2475.40	2469.97	2469.89	2469.90	2449.18	2450.10	2450.84
revenue ERENKOY	9478.30	9474.61	9432.27	9478.62	9474.46	9432.46	9478.71	9474.82	9431.71
total cost	10892.64	10873.60	10886.20	10887.22	10870.45	10880.37	10873.50	10855.99	10866.96
profit	1061.27	1076.29	1021.47	1061.37	1073.90	1022.00	1054.39	1068.93	1015.59

Table 4.30. Daily outputs of system with two stores without transfer in 6 % discount period

z values of AHL store	7 days	7 days	7 days	6 days	6 days	6 days	5 days	5 days	5 days
z values of ERENKOY store	8 days	7 days	6 days	8 days	7 days	6 days	8 days	7 days	6 days
shipment cost AHL	50.39	50.32	50.93	51.63	51.53	52.27	52.70	52.72	53.47
shipment cost ERENKOY	137.40	134.97	153.07	137.50	135.17	152.75	137.87	135.52	153.45
shipment cost WH	223.29	223.35	222.55	223.12	223.17	222.38	222.63	222.71	221.84
return cost AHL	16.19	16.11	17.01	18.17	18.06	19.14	20.32	20.33	21.40
return cost ERENKOY	41.56	38.01	65.89	41.69	38.27	65.38	42.18	38.68	66.42
purchasing cost AHL	1657.53	1657.23	1657.16	1653.48	1653.15	1653.06	1639.12	1639.70	1639.66
purchasing cost ERENKOY	6066.90	6064.01	6035.49	6066.44	6064.20	6035.31	6067.02	6064.07	6034.82
penalty cost AHL	3.40	3.51	3.60	5.05	5.19	5.36	11.37	11.06	11.15
penalty cost ERENKOY	1.41	2.61	15.24	1.61	2.53	15.26	1.37	2.59	15.35
holding cost AHL	69.23	69.30	69.43	61.69	61.78	61.97	52.31	52.38	52.59
holding cost ERENKOY	179.31	166.72	145.85	179.57	166.96	146.07	179.61	167.08	146.19
holding cost WH	105.99	105.87	115.85	106.84	106.75	116.68	107.95	107.67	117.88
rent cost AHL	247.48	247.44	247.42	246.91	246.86	246.83	244.84	244.93	244.91
rent cost ERENKOY	1500.00	1500.00	1500.00	1500.00	1500.00	1500.00	1500.00	1500.00	1500.00
revenue AHL	2474.78	2474.36	2474.20	2469.07	2468.60	2468.34	2448.39	2449.28	2449.14
revenue ERENKOY	8931.92	8927.83	8886.68	8931.25	8928.10	8886.47	8932.08	8927.91	8885.90
total cost	10300.07	10279.44	10299.50	10293.71	10273.61	10292.46	10279.29	10259.41	10279.14
profit	1106.63	1122.75	1061.38	1106.62	1123.08	1062.35	1101.17	1117.77	1055.90

Table 4.31. Daily outputs of system with two stores with transfer in no discount period

z values of AHL store	7 DAYS	7 DAYS	7 DAYS	6 DAYS	6 DAYS	6 DAYS	5 DAYS	5 DAYS	5 DAYS
z values of ERENKOY store	8 DAYS	7 DAYS	6 DAYS	8 DAYS	7 DAYS	6 DAYS	8 DAYS	7 DAYS	6 DAYS
shipment cost AHL	44.44	44.61	43.52	46.12	46.12	45.46	47.07	46.86	46.23
shipment cost ERENKOY	120.55	118.44	132.24	118.99	117.76	130.69	119.45	117.92	131.97
shipment cost WH	202.87	203.01	202.45	202.79	202.88	202.31	202.34	202.38	201.78
return cost AHL	10.58	10.44	11.88	11.48	11.61	13.39	12.92	12.88	14.96
return cost ERENKOY	33.43	30.60	48.77	32.76	30.77	47.89	33.91	31.34	49.87
transfer cost AHL	1.85	1.78	2.44	1.83	1.79	2.37	1.77	1.78	2.33
transfer cost ERENKOY	3.51	3.57	3.19	4.07	3.98	3.63	4.14	4.07	3.60
purchasing cost AHL	1,504.16	1,504.18	1,504.15	1,500.91	1,501.24	1,499.87	1,488.61	1,487.66	1,486.57
purchasing cost ERENKOY	5,728.65	5,725.91	5,706.46	5,728.86	5,726.39	5,707.30	5,728.11	5,726.57	5,706.31
penalty cost AHL	4.83	4.83	4.85	6.41	6.16	6.82	12.40	12.67	13.22
penalty cost ERENKOY	15.53	16.67	26.26	15.43	16.49	25.98	15.77	16.41	26.40
holding cost AHL	64.07	64.15	64.17	56.94	57.03	57.01	48.52	48.57	48.63
holding cost ERENKOY	147.46	137.36	122.66	147.58	137.46	122.82	147.65	137.44	122.76
holding cost WH	103.19	102.51	109.54	104.20	103.56	110.50	104.92	104.64	111.72
rent cost AHL	229.99	229.99	229.99	229.51	229.57	229.36	227.68	227.56	227.39
rent cost ERENKOY	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00
revenue AHL	2,299.91	2,299.93	2,299.88	2,295.08	2,295.66	2,293.63	2,276.79	2,275.58	2,273.93
revenue ERENKOY	8,783.77	8,779.90	8,750.86	8,784.08	8,780.56	8,751.98	8,783.00	8,780.81	8,750.57
total cost	9,715.09	9,698.07	9,712.56	9,707.88	9,692.82	9,705.39	9,695.23	9,678.76	9,693.76
profit	1,368.59	1,381.76	1,338.18	1,371.29	1,383.40	1,340.21	1,364.55	1,377.63	1,330.74

Table 4.32. Daily outputs of system with two stores with transfer in 12 % discount period

z values of AHL store	7 DAYS	7 DAYS	7 DAYS	6 DAYS	6 DAYS	6 DAYS	5 DAYS	5 DAYS	5 DAYS
z values of ERENKOY store	8 DAYS	7 DAYS	6 DAYS	8 DAYS	7 DAYS	6 DAYS	8 DAYS	7 DAYS	6 DAYS
shipment cost AHL	53.46	53.58	52.75	54.62	54.82	54.28	57.97	57.99	57.57
shipment cost ERENKOY	135.35	133.39	149.19	133.97	131.65	147.23	133.60	132.22	147.46
shipment cost WH	250.98	251.10	251.09	251.02	251.10	251.17	251.07	251.20	251.12
return cost AHL	5.41	5.40	7.13	5.85	5.78	7.84	9.04	8.91	11.29
return cost ERENKOY	25.94	23.15	43.98	25.17	22.07	42.64	26.37	24.47	44.50
transfer cost AHL	1.38	1.38	2.24	1.41	1.38	2.17	1.32	1.28	1.96
transfer cost ERENKOY	1.46	1.52	1.39	1.92	2.02	1.84	2.43	2.45	2.14
purchasing cost AHL	1,953.88	1,953.78	1,953.94	1,953.83	1,953.76	1,953.95	1,953.41	1,953.38	1,953.35
purchasing cost ERENKOY	6,364.15	6,363.49	6,357.38	6,364.10	6,363.70	6,357.22	6,364.25	6,363.95	6,357.64
penalty cost AHL	0.07	0.11	0.05	0.09	0.11	0.05	0.24	0.27	0.28
penalty cost ERENKOY	0.14	0.39	2.70	0.16	0.32	2.81	0.10	0.22	2.63
holding cost AHL	75.98	75.96	75.89	71.46	71.45	71.39	62.88	62.97	63.01
holding cost ERENKOY	180.44	170.75	152.60	180.58	170.94	152.74	180.67	171.05	152.90
holding cost WH	101.55	100.71	109.47	101.73	100.90	109.93	103.52	102.88	111.73
rent cost AHL	283.80	283.78	283.80	283.79	283.78	283.80	283.73	283.73	283.72
rent cost ERENKOY	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00
revenue AHL	2,837.96	2,837.81	2,838.04	2,837.88	2,837.80	2,838.05	2,837.31	2,837.26	2,837.21
revenue ERENKOY	8,959.50	8,958.58	8,950.17	8,959.42	8,958.87	8,949.90	8,959.64	8,959.22	8,950.50
total cost	10,933.99	10,918.49	10,943.60	10,929.69	10,913.78	10,939.04	10,930.60	10,916.96	10,941.29
profit	863.47	877.90	844.61	867.61	882.89	848.91	866.35	879.52	846.43

Table 4.33. Daily outputs of system with two stores with transfer in 9 % discount period

z values of AHL store	7 DAYS	7 DAYS	7 DAYS	6 DAYS	6 DAYS	6 DAYS	5 DAYS	5 DAYS	5 DAYS
z values of ERENKOY store	8 DAYS	7 DAYS	6 DAYS	8 DAYS	7 DAYS	6 DAYS	8 DAYS	7 DAYS	6 DAYS
shipment cost AHL	49.75	49.52	48.43	51.42	51.57	50.43	53.62	53.33	52.52
shipment cost ERENKOY	137.91	137.06	153.75	136.01	135.33	151.22	135.95	135.32	151.68
shipment cost WH	238.93	239.03	238.06	238.88	238.90	237.92	238.29	238.38	237.49
return cost AHL	10.12	10.06	12.02	10.56	10.88	12.96	13.10	13.05	15.57
return cost ERENKOY	31.86	30.36	52.68	31.13	30.09	50.99	32.39	31.09	52.70
transfer cost AHL	1.71	1.80	2.74	1.75	1.79	2.70	1.71	1.80	2.58
transfer cost ERENKOY	2.74	2.75	2.49	3.51	3.52	3.18	3.92	3.88	3.40
purchasing cost AHL	1,676.64	1,676.24	1,676.96	1,672.95	1,672.95	1,671.57	1,657.12	1,657.64	1,658.70
purchasing cost ERENKOY	6,607.92	6,605.45	6,575.43	6,608.68	6,605.85	6,577.81	6,608.67	6,605.70	6,577.57
penalty cost AHL	3.38	3.52	3.27	4.73	4.80	5.29	11.35	11.10	10.63
penalty cost ERENKOY	2.12	3.08	15.57	1.82	2.99	14.60	1.81	3.01	14.63
holding cost AHL	69.48	69.52	69.68	62.15	62.22	62.39	52.63	52.74	53.01
holding cost ERENKOY	189.64	176.92	155.99	189.93	177.19	156.34	190.13	177.31	156.52
holding cost WH	105.17	105.44	114.78	105.96	106.32	115.44	107.24	107.69	116.80
rent cost AHL	247.36	247.31	247.41	246.86	246.85	246.67	244.62	244.69	244.85
rent cost ERENKOY	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00
revenue AHL	2,473.64	2,473.12	2,474.09	2,468.61	2,468.53	2,466.67	2,446.16	2,446.92	2,448.45
revenue ERENKOY	9,477.98	9,474.56	9,432.05	9,479.04	9,475.05	9,435.40	9,479.05	9,474.88	9,435.12
total cost	10,874.73	10,858.05	10,869.26	10,866.35	10,851.23	10,859.50	10,852.55	10,836.74	10,848.63
profit	1,076.90	1,089.63	1,036.87	1,081.30	1,092.35	1,042.57	1,072.65	1,085.06	1,034.94

Table 4.34. Daily outputs of system with two stores with transfer in 6 % discount period

z values of AHL store	7 DAYS	7 DAYS	7 DAYS	6 DAYS	6 DAYS	6 DAYS	5 DAYS	5 DAYS	5 DAYS
z values of ERENKOY store	8 DAYS	7 DAYS	6 DAYS	8 DAYS	7 DAYS	6 DAYS	8 DAYS	7 DAYS	6 DAYS
shipment cost AHL	48.21	47.82	46.73	49.94	49.61	48.44	51.60	51.13	50.33
shipment cost ERENKOY	130.75	129.34	147.76	128.98	127.49	146.08	129.33	127.58	146.71
shipment cost WH	223.27	223.36	222.50	223.12	223.32	222.37	222.61	222.81	221.90
return cost AHL	10.51	10.32	12.46	11.14	11.13	13.50	13.37	12.88	16.11
return cost ERENKOY	34.09	31.62	56.27	33.42	30.79	55.24	34.68	31.80	56.87
transfer cost AHL	1.86	2.01	2.90	1.91	2.02	2.92	1.90	2.00	2.85
transfer cost ERENKOY	2.69	2.71	2.34	3.44	3.38	2.91	3.69	3.70	3.07
purchasing cost AHL	1,656.42	1,655.91	1,656.28	1,651.56	1,652.47	1,650.08	1,637.26	1,638.46	1,637.20
purchasing cost ERENKOY	6,066.65	6,063.90	6,035.22	6,067.47	6,064.45	6,039.15	6,066.98	6,064.04	6,037.74
penalty cost AHL	3.86	4.10	3.98	5.89	5.53	6.51	12.09	11.51	12.21
penalty cost ERENKOY	1.51	2.65	15.54	1.18	2.44	13.71	1.38	2.67	14.21
holding cost AHL	68.69	68.75	68.85	61.03	61.17	61.27	51.56	51.69	51.84
holding cost ERENKOY	179.38	166.73	145.90	179.57	167.01	146.18	179.67	167.16	146.35
holding cost WH	106.89	106.94	117.15	107.83	107.63	117.94	109.01	108.72	119.09
rent cost AHL	247.32	247.24	247.29	246.63	246.76	246.42	244.58	244.76	244.56
rent cost ERENKOY	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00
revenue AHL	2,473.21	2,472.45	2,472.94	2,466.31	2,467.58	2,464.21	2,445.81	2,447.59	2,445.64
revenue ERENKOY	8,931.56	8,927.68	8,886.11	8,932.72	8,928.43	8,891.86	8,932.03	8,927.80	8,889.96
total cost	10,282.10	10,263.39	10,281.17	10,273.09	10,255.19	10,272.70	10,259.69	10,240.92	10,261.04
profit	1,122.66	1,136.73	1,077.88	1,125.94	1,140.82	1,083.36	1,118.16	1,134.47	1,074.55

Allowing transfers, increases profit by 1.3% and decreases transportation cost by 3.7% in the no discount period, as well as decreasing transportation cost by 2% and increasing profit by 1 % in the 12 % discount period. In the 9% discount period, transfers increase profit by 1% and decrease transportation cost 2.7%. In the 6% discount, period transfers increase profit by 1.6% and decrease transportation cost by 4%. We can thus say that transfer is more effective in the 6% discount period. Moreover we will investigate transfer efficiency with the three store system. The daily profits of the system with two stores are given below.

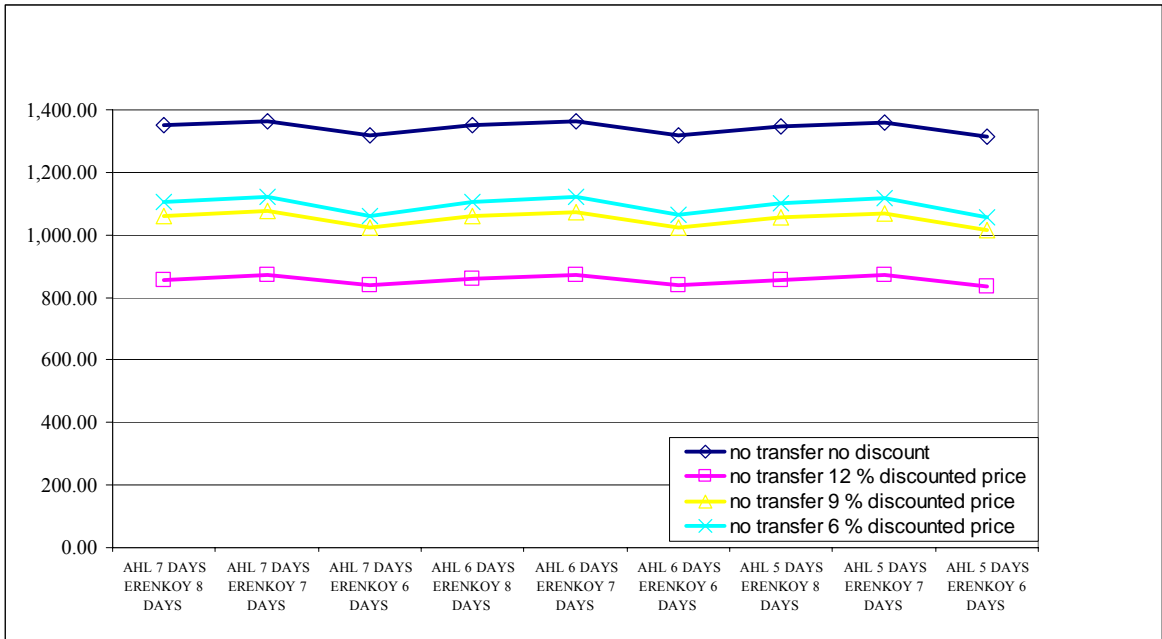


Figure 4.10. Daily profit of two stores without transfer

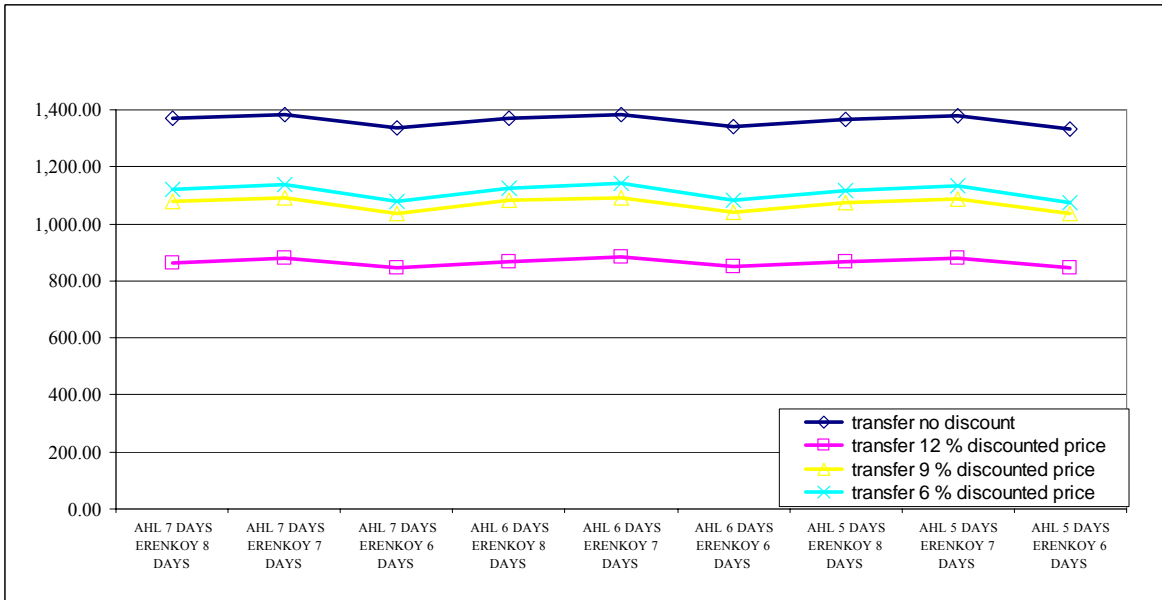


Figure 4.11. Daily profit of two stores with transfer

4.7. System with Three Stores

Finally, we simulate the system with three stores so as to analyze the effect of transfers in the no discount and 12% discount periods.

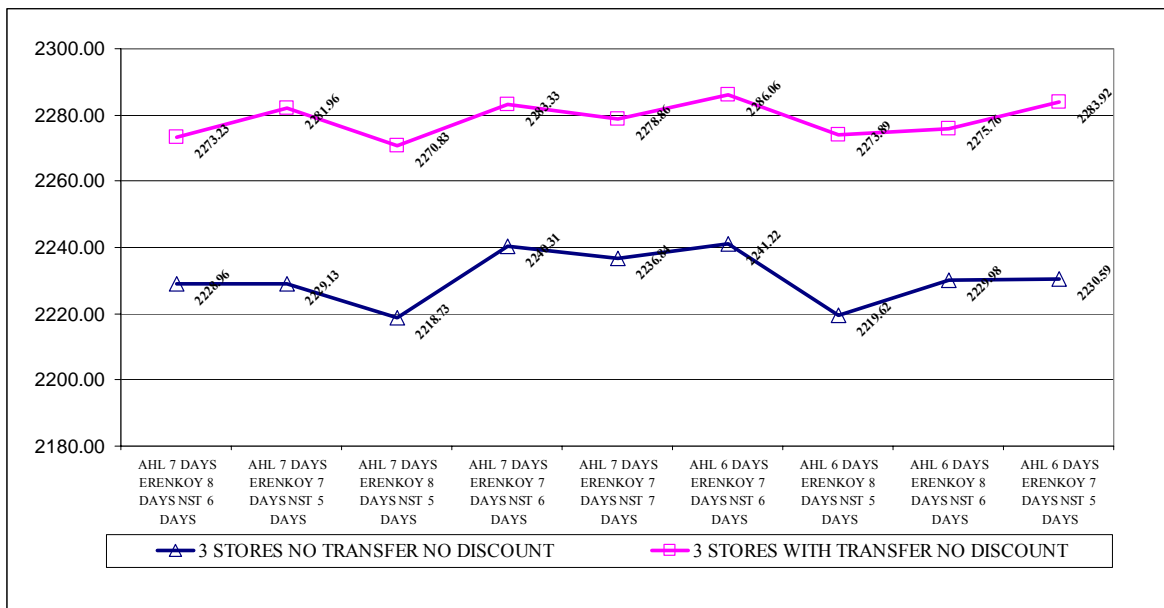


Figure 4.12. Daily profit of three stores system in no discount period

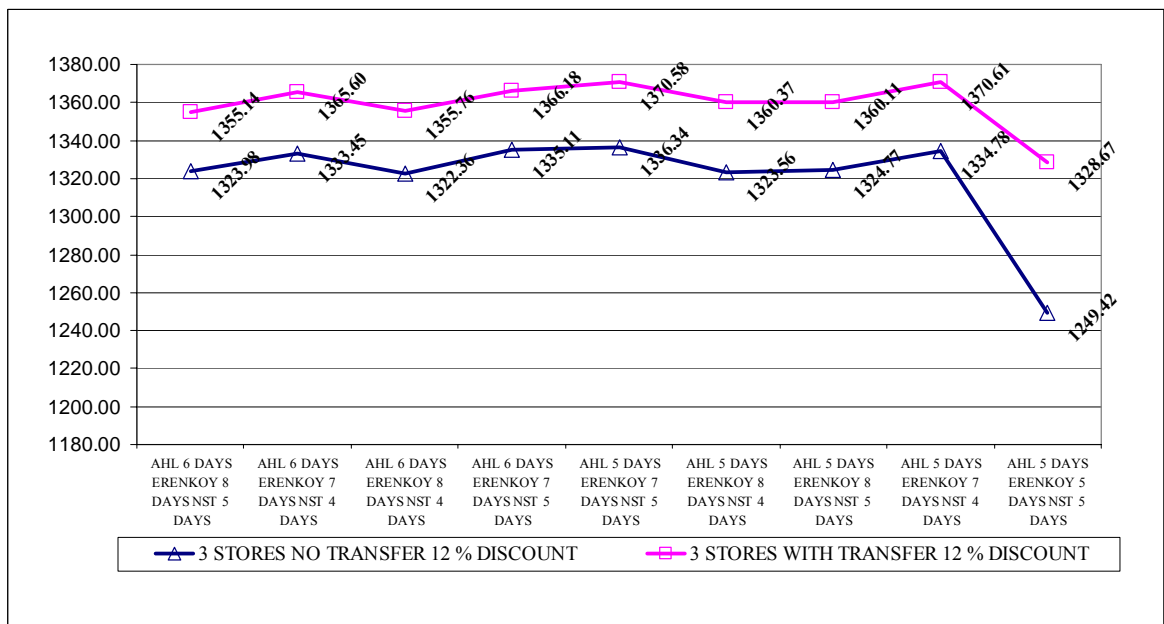


Figure 4.13. Daily profit of three stores system in 12 % discount period

The simulation outputs of the system with three stores for z values in the no discount and discounted periods are given below.

Table 4.35. Daily outputs of system with three stores no transfer in no discount period

z values of AHL store	7 DAYS	7 DAYS	7 DAYS	7 DAYS	7 DAYS	6 DAYS	6 DAYS	6 DAYS	6 DAYS
z values of ERENKOY store	8 DAYS	7 DAYS	8 DAYS	7 DAYS	7 DAYS	7 DAYS	8 DAYS	8 DAYS	7 DAYS
z values of NST store	6 DAYS	5 DAYS	5 DAYS	6 DAYS	7 DAYS	6 DAYS	5 DAYS	6 DAYS	5 DAYS
shipment cost AHL	43.99	43.82	43.94	43.78	43.66	45.02	45.02	45.09	45.01
shipment cost ERENKOY	113.79	113.84	114.22	113.33	113.21	113.32	114.30	113.90	113.79
shipment cost NST	71.98	73.80	74.16	71.43	69.93	71.34	74.13	72.00	73.65
shipment cost WH	290.55	290.19	290.08	290.70	290.82	290.59	289.93	290.47	290.07
return cost AHL	14.82	14.57	14.77	14.51	14.32	16.48	16.51	16.57	16.47
return cost ERENKOY	18.15	18.34	18.91	17.47	17.30	17.41	18.99	18.31	18.25
return cost NST	19.93	23.07	23.61	19.08	16.72	18.97	23.54	19.97	22.83
purchasing cost AHL	1,505.05	1,504.80	1,504.87	1,505.13	1,505.53	1,501.59	1,501.14	1,501.87	1,501.23
purchasing cost ERENKOY	5,732.60	5,728.56	5,731.00	5,729.84	5,729.84	5,730.13	5,731.13	5,732.64	5,728.51
purchasing cost NST	3,345.75	3,333.46	3,333.37	3,345.96	3,348.90	3,345.99	3,333.52	3,346.04	3,333.82
penalty cost AHL	4.33	4.48	4.46	4.30	4.12	5.98	6.25	5.83	6.15
penalty cost ERENKOY	13.00	15.11	14.01	14.24	14.27	14.11	13.95	12.99	15.13
penalty cost NST	2.19	8.59	8.59	2.05	0.61	2.03	8.53	2.03	8.34
holding cost AHL	64.02	64.10	64.08	64.04	64.03	56.91	56.96	56.92	56.99
holding cost ERENKOY	144.48	134.54	144.45	134.47	134.64	134.60	144.57	144.59	134.65
holding cost NST	82.58	70.34	70.24	82.74	94.84	82.84	70.33	82.68	70.44
holding cost WH	106.29	106.54	107.32	105.54	104.22	106.16	107.80	106.88	107.17
rent cost AHL	230.13	230.09	230.10	230.14	230.20	229.62	229.55	229.66	229.57
rent cost ERENKOY	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00
rent cost NST	750.00	750.00	750.00	750.00	750.00	750.00	750.00	750.00	750.00
revenue AHL	2,301.30	2,300.90	2,301.00	2,301.41	2,302.00	2,296.19	2,295.47	2,296.62	2,295.66
revenue ERENKOY	8,790.25	8,784.10	8,787.64	8,786.26	8,786.22	8,786.67	8,787.84	8,790.30	8,784.04
revenue NST	5,191.05	5,172.36	5,172.27	5,191.40	5,195.78	5,191.44	5,172.48	5,191.49	5,172.97
total cost	14,053.64	14,028.23	14,042.17	14,038.76	14,047.16	14,033.09	14,036.16	14,048.43	14,022.08
profit	2,228.96	2,229.13	2,218.73	2,240.31	2,236.84	2,241.22	2,219.62	2,229.98	2,230.59

Table 4.36. Daily outputs of system with three stores no transfer in 12 % discount period

z values of AHL store	6 DAYS	6 DAYS	6 DAYS	6 DAYS	5 DAYS	5 DAYS	5 DAYS	5 DAYS	5 DAYS
z values of ERENKOY store	8 DAYS	7 DAYS	8 DAYS	7 DAYS	7 DAYS	8 DAYS	8 DAYS	7 DAYS	5 DAYS
z values of NST store	5 DAYS	4 DAYS	4 DAYS	5 DAYS	5 DAYS	4 DAYS	5 DAYS	4 DAYS	5 DAYS
shipment cost AHL	54.61	54.53	54.59	54.61	56.66	56.61	56.64	56.55	58.48
shipment cost ERENKOY	127.20	126.92	127.79	126.30	126.23	127.73	127.18	126.88	142.08
shipment cost NST	76.51	75.43	75.37	76.37	76.65	75.81	76.86	75.80	78.65
shipment cost WH	347.71	346.93	346.82	347.81	347.86	346.90	347.74	346.98	345.15
return cost AHL	7.38	7.26	7.35	7.38	10.45	10.38	10.42	10.30	13.01
return cost ERENKOY	13.53	13.07	14.38	12.20	12.10	14.29	13.49	13.03	38.30
return cost NST	17.44	16.74	16.61	17.27	17.69	17.26	17.97	17.27	20.57
purchasing cost AHL	1,954.03	1,954.04	1,953.99	1,954.05	1,953.58	1,953.61	1,953.59	1,953.63	1,953.51
purchasing cost ERENKOY	6,364.33	6,363.63	6,364.48	6,363.38	6,363.37	6,364.46	6,364.17	6,363.71	6,275.91
purchasing cost NST	3,408.45	3,385.25	3,385.87	3,407.78	3,407.91	3,386.32	3,408.54	3,385.78	3,407.08
penalty cost AHL	0.01	0.01	0.03	0.01	0.18	0.18	0.18	0.16	0.21
penalty cost ERENKOY	0.07	0.34	0.02	0.44	0.44	0.03	0.14	0.31	34.07
penalty cost NST	3.67	13.11	12.85	3.98	3.90	12.64	3.64	12.93	4.22
holding cost AHL	70.78	70.87	70.83	70.85	62.43	62.32	62.32	62.43	62.61
holding cost ERENKOY	177.00	167.70	177.12	167.64	167.81	177.25	177.19	167.86	122.54
holding cost NST	76.63	62.26	62.16	76.77	76.99	62.34	76.85	62.46	78.56
holding cost WH	107.75	105.95	106.90	106.87	107.84	107.98	108.75	106.99	121.75
rent cost AHL	283.82	283.82	283.81	283.82	283.75	283.76	283.76	283.76	283.74
rent cost ERENKOY	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00
rent cost NST	750.00	750.00	750.00	750.00	750.00	750.00	750.00	750.00	750.00
revenue AHL	2,838.16	2,838.17	2,838.10	2,838.18	2,837.55	2,837.57	2,837.55	2,837.62	2,837.44
revenue ERENKOY	8,959.74	8,958.77	8,959.95	8,958.43	8,958.42	8,959.92	8,959.52	8,958.89	8,837.33
revenue NST	4,867.01	4,834.37	4,835.25	4,866.03	4,866.24	4,835.91	4,867.13	4,835.08	4,865.10
total cost	15,340.94	15,297.86	15,310.95	15,327.53	15,325.87	15,309.84	15,339.44	15,296.81	15,290.44
profit	1,323.98	1,333.45	1,322.36	1,335.11	1,336.34	1,323.56	1,324.77	1,334.78	1,249.42

Table 4.37. Daily outputs of system with three stores with transfer in no discount period

z values of AHL store	7 DAYS	7 DAYS	7 DAYS	7 DAYS	7 DAYS	6 DAYS	6 DAYS	6 DAYS	6 DAYS
z values of ERENKOY store	8 DAYS	7 DAYS	8 DAYS	7 DAYS	7 DAYS	7 DAYS	8 DAYS	8 DAYS	7 DAYS
z values of NST store	6 DAYS	5 DAYS	5 DAYS	6 DAYS	7 DAYS	6 DAYS	5 DAYS	6 DAYS	5 DAYS
transfer cost AHL	1.28	1.21	1.32	1.18	1.13	1.19	1.29	1.32	1.20
transfer cost ERENKOY	6.38	6.88	6.72	6.43	6.14	6.81	7.17	6.76	7.20
transfer cost NST	1.74	1.90	1.85	1.84	1.95	1.95	1.90	1.81	2.01
shipment cost AHL	40.77	40.83	40.73	40.90	41.08	42.09	41.93	41.85	42.10
shipment cost ERENKOY	99.28	98.26	99.13	98.70	99.34	97.89	98.14	98.54	97.54
shipment cost NST	68.85	69.18	69.65	68.34	66.45	68.21	69.38	68.58	68.89
shipment cost WH	290.62	290.33	290.31	290.69	290.95	290.67	290.23	290.50	290.17
return cost AHL	4.70	4.36	4.70	4.47	4.39	4.83	4.86	4.92	4.87
return cost ERENKOY	9.36	9.26	9.91	8.67	8.48	8.69	9.83	9.36	9.17
return cost NST	7.46	7.31	8.23	6.96	5.46	6.98	8.11	7.41	7.38
purchasing cost AHL	1,505.73	1,505.01	1,504.93	1,505.31	1,505.45	1,501.84	1,500.87	1,501.61	1,501.30
purchasing cost ERENKOY	5,734.48	5,731.35	5,733.66	5,731.43	5,732.52	5,731.85	5,734.02	5,734.27	5,731.77
purchasing cost NST	3,346.20	3,335.51	3,336.31	3,346.52	3,348.89	3,346.68	3,336.50	3,346.65	3,335.01
penalty cost AHL	4.01	4.38	4.43	4.21	4.13	5.88	6.37	5.98	6.14
penalty cost ERENKOY	11.75	13.28	12.22	13.19	12.47	13.01	12.06	11.84	13.11
penalty cost NST	1.93	7.31	6.96	1.74	0.62	1.65	6.89	1.67	7.59
holding cost AHL	64.05	64.17	64.11	64.12	64.12	57.13	57.15	57.12	57.22
holding cost ERENKOY	144.92	135.03	144.95	134.92	135.00	135.10	145.15	145.14	135.16
holding cost NST	82.34	70.14	70.15	82.45	94.50	82.47	70.19	82.42	70.23
holding cost WH	108.14	107.82	108.80	107.27	106.25	107.92	109.34	108.62	108.41
rent cost AHL	230.23	230.12	230.11	230.17	230.19	229.66	229.51	229.62	229.57
rent cost ERENKOY	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00
rent cost NST	750.00	750.00	750.00	750.00	750.00	750.00	750.00	750.00	750.00
revenue AHL	2,302.29	2,301.21	2,301.08	2,301.69	2,301.90	2,296.55	2,295.08	2,296.21	2,295.74
revenue ERENKOY	8,793.39	8,788.72	8,792.09	8,788.90	8,790.71	8,789.50	8,792.61	8,793.08	8,789.32
revenue NST	5,191.76	5,175.69	5,176.84	5,192.27	5,195.75	5,192.51	5,177.09	5,192.46	5,174.90
total cost	14,014.21	13,983.67	13,999.19	13,999.52	14,009.50	13,992.50	13,990.89	14,005.99	13,976.05
profit	2,273.23	2,281.96	2,270.83	2,283.33	2,278.86	2,286.06	2,273.89	2,275.76	2,283.92

Table 4.38. Daily outputs of system with three stores with transfer in 12 % discount period

z values of AHL store	6 DAYS	6 DAYS	6 DAYS	6 DAYS	5 DAYS	5 DAYS	5 DAYS	5 DAYS	5 DAYS
z values of ERENKOY store	8 DAYS	7 DAYS	8 DAYS	7 DAYS	7 DAYS	8 DAYS	8 DAYS	7 DAYS	5 DAYS
z values of NST store	5 DAYS	4 DAYS	4 DAYS	5 DAYS	5 DAYS	4 DAYS	5 DAYS	4 DAYS	5 DAYS
transfer cost AHL	0.99	0.81	0.92	0.85	0.80	0.85	0.92	0.78	1.20
transfer cost ERENKOY	5.86	5.49	5.39	5.84	6.39	6.03	6.38	6.08	6.15
transfer cost NST	1.46	1.60	1.55	1.50	1.59	1.62	1.53	1.65	3.42
shipment cost AHL	52.91	53.03	52.77	53.14	54.89	54.61	54.59	54.67	55.48
shipment cost ERENKOY	114.30	114.61	115.55	113.64	112.56	114.14	113.26	113.45	123.84
shipment cost NST	73.38	71.14	71.15	73.09	73.00	71.22	73.28	71.29	70.64
shipment cost WH	347.57	346.69	346.63	347.70	347.74	346.70	347.66	346.84	346.02
return cost AHL	2.20	2.02	2.06	2.19	2.76	2.56	2.70	2.55	4.66
return cost ERENKOY	6.31	5.57	6.37	5.48	5.67	6.50	6.50	5.80	17.35
return cost NST	3.47	2.62	2.75	3.22	3.33	2.84	3.58	2.73	5.60
purchasing cost AHL	1,954.04	1,954.00	1,954.02	1,954.01	1,953.61	1,953.51	1,953.62	1,953.73	1,953.13
purchasing cost ERENKOY	6,364.14	6,363.56	6,364.44	6,363.40	6,363.53	6,364.49	6,364.18	6,363.66	6,303.61
purchasing cost NST	3,405.39	3,381.57	3,383.49	3,404.29	3,404.33	3,383.81	3,405.71	3,382.42	3,404.70
penalty cost AHL	0.01	0.03	0.02	0.02	0.19	0.24	0.19	0.14	0.40
penalty cost ERENKOY	0.14	0.37	0.03	0.43	0.38	0.01	0.12	0.33	23.01
penalty cost NST	4.96	14.88	14.01	5.39	5.43	14.03	4.86	14.55	5.21
holding cost AHL	70.48	70.59	70.55	70.55	62.43	62.42	62.39	62.46	62.74
holding cost ERENKOY	177.43	168.17	177.47	168.06	168.26	177.72	177.67	168.31	124.97
holding cost NST	76.17	61.68	61.63	76.30	76.36	61.72	76.31	61.75	77.62
holding cost WH	110.16	107.89	109.39	108.62	109.73	110.27	110.90	109.10	122.60
rent cost AHL	283.82	283.81	283.81	283.81	283.76	283.74	283.76	283.77	283.69
rent cost ERENKOY	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00
rent cost NST	750.00	750.00	750.00	750.00	750.00	750.00	750.00	750.00	750.00
revenue AHL	2,838.17	2,838.12	2,838.14	2,838.14	2,837.56	2,837.41	2,837.58	2,837.73	2,836.87
revenue ERENKOY	8,959.49	8,958.69	8,959.90	8,958.46	8,958.63	8,959.96	8,959.55	8,958.82	8,876.09
revenue NST	4,862.66	4,828.93	4,831.72	4,861.13	4,861.14	4,832.02	4,863.08	4,830.11	4,861.72
total cost	15,305.19	15,260.13	15,274.00	15,291.55	15,286.75	15,269.02	15,300.11	15,256.05	15,246.02
profit	1,355.14	1,365.60	1,355.76	1,366.18	1,370.58	1,360.37	1,360.11	1,370.61	1,328.67

System profit decreases sharply when the z value of ERENKOY store becomes five days. ERENKOY store is the most profitable store in the system. For the highest profit without transfers, z values are as follows: six days for AHL store, seven days for ERENKOY store, and six days for NST store in the no discount period. Furthermore, allowing transfers, the z values do not change for the highest profit. z values of five days for AHL store, seven days for ERENKOY store, and four days for NST store are the values that give the highest profit in the 12% discount period. Moreover, the profit of the system is almost the same for the z value of five days for NST store.

Allowing transfers increases profit by 2% and decreases transportation cost by 7.6% in the no discount period, as well as decreasing transportation cost by 6.4% and increasing profit by 2.5 % in the 12% discount period. We can thus say that allowing transfers between the three stores is more effective in the no discount period.

It is obvious that transfer effect increases when the number of stores increases. The differences between the profits occurring for different z values are small percentages. The company is Turkey's leading provider of books, music, and videos operating 32 stores in eight cities. The company had about 100 million YTL in revenue and 20 million YTL in profits in 2004. Thus, a 1 % recovery rate means 200,000 YTL/year.

5. CONCLUSIONS AND FUTURE RESEARCH

Inventory management has always been an important task in the workings of an effective supply chain. In this project, we have presented analyses of an inventory system with multi stores, multi items, considering various discount options via a simulation of the model. The model is a real-life problem of any book and music chain store. The company works sales oriented ignoring effective inventory control and profitability of campaigns. We have tried to emphasize the importance of pricing options. This investigation gives pause for thought as to whether the discount and ordering information is important or not, so that in the end we want to know the effects of these on the company's profit. Firstly, we compared the performance of one store distribution systems with each other so as to analyze the effect of ordering policies on profit. Then, we simulated the system with two stores for different discount rates with transferring options, and compared their performance. Lastly, we simulated the system with three stores so as to analyze the effect of transfers. In transfer allowed systems, we used complete pooling for responding to demands rapidly. Our results indicate that determining ordering policies for each store is a crucial decision variable for the company. Making any discount is not profitable for the company despite increasing demand. Discounts should be made for the selling-off of old products or the reduction of excess inventory in the warehouse. We have also discovered that the efficiency of transfer increases as the number of stores increase. The findings are valid under the specific assumptions of the model studied in this project.

For this subject, there are many parameters to be investigated. In further studies, a number of extensions should be included in our model. Related topics are the following:

- Stock dependent demand
- Shelf space allocation
- Product assortment and number of stores should be increased
- Capacity constraints for transfers and shipments
- Alternative partial pooling designs for more stores
- Different ordering and transferring policies
- Different discount rates for each product and store

APPENDIX A: PAIRWISE COMPARISON METHODS

Table A.1. Analysis of variance for the research book sales data of AHL store in no discount period

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F_0	P- Value
Days	5221.95	6.00	870.33	8.01	< 0,01
Error	78564.60	723.00	108.66		
Total	83786.55	729.00			
$F_{0.05,6,723}$	2.10				
$F_0 =$	8.01 > 2,1 ; reject H_0				

Table A.2. Analysis of variance for the education book sales data of AHL store in no discount period

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F_0	P- Value
Days	2894.27	6.00	482.38	5.04	< 0,01
Error	69152.33	723.00	95.65		
Total	72046.60	729.00			
$F_{0.05,6,723}$	2.10				
$F_0 =$	5.04 > 2,1 ; reject H_0				

Table A.3. Analysis of variance for the literature book sales data of AHL store in no discount period

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F_0	P- Value
Days	42290.77	6.00	7,048.46	10.24	< 0,01
Error	497477.93	723.00	688.07		
Total	539768.70	729.00			
$F_{0.05,6,723}$	2.10				
$F_0 =$	10.24 > 2,1 ; reject H_0				

Table A.4. Analysis of variance for the pop / rock music sales data of AHL store in no discount period

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F_0	P- Value
Days	635.27	6.00	105.88	3.77	< 0,01
Error	20300.60	723.00	28.08		
Total	20935.87	729.00			
$F_{0.05,6,723}$	2.10				
$F_{0=}$	3.77	> 2,1 ; reject H_0			

Table A.5. Analysis of variance for the Turkish pop music sales data of AHL store in no discount period

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F_0	P- Value
Days	81889.29	6.00	13,648.22	19.72	< 0,01
Error	500265.48	723.00	691.93		
Total	582154.77	729.00			
$F_{0.05,6,723}$	2.10				
$F_{0=}$	19.72	> 2,1 ; reject H_0			

Table A.6. Analysis of variance for the other music sales data of AHL store in no discount period

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F_0	P- Value
Days	14887.42	6.00	2,481.24	12.04	< 0,01
Error	149054.53	723.00	206.16		
Total	163941.95	729.00			
$F_{0.05,6,723}$	2.10				
$F_{0=}$	12.04	> 2,1 ; reject H_0			

Table A.7. Analysis of variance for the Turkish video sales data of AHL store in no discount period

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F_0	P- Value
Days	1697.26	6.00	282.88	3.51	< 0,01
Error	58338.12	723.00	80.69		
Total	60035.38	729.00			
$F_{0.05,6,723}$	2.10				
$F_{0=}$	3.51	> 2,1 ; reject H_0			

Table A.8. Analysis of variance for the foreign video sales data of AHL store in no discount period

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F_0	P- Value
Days	415.77	6.00	69.29	2.06	0.12
Error	24327.52	723.00	33.65		
Total	24743.29	729.00			
$F_{0.05,6,723}$	2.10				
$F_0 =$	2.06	< 2,1 ; accept H_0			

Table A.9. Analysis of variance for the research book sales data of AHL store in campaign period

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F_0	P- Value
Days	1741.25	6.00	290.21	6.96	< 0,01
Error	5792.65	139.00	41.67		
Total	7533.89	145.00			
$F_{0.05,6,138}$	2.10				
$F_0 =$	6.96	> 2,1 ; reject H_0			

Table A.10. Analysis of variance for the education book sales data of AHL store in campaign period

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F_0	P- Value
Days	487.92	6.00	81.32	2.35	< 0,01
Error	4814.30	139.00	34.64		
Total	5302.22	145.00			
$F_{0.05,6,138}$	2.10				
$F_0 =$	2.35	> 2,1 ; reject H_0			

Table A.11. Analysis of variance for the literature book sales data of AHL store in campaign period

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F_0	P- Value
Days	20434.08	6.00	3,405.68	16.48	< 0,01
Error	28716.66	139.00	206.59		
Total	49150.75	145.00			
$F_{0.05,6,138}$	2.10				
$F_0 =$	16.48	> 2,1 ; reject H_0			

Table A.12. Analysis of variance for the pop/rock music sales data of AHL store in campaign period

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F_0	P - Value
Days	251.63	6.00	41.94	1.39	< 0,01
Error	4184.70	139.00	30.11		
Total	4436.34	145.00			
$F_{0.05,6,138}$	2.10				
$F_{0=}$	1.39	< 2,1 ; accept H_0			

Table A.13. Analysis of variance for the Turkish pop music sales data of AHL store in campaign period

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F_0	P - Value
Days	17764.09	6.00	2,960.68	13.00	< 0,01
Error	31652.25	139.00	227.71		
Total	49416.34	145.00			
$F_{0.05,6,138}$	2.10				
$F_{0=}$	13.00	> 2,1 ; reject H_0			

Table A.14. Analysis of variance for the other music sales data of AHL store in campaign period

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F_0	P - Value
Days	2905.78	6.00	484.30	5.38	< 0,01
Error	12515.56	139.00	90.04		
Total	15421.34	145.00			
$F_{0.05,6,138}$	2.10				
$F_{0=}$	5.38	> 2,1 ; reject H_0			

Table A.15. Analysis of variance for the Turkish video sales data of AHL store in campaign period

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F_0	P - Value
Days	362.31	6.00	60.39	1.50	< 0,01
Error	5591.67	139.00	40.23		
Total	5953.98	145.00			
$F_{0.05,6,138}$	2.10				
$F_{0=}$	1.50	< 2,1 ; accept H_0			

Table A.16. Analysis of variance for the foreign video sales data of AHL store in campaign period

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F_0	P- Value
Days	196.87	6.00	32.81	4.00	< 0,01
Error	1139.65	139.00	8.20		
Total	1336.52	145.00			
$F_{0.05,6,138}$	2.10				
$F_0 =$	4.00	> 2,1 ; reject H_0			

Table A.17. Analysis of variance for the research book sales data of ERENKOY store in no discount period

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F_0	P- Value
Days	71763.34	6.00	11,960.56	99.63	< 0,01
Error	86917.12	724.00	120.05		
Total	158680.46	730.00			
$F_{0.05,6,724}$	2.10				
$F_0 =$	99.63	> 2,1 ; reject H_0			

Table A.18. Analysis of variance for the education book sales data of ERENKOY store in no discount period

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F_0	P- Value
Days	199048.02	6.00	33,174.67	180.57	< 0,01
Error	133013.96	724.00	183.72		
Total	332061.98	730.00			
$F_{0.05,6,724}$	2.10				
$F_0 =$	180.57	> 2,1 ; reject H_0			

Table A.19. Analysis of variance for the literature book sales data of ERENKOY store in no discount period

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F_0	P- Value
Days	1651090.03	6.00	275,181.67	134.08	< 0,01
Error	1485951.14	724.00	2,052.42		
Total	3137041.16	730.00			
$F_{0.05,6,724}$	2.10				
$F_0 =$	134.08	> 2,1 ; reject H_0			

Table A.20. Analysis of variance for the pop music sales data of ERENKOY store in no discount period

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F_0	P- Value
Days	190710.72	6.00	31,785.12	158.91	< 0,01
Error	144817.87	724.00	200.02		
Total	335528.58	730.00			
$F_{0.05,6,724}$	2.10				
$F_0 =$	158.91	> 2,1 ; reject H_0			

Table A.21. Analysis of variance for the Turkish pop music sales data of ERENKOY store in no discount period

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F_0	P- Value
Days	1640297.19	6.00	273,382.86	60.10	< 0,01
Error	3293584.48	724.00	4,549.15		
Total	4933881.67	730.00			
$F_{0.05,6,724}$	2.10				
$F_0 =$	60.10	> 2,1 ; reject H_0			

Table A.22. Analysis of variance for the other music sales data of ERENKOY store in no discount period

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F_0	P- Value
Days	59706.76	6.00	9,951.13	54.26	< 0,01
Error	132779.70	724.00	183.40		
Total	192486.46	730.00			
$F_{0.05,6,724}$	2.10				
$F_0 =$	54.26	> 2,1 ; reject H_0			

Table A.23. Analysis of variance for the Turkish video sales data of ERENKOY store in no discount period

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F_0	P- Value
Days	8845.18	6.00	1,474.20	24.41	< 0,01
Error	43720.53	724.00	60.39		
Total	52565.71	730.00			
$F_{0.05,6,724}$	2.10				
$F_0 =$	24.41	> 2,1 ; reject H_0			

Table A.24. Analysis of variance for the foreign video sales data of ERENKOY store in no discount period

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F_0	P- Value
Days	1691678.64	6.00	281,946.44	137.95	< 0,01
Error	1479716.01	724.00	2,043.81		
Total	3171394.65	730.00			
$F_{0.05,6,724}$	2.10				
$F_0 =$	137.95	> 2,1 ; reject H_0			

Table A.25. Analysis of variance for the research book sales data of ERENKOY store in campaign period

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F_0	P- Value
Days	16709.91	6.00	2,784.99	34.82	< 0,01
Error	14237.71	178.00	79.99		
Total	30947.62	184.00			
$F_{0.05,6,178}$	2.10				
$F_0 =$	34.82	> 2,1 ; reject H_0			

Table A.26. Analysis of variance for the education book sales data of ERENKOY store in campaign period

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F_0	P- Value
Days	47056.04	6.00	7,842.67	35.66	< 0,01
Error	39149.22	178.00	219.94		
Total	86205.26	184.00			
$F_{0.05,6,178}$	2.10				
$F_0 =$	35.66	> 2,1 ; reject H_0			

Table A.27. Analysis of variance for the literature book sales data of ERENKOY store in campaign period

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F_0	P- Value
Days	492015.64	6.00	82,002.61	56.97	< 0,01
Error	256212.16	178.00	1,439.39		
Total	748227.81	184.00			
$F_{0.05,6,178}$	2.10				
$F_0 =$	56.97	> 2,1 ; reject H_0			

Table A.28. Analysis of variance for the pop rock music sales data of ERENKOY store in campaign period

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F_0	P - Value
Days	34423.38	6.00	5,737.23	47.05	< 0,01
Error	21704.48	178.00	121.94		
Total	56127.86	184.00			
$F_{0.05,6,178}$	2.10				
$F_0 =$	47.05	> 2,1 ; reject H_0			

Table A.29. Analysis of variance for the Turkish pop music sales data of ERENKOY store in campaign period

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F_0	P - Value
Days	543047.78	6.00	90,507.96	15.00	< 0,01
Error	1074036.08	178.00	6,033.91		
Total	1617083.86	184.00			
$F_{0.05,6,178}$	2.10				
$F_0 =$	15.00	> 2,1 ; reject H_0			

Table A.30. Analysis of variance for the other music sales data of ERENKOY store in campaign period

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F_0	P - Value
Days	11630.91	6.00	1,938.48	17.77	< 0,01
Error	19417.83	178.00	109.09		
Total	31048.74	184.00			
$F_{0.05,6,178}$	2.10				
$F_0 =$	17.77	> 2,1 ; reject H_0			

Table A.31. Analysis of variance for the Turkish video sales data of ERENKOY store in campaign period

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F_0	P - Value
Days	2497.65	6.00	416.27	6.82	< 0,01
Error	10872.17	178.00	61.08		
Total	13369.82	184.00			
$F_{0.05,6,178}$	2.10				
$F_0 =$	6.82	> 2,1 ; reject H_0			

Table A.32. Analysis of variance for the foreign video sales data of ERENKOY store in campaign period

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F_0	P- Value
Days	543414.28	6.00	90,569.05	48.54	< 0,01
Error	332091.67	178.00	1,865.68		
Total	875505.95	184.00			
$F_{0.05,6,178}$	2.10				
$F_{0=}$	48.54	> 2,1 ; reject H_0			

Table A.33. Analysis of variance for the research book sales data of NST store in no discount period

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F_0	P- Value
Days	10088.64	6.00	1,681.44	23.45	< 0,01
Error	51910.71	724.00	71.70		
Total	61999.35	730.00			
$F_{0.05,6,724}$	2.10				
$F_{0=}$	23.45	> 2,1 ; reject H_0			

Table A.34. Analysis of variance for the education book sales data of NST store in no discount period

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F_0	P- Value
Days	24180.85	6.00	4,030.14	39.17	< 0,01
Error	74484.59	724.00	102.88		
Total	98665.45	730.00			
$F_{0.05,6,724}$	2.10				
$F_{0=}$	39.17	> 2,1 ; reject H_0			

Table A.35. Analysis of variance for the literature book sales data of NST store in no discount period

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F_0	P- Value
Days	268747.20	6.00	44,791.20	59.41	< 0,01
Error	545862.97	724.00	753.95		
Total	814610.16	730.00			
$F_{0.05,6,724}$	2.10				
$F_{0=}$	59.41	> 2,1 ; reject H_0			

Table A.36. Analysis of variance for the pop music sales data of NST store in no discount period

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F_0	P- Value
Days	16755.03	6.00	2,792.51	53.30	< 0,01
Error	37933.33	724.00	52.39		
Total	54688.37	730.00			
$F_{0.05,6,724}$	2.10				
$F_0 =$	53.30	> 2,1 ; reject H_0			

Table A.37. Analysis of variance for the Turkish pop music sales data of NST store in no discount period

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F_0	P- Value
Days	111401.66	6.00	18,566.94	20.63	< 0,01
Error	651677.27	724.00	900.11		
Total	763078.93	730.00			
$F_{0.05,6,724}$	2.10				
$F_0 =$	20.63	> 2,1 ; reject H_0			

Table A.38. Analysis of variance for the other music sales data of NST store in no discount period

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F_0	P- Value
Days	3500.91	6.00	583.49	11.57	< 0,01
Error	36515.71	724.00	50.44		
Total	40016.63	730.00			
$F_{0.05,6,724}$	2.10				
$F_0 =$	11.57	> 2,1 ; reject H_0			

Table A.39. Analysis of variance for the Turkish video sales data of NST store in no discount period

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F_0	P- Value
Days	944.75	6.00	157.46	6.08	< 0,01
Error	18751.94	724.00	25.90		
Total	19696.69	730.00			
$F_{0.05,6,724}$	2.10				
$F_0 =$	6.08	> 2,1 ; reject H_0			

Table A.40. Analysis of variance for the foreign video sales data of NST store in no discount period

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F_0	P- Value
Days	244395.90	6.00	40,732.65	53.02	< 0,01
Error	556175.81	724.00	768.20		
Total	800571.71	730.00			
$F_{0.05,6,724}$	2.10				
$F_{0=}$	53.02	> 2,1 ; reject H_0			

Table A.41. Analysis of variance for the research book sales data of NST store in campaign period

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F_0	P- Value
Days	3122.58	6.00	520.43	9.77	< 0,01
Error	9484.48	178.00	53.28		
Total	12607.06	184.00			
$F_{0.05,6,178}$	2.10				
$F_{0=}$	9.77	> 2,1 ; reject H_0			

Table A.42. Analysis of variance for the education book sales data of NST store in campaign period

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F_0	P- Value
Days	5711.41	6.00	951.90	9.46	< 0,01
Error	17912.41	178.00	100.63		
Total	23623.82	184.00			
$F_{0.05,6,178}$	2.10				
$F_{0=}$	9.46	> 2,1 ; reject H_0			

Table A.43. Analysis of variance for the literature book sales data of NST store in campaign period

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F_0	P- Value
Days	74815.84	6.00	12,469.31	23.11	< 0,01
Error	96062.10	178.00	539.67		
Total	170877.95	184.00			
$F_{0.05,6,178}$	2.10				
$F_{0=}$	23.11	> 2,1 ; reject H_0			

Table A.44. Analysis of variance for the pop rock music sales data of NST store in campaign period

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F_0	P - Value
Days	2731.52	6.00	455.25	13.92	< 0,01
Error	5822.30	178.00	32.71		
Total	8553.82	184.00			
$F_{0.05,6,178}$	2.10				
$F_0 =$	13.92	> 2,1 ; reject H_0			

Table A.45. Analysis of variance for the Turkish pop music sales data of NST store in campaign period

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F_0	P - Value
Days	48510.64	6.00	8,085.11	6.20	< 0,01
Error	231971.50	178.00	1,303.21		
Total	280482.14	184.00			
$F_{0.05,6,178}$	2.10				
$F_0 =$	6.20	> 2,1 ; reject H_0			

Table A.46. Analysis of variance for the other music sales data of NST store in campaign period

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F_0	P - Value
Days	1189.75	6.00	198.29	5.15	< 0,01
Error	6859.87	178.00	38.54		
Total	8049.62	184.00			
$F_{0.05,6,178}$	2.10				
$F_0 =$	5.15	> 2,1 ; reject H_0			

Table A.47. Analysis of variance for the Turkish video sales data of NST store in campaign period

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F_0	P - Value
Days	609.31	6.00	101.55	4.65	< 0,01
Error	3891.42	178.00	21.86		
Total	4500.74	184.00			
$F_{0.05,6,178}$	2.10				
$F_0 =$	4.65	> 2,1 ; reject H_0			

Table A.48. Analysis of variance for the foreign video sales data of NST store in campaign period

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F_0	P - Value
Days	49060.51	6.00	8,176.75	24.25	< 0,01
Error	60010.55	178.00	337.14		
Total	109071.06	184.00			
$F_{0.05,6,178}$	2.10				
$F_0 =$	24.25	> 2,1 ; reject H_0			

Starred values in the tables indicate that pairs are significantly different.

Table A.49. Tukey's test tables of AHL store in no discount period

	Research Book		Education Book		Literature Book		Pop/Rock Music		Turkish Pop Music		Other Music		Turkish video		Foreign video									
	Differences in Averages	$T_{0.05}$ Value	Differences in Averages	$T_{0.05}$ Value	Differences in Averages	$T_{0.05}$ Value	Differences in Averages	$T_{0.05}$ Value	Differences in Averages	$T_{0.05}$ Value	Differences in Averages	$T_{0.05}$ Value	Differences in Averages	$T_{0.05}$ Value	Differences in Averages	$T_{0.05}$ Value								
$\overline{y_1} - \overline{y_2}$	1.87	4.26	1.12	4.00	8.04	10.73	1.25	2.17	13.09	10.76	*	4.82	5.87	0.48	3.67	1.05	2.37							
$\overline{y_1} - \overline{y_3}$	1.70	4.25	0.16	3.99	5.30	10.70	0.95	2.16	8.77	10.73		2.66	5.86	2.03	3.66	0.46	2.37							
$\overline{y_1} - \overline{y_4}$	2.99	4.25	-0.51	3.99	6.58	10.70	0.60	2.16	8.79	10.73		2.52	5.86	0.60	3.66	0.24	2.37							
$\overline{y_1} - \overline{y_5}$	0.60	4.25	-0.57	3.99	4.52	10.70	0.39	2.16	6.96	10.73		2.46	5.86	1.26	3.66	-0.56	2.37							
$\overline{y_1} - \overline{y_6}$	1.13	4.27	-1.13	4.01	2.76	10.75	0.34	2.17	4.25	10.78		2.76	5.89	0.28	3.68	0.25	2.38							
$\overline{y_1} - \overline{y_7}$	-5.84	4.26	*	-5.54	4.00	*	-16.12	10.73	*	-1.85	2.17		-21.33	10.76	*	-9.85	5.87	*	-3.19	3.67	-1.50	2.37		
$\overline{y_2} - \overline{y_3}$	-0.17	4.25		-0.96	3.99		-2.74	10.70		-0.30	2.16		-4.32	10.73		-2.16	5.86		1.55	3.66	-0.59	2.37		
$\overline{y_2} - \overline{y_4}$	1.12	4.25		-1.63	3.99		-1.46	10.70		-0.65	2.16		-4.30	10.73		-2.30	5.86		0.11	3.66	-0.81	2.37		
$\overline{y_2} - \overline{y_5}$	-1.26	4.25		-1.68	3.99		-3.52	10.70		-0.86	2.16		-6.12	10.73		-2.36	5.86		0.78	3.66	-1.61	2.37		
$\overline{y_2} - \overline{y_6}$	-0.73	4.27		-2.25	4.01		-5.28	10.75		-0.91	2.17		-8.83	10.78		-2.06	5.89		-0.20	3.68	-0.80	2.38		
$\overline{y_2} - \overline{y_7}$	-7.70	4.26	*	-6.65	4.00	*	-24.15	10.73	*	-3.10	2.17	*	-34.41	10.76	*	-14.66	5.87	*	-3.67	3.67	*	-2.55	2.37	*
$\overline{y_3} - \overline{y_4}$	1.29	4.24		-0.67	3.98		1.28	10.67		-0.35	2.16		0.02	10.70		-0.13	5.84		-1.44	3.66	-0.22	2.36		
$\overline{y_3} - \overline{y_5}$	-1.10	4.24		-0.72	3.98		-0.78	10.67		-0.56	2.16		-1.81	10.70		-0.20	5.84		-0.77	3.66	-1.02	2.36		
$\overline{y_3} - \overline{y_6}$	-0.57	4.26		-1.29	4.00		-2.54	10.73		-0.61	2.17		-4.52	10.76		0.10	5.87		-1.76	3.67	-0.21	2.37		
$\overline{y_3} - \overline{y_7}$	-7.54	4.25	*	-5.70	3.99	*	-21.42	10.70	*	-2.80	2.16	*	-30.10	10.73	*	-12.50	5.86	*	-5.23	3.66	*	-1.96	2.37	
$\overline{y_4} - \overline{y_5}$	-2.38	4.24		-0.06	3.98		-2.06	10.67		-0.21	2.16		-1.83	10.70		-0.07	5.84		0.67	3.66	-0.80	2.36		
$\overline{y_4} - \overline{y_6}$	-1.85	4.26		-0.62	4.00		-3.82	10.73		-0.26	2.17		-4.54	10.76		0.24	5.87		-0.32	3.67	0.01	2.37		
$\overline{y_4} - \overline{y_7}$	-8.82	4.25	*	-5.03	3.99	*	-22.69	10.70	*	-2.45	2.16	*	-30.12	10.73	*	-12.37	5.86	*	-3.79	3.66	*	-1.74	2.37	
$\overline{y_5} - \overline{y_6}$	0.53	4.26		-0.56	4.00		-1.76	10.73		-0.05	2.17		-2.71	10.76		0.30	5.87		-0.98	3.67	0.81	2.37		
$\overline{y_5} - \overline{y_7}$	-6.44	4.25	*	-4.97	3.99	*	-20.64	10.70	*	-2.24	2.16	*	-28.29	10.73	*	-12.30	5.86	*	-4.45	3.66	*	-0.94	2.37	
$\overline{y_6} - \overline{y_7}$	-6.97	4.27	*	-4.41	4.01	*	-18.88	10.75	*	-2.18	2.17	*	-25.58	10.78	*	-12.61	5.89	*	-3.47	3.68	-1.75	2.38		

Table A.50. Tukey's test tables of AHL store in campaign period

	Research Book		Education Book		Literature Book		Turkish Pop Music		Other Music		Foreign video					
	Differences in Averages	T _{0.05} Value	Differences in Averages	T _{0.05} Value	Differences in Averages	T _{0.05} Value	Differences in Averages	T _{0.05} Value	Differences in Averages	T _{0.05} Value	Differences in Averages	T _{0.05} Value				
$\bar{y}_1 - \bar{y}_2$	1.60	5.95	-0.32	5.42	12.33	13.24	8.25	13.90	5.08	8.74	2.23	2.64				
$\bar{y}_1 - \bar{y}_3$	3.81	5.87	0.10	5.36	12.29	13.08	7.86	13.73	3.43	8.63	1.76	2.61				
$\bar{y}_1 - \bar{y}_4$	2.57	5.87	-1.67	5.36	11.33	13.08	5.71	13.73	2.48	8.63	1.24	2.61				
$\bar{y}_1 - \bar{y}_5$	2.05	5.87	0.38	5.36	5.48	13.08	4.48	13.73	1.76	8.63	1.19	2.61				
$\bar{y}_1 - \bar{y}_6$	3.76	5.87	0.05	5.36	3.76	13.08	-1.86	13.73	2.24	8.63	1.19	2.61				
$\bar{y}_1 - \bar{y}_7$	-6.90	5.87	*	-5.14	5.36	-23.81	13.08	*	-25.76	13.73	*	-9.57	8.63	*	-1.52	2.61
$\bar{y}_2 - \bar{y}_3$	2.21	5.95	0.41	5.42	-0.05	13.24	-0.39	13.90	-1.65	8.74	-0.46	2.64				
$\bar{y}_2 - \bar{y}_4$	0.97	5.95	-1.35	5.42	-1.00	13.24	-2.53	13.90	-2.61	8.74	-0.99	2.64				
$\bar{y}_2 - \bar{y}_5$	0.45	5.95	0.70	5.42	-6.85	13.24	-3.77	13.90	-3.32	8.74	-1.04	2.64				
$\bar{y}_2 - \bar{y}_6$	2.16	5.95	0.37	5.42	-8.57	13.24	-10.10	13.90	-2.85	8.74	-1.04	2.64				
$\bar{y}_2 - \bar{y}_7$	-8.51	5.95	*	-4.82	5.42	-36.14	13.24	*	-34.01	13.90	*	-14.65	8.74	*	-3.75	2.64
$\bar{y}_3 - \bar{y}_4$	-1.24	5.87	-1.76	5.36	-0.95	13.08	-2.14	13.73	-0.95	8.63	-0.52	2.61				
$\bar{y}_3 - \bar{y}_5$	-1.76	5.87	0.29	5.36	-6.81	13.08	-3.38	13.73	-1.67	8.63	-0.57	2.61				
$\bar{y}_3 - \bar{y}_6$	-0.05	5.87	-0.05	5.36	-8.52	13.08	-9.71	13.73	-1.19	8.63	-0.57	2.61				
$\bar{y}_3 - \bar{y}_7$	-10.71	5.87	*	-5.24	5.36	-36.10	13.08	*	-33.62	13.73	*	-13.00	8.63	*	-3.29	2.61
$\bar{y}_4 - \bar{y}_5$	-0.52	5.87	2.05	5.36	-5.86	13.08	-1.24	13.73	-0.71	8.63	-0.05	2.61				
$\bar{y}_4 - \bar{y}_6$	1.19	5.87	1.71	5.36	-7.57	13.08	-7.57	13.73	-0.24	8.63	-0.05	2.61				
$\bar{y}_4 - \bar{y}_7$	-9.48	5.87	*	-3.48	5.36	-35.14	13.08	*	-31.48	13.73	*	-12.05	8.63	*	-2.76	2.61
$\bar{y}_5 - \bar{y}_6$	1.71	5.87	-0.33	5.36	-1.71	13.08	-6.33	13.73	0.48	8.63	0.00	2.61				
$\bar{y}_5 - \bar{y}_7$	-8.95	5.87	*	-5.52	5.36	* -29.29	13.08	*	-30.24	13.73	*	-11.33	8.63	*	-2.71	2.61
$\bar{y}_6 - \bar{y}_7$	-10.67	5.87	*	-5.19	5.36	-27.57	13.08	*	-23.90	13.73	*	-11.81	8.63	*	-2.71	2.61

Table A.51. Tukey's test tables of ERENKOY store in no discount period

	Research Book		Education Book		Literature Book		Pop/Rock Music		Turkish Pop Music		Other Music		Turkish video		Foreign video	
	Differences in Averages	T _{0.05} Value	Differences in Averages	T _{0.05} Value	Differences in Averages	T _{0.05} Value	Differences in Averages	T _{0.05} Value	Differences in Averages	T _{0.05} Value	Differences in Averages	T _{0.05} Value	Differences in Averages	T _{0.05} Value	Differences in Averages	T _{0.05} Value
$\bar{y}_1 - \bar{y}_2$	-0.89	4.48	1.33	5.54	-1.78	18.52	-0.03	5.78	4.82	27.58	0.47	5.54	-0.77	3.18	-4.16	18.49
$\bar{y}_1 - \bar{y}_3$	-1.15	4.47	0.18	5.53	-1.22	18.48	-1.18	5.77	0.97	27.51	-0.13	5.52	0.29	3.17	-1.36	18.44
$\bar{y}_1 - \bar{y}_4$	-1.57	4.47	0.34	5.53	-0.33	18.48	-1.99	5.77	-3.02	27.51	0.31	5.52	-1.41	3.17	1.88	18.44
$\bar{y}_1 - \bar{y}_5$	-6.19	4.47	* -6.91	5.53	* -24.51	18.48	* -9.94	5.77	* -23.51	27.51	* -5.93	5.52	* -2.48	3.17	* -25.35	18.44
$\bar{y}_1 - \bar{y}_6$	-25.07	4.48	* -38.28	5.54	* -118.83	18.52	* -42.92	5.78	* -123.18	27.58	* -23.10	5.54	* -8.80	3.18	* -123.40	18.49
$\bar{y}_1 - \bar{y}_7$	-21.86	4.48	* -35.99	5.54	* -98.59	18.52	* -31.18	5.78	* -87.38	27.58	* -17.44	5.54	* -7.87	3.18	* -95.55	18.49
$\bar{y}_2 - \bar{y}_3$	-0.26	4.47	-1.15	5.53	0.56	18.48	-1.15	5.77	-3.85	27.51	-0.60	5.52	1.06	3.17	2.80	18.44
$\bar{y}_2 - \bar{y}_4$	-0.68	4.47	-0.99	5.53	1.45	18.48	-1.96	5.77	-7.84	27.51	-0.16	5.52	-0.64	3.17	6.04	18.44
$\bar{y}_2 - \bar{y}_5$	-5.30	4.47	* -8.23	5.53	* -22.73	18.48	* -9.92	5.77	* -28.33	27.51	* -6.40	5.52	* -1.71	3.17	* -21.19	18.44
$\bar{y}_2 - \bar{y}_6$	-24.17	4.48	* -39.61	5.54	* -117.05	18.52	* -42.89	5.78	* -128.00	27.58	* -23.57	5.54	* -8.03	3.18	* -119.24	18.49
$\bar{y}_2 - \bar{y}_7$	-20.96	4.48	* -37.32	5.54	* -96.81	18.52	* -31.15	5.78	* -92.19	27.58	* -17.91	5.54	* -7.10	3.18	* -91.38	18.49
$\bar{y}_3 - \bar{y}_4$	-0.42	4.46	0.16	5.52	0.90	18.44	-0.81	5.76	-3.99	27.45	0.44	5.51	-1.70	3.16	3.24	18.40
$\bar{y}_3 - \bar{y}_5$	-5.04	4.46	* -7.09	5.52	* -23.29	18.44	* -8.76	5.76	* -24.49	27.45	* -5.80	5.51	* -2.77	3.16	* -23.99	18.40
$\bar{y}_3 - \bar{y}_6$	-23.91	4.47	* -38.46	5.53	* -117.61	18.48	* -41.74	5.77	* -124.15	27.51	* -22.97	5.52	* -9.09	3.17	* -122.04	18.44
$\bar{y}_3 - \bar{y}_7$	-20.70	4.47	* -36.17	5.53	* -97.37	18.48	* -30.00	5.77	* -88.35	27.51	* -17.31	5.52	* -8.16	3.17	* -94.19	18.44
$\bar{y}_4 - \bar{y}_5$	-4.62	4.46	* -7.25	5.52	* -24.18	18.44	* -7.95	5.76	* -20.50	27.45	* -6.24	5.51	* -1.07	3.16	* -27.23	18.40
$\bar{y}_4 - \bar{y}_6$	-23.49	4.47	* -38.62	5.53	* -118.50	18.48	* -40.93	5.77	* -120.16	27.51	* -23.40	5.52	* -7.39	3.17	* -125.28	18.44
$\bar{y}_4 - \bar{y}_7$	-20.28	4.47	* -36.33	5.53	* -98.26	18.48	* -29.19	5.77	* -84.36	27.51	* -17.75	5.52	* -6.45	3.17	* -97.43	18.44
$\bar{y}_5 - \bar{y}_6$	-18.88	4.47	* -31.37	5.53	* -94.32	18.48	* -32.98	5.77	* -99.67	27.51	* -17.17	5.52	* -6.32	3.17	* -98.05	18.44
$\bar{y}_5 - \bar{y}_7$	-15.66	4.47	* -29.08	5.53	* -74.08	18.48	* -21.24	5.77	* -63.86	27.51	* -11.51	5.52	* -5.39	3.17	* -70.20	18.44
$\bar{y}_6 - \bar{y}_7$	3.21	4.48	2.29	5.54	20.24	18.52	11.74	5.78	35.81	27.58	5.65	5.54	0.93	3.18	27.86	18.49

Table A.52. Tukey's test tables of ERENKOY store in campaign period

	Research Book		Education Book		Literature Book		Pop/Rock Music		Turkish Pop Music		Other Music		Turkish video		Foreign video	
	Differences in Averages	T _{0.05} Value	Differences in Averages	T _{0.05} Value	Differences in Averages	T _{0.05} Value	Differences in Averages	T _{0.05} Value	Differences in Averages	T _{0.05} Value	Differences in Averages	T _{0.05} Value	Differences in Averages	T _{0.05} Value	Differences in Averages	T _{0.05} Value
$\overline{y_1} - \overline{y_2}$	-2.81	7.31	-0.42	12.13	-4.38	31.03	-2.88	9.03	1.85	63.53	-1.42	8.54	0.96	6.39	-7.54	35.32
$\overline{y_1} - \overline{y_3}$	-0.08	7.25	0.46	12.02	5.55	30.74	-1.17	8.95	9.10	62.93	1.06	8.46	2.96	6.33	8.85	35.00
$\overline{y_1} - \overline{y_4}$	-2.49	7.25	-1.91	12.02	-1.16	30.74	-3.25	8.95	-10.38	62.93	-2.94	8.46	1.40	6.33	4.74	35.00
$\overline{y_1} - \overline{y_5}$	-5.90	7.25	-8.50	12.02	-33.41	30.74 *	-11.39	8.95 *	-20.64	62.93	-7.09	8.46	1.48	6.33	-23.04	35.00
$\overline{y_1} - \overline{y_6}$	-23.54	7.31 *	-38.04	12.13 *	-126.46	31.03 *	-35.27	9.03 *	-138.23	63.53 *	-20.50	8.54 *	-6.38	6.39	-134.88	35.32 *
$\overline{y_1} - \overline{y_7}$	-22.46	7.31 *	-35.96	12.13 *	-109.58	31.03 *	-30.81	9.03 *	-104.38	63.53 *	-17.04	8.54 *	-6.81	6.39 *	-106.92	35.32 *
$\overline{y_2} - \overline{y_3}$	2.73	7.25	0.88	12.02	9.93	30.74	1.71	8.95	7.25	62.93	2.48	8.46	2.00	6.33	16.39	35.00
$\overline{y_2} - \overline{y_4}$	0.32	7.25	-1.49	12.02	3.23	30.74	-0.36	8.95	-12.23	62.93	-1.52	8.46	0.44	6.33	12.28	35.00
$\overline{y_2} - \overline{y_5}$	-3.09	7.25	-8.08	12.02	-29.03	30.74	-8.51	8.95	-22.49	62.93	-5.67	8.46	0.51	6.33	-15.50	35.00
$\overline{y_2} - \overline{y_6}$	-20.73	7.31 *	-37.62	12.13 *	-122.08	31.03 *	-32.38	9.03 *	-140.08	63.53 *	-19.08	8.54 *	-7.35	6.39 *	-127.35	35.32 *
$\overline{y_2} - \overline{y_7}$	-19.65	7.31 *	-35.54	12.13 *	-105.19	31.03 *	-27.92	9.03 *	-106.23	63.53 *	-15.62	8.54 *	-7.77	6.39 *	-99.38	35.32 *
$\overline{y_3} - \overline{y_4}$	-2.41	7.18	-2.37	11.90	-6.70	30.45	-2.07	8.86	-19.48	62.34	-4.00	8.38	-1.56	6.27	-4.11	34.66
$\overline{y_3} - \overline{y_5}$	-5.81	7.18	-8.96	11.90	-38.96	30.45 *	-10.22	8.86 *	-29.74	62.34	-8.15	8.38	-1.48	6.27	-31.89	34.66
$\overline{y_3} - \overline{y_6}$	-23.46	7.25 *	-38.50	12.02 *	-132.01	30.74 *	-34.10	8.95 *	-147.33	62.93 *	-21.56	8.46 *	-9.34	6.33 *	-143.74	35.00 *
$\overline{y_3} - \overline{y_7}$	-22.38	7.25 *	-36.42	12.02 *	-115.13	30.74 *	-29.64	8.95 *	-113.48	62.93 *	-18.10	8.46 *	-9.76	6.33 *	-115.78	35.00 *
$\overline{y_4} - \overline{y_5}$	-3.41	7.18	-6.59	11.90	-32.26	30.45 *	-8.15	8.86	-10.26	62.34	-4.15	8.38	0.07	6.27	-27.78	34.66
$\overline{y_4} - \overline{y_6}$	-21.05	7.25 *	-36.13	12.02 *	-125.31	30.74 *	-32.02	8.95 *	-127.85	62.93 *	-17.56	8.46 *	-7.79	6.33 *	-139.63	35.00 *
$\overline{y_4} - \overline{y_7}$	-19.97	7.25 *	-34.05	12.02 *	-108.42	30.74 *	-27.56	8.95 *	-94.00	62.93 *	-14.10	8.46 *	-8.21	6.33 *	-111.67	35.00 *
$\overline{y_5} - \overline{y_6}$	-17.64	7.25 *	-29.54	12.02 *	-93.05	30.74 *	-23.87	8.95 *	-117.59	62.93 *	-13.41	8.46 *	-7.86	6.33 *	-111.85	35.00 *
$\overline{y_5} - \overline{y_7}$	-16.56	7.25 *	-27.46	12.02 *	-76.16	30.74 *	-19.41	8.95 *	-83.74	62.93 *	-9.95	8.46 *	-8.28	6.33 *	-83.89	35.00 *
$\overline{y_6} - \overline{y_7}$	1.08	7.31	2.08	12.13	16.88	31.03	4.46	9.03	33.85	63.53	3.46	8.54	-0.42	6.39	27.96	35.32

Table A.53. Tukey's test tables of NST store in no discount period

	Research Book		Education Book		Literature Book		Pop/Rock Music		Turkish Pop Music		Other Music		Turkish video		Foreign video									
	Differences in Averages	T _{0,05} Value	Differences in Averages	T _{0,05} Value	Differences in Averages	T _{0,05} Value	Differences in Averages	T _{0,05} Value	Differences in Averages	T _{0,05} Value	Differences in Averages	T _{0,05} Value	Differences in Averages	T _{0,05} Value	Differences in Averages	T _{0,05} Value								
$\bar{y}_1 - \bar{y}_2$	-1.32	3.46	-1.84	4.15	-0.55	11.23	0.49	2.96	4.08	12.27	0.05	2.90	0.90	2.08	-1.81	11.33								
$\bar{y}_1 - \bar{y}_3$	-0.73	3.45	-1.57	4.14	2.17	11.20	-0.06	2.95	1.34	12.24	-0.69	2.90	1.41	2.08	0.34	11.31								
$\bar{y}_1 - \bar{y}_4$	-0.68	3.45	-0.72	4.14	-0.78	11.20	0.06	2.95	-1.00	12.24	-0.82	2.90	0.69	2.08	2.29	11.31								
$\bar{y}_1 - \bar{y}_5$	-2.75	3.45	-1.79	4.14	-12.00	11.20	*	-1.89	2.95	-7.79	12.24	-2.57	2.90	-0.52	2.08	-14.37	11.31	*						
$\bar{y}_1 - \bar{y}_6$	-10.11	3.46	*	-9.76	4.15	*	-36.97	11.23	*	-11.74	2.96	*	-18.60	12.27	*	-3.84	2.90	*	-2.13	2.08	*	-52.39	11.33	*
$\bar{y}_1 - \bar{y}_7$	2.81	3.46	11.41	4.15	*	33.14	11.23	*	5.31	2.96	*	25.42	12.27	*	3.69	2.90	*	1.13	2.08	0.43	11.33			
$\bar{y}_2 - \bar{y}_3$	0.59	3.45	0.27	4.14	2.72	11.20	-0.55	2.95	-2.74	12.24	-0.73	2.90	0.51	2.08	2.15	11.31								
$\bar{y}_2 - \bar{y}_4$	0.63	3.45	1.12	4.14	-0.24	11.20	-0.43	2.95	-5.08	12.24	-0.87	2.90	-0.22	2.08	4.10	11.31								
$\bar{y}_2 - \bar{y}_5$	-1.43	3.45	0.04	4.14	-11.45	11.20	*	-2.38	2.95	-11.86	12.24	-2.62	2.90	-1.43	2.08	-12.57	11.31	*						
$\bar{y}_2 - \bar{y}_6$	-8.79	3.46	*	-7.92	4.15	*	-36.42	11.23	*	-12.23	2.96	*	-22.67	12.27	*	-3.88	2.90	*	-3.04	2.08	*	-50.59	11.33	*
$\bar{y}_2 - \bar{y}_7$	4.13	3.46	*	13.25	4.15	*	33.69	11.23	*	4.82	2.96	*	21.35	12.27	*	3.64	2.90	*	0.22	2.08	2.24	11.33		
$\bar{y}_3 - \bar{y}_4$	0.05	3.45	0.85	4.13	-2.95	11.17	0.11	2.95	-2.34	12.21	-0.13	2.89	-0.72	2.07	1.95	11.28								
$\bar{y}_3 - \bar{y}_5$	-2.02	3.45	-0.23	4.13	-14.17	11.17	*	-1.84	2.95	-9.12	12.21	-1.89	2.89	-1.93	2.07	-14.71	11.28	*						
$\bar{y}_3 - \bar{y}_6$	-9.37	3.45	*	-8.19	4.14	*	-39.14	11.20	*	-11.68	2.95	*	-19.93	12.24	*	-3.15	2.90	*	-3.54	2.08	*	-52.73	11.31	*
$\bar{y}_3 - \bar{y}_7$	3.54	3.45	*	12.98	4.14	*	30.98	11.20	*	5.36	2.95	*	24.08	12.24	*	4.38	2.90	*	-0.28	2.08	0.09	11.31		
$\bar{y}_4 - \bar{y}_5$	-2.07	3.45	-1.08	4.13	-11.22	11.17	*	-1.95	2.95	-6.78	12.21	-1.75	2.89	-1.21	2.07	-16.67	11.28	*						
$\bar{y}_4 - \bar{y}_6$	-9.42	3.45	*	-9.04	4.14	*	-36.19	11.20	*	-11.80	2.95	*	-17.59	12.24	*	-3.02	2.90	*	-2.82	2.08	*	-54.69	11.31	*
$\bar{y}_4 - \bar{y}_7$	3.49	3.45	*	12.13	4.14	*	33.93	11.20	*	5.25	2.95	*	26.43	12.24	*	4.51	2.90	*	0.44	2.08	-1.86	11.31		
$\bar{y}_5 - \bar{y}_6$	-7.35	3.45	*	-7.96	4.14	*	-24.97	11.20	*	-9.85	2.95	*	-10.81	12.24		-1.26	2.90		-1.61	2.08	-38.02	11.31	*	
$\bar{y}_5 - \bar{y}_7$	5.56	3.45	*	13.21	4.14	*	45.15	11.20	*	7.20	2.95	*	33.21	12.24	*	6.26	2.90	*	1.65	2.08	14.81	11.31	*	
$\bar{y}_6 - \bar{y}_7$	12.91	3.46	*	21.17	4.15	*	70.12	11.23	*	17.05	2.96	*	44.02	12.27	*	7.53	2.90	*	3.26	2.08	*	52.83	11.33	*

Table A.54. Tukey's test tables of NST store in campaign period

	Research Book		Education Book		Literature Book		Pop/Rock Music		Turkish Pop Music		Other Music		Turkish video		Foreign video	
	Differences in Averages	T _{0.05} Value	Differences in Averages	T _{0.05} Value	Differences in Averages	T _{0.05} Value	Differences in Averages	T _{0.05} Value	Differences in Averages	T _{0.05} Value	Differences in Averages	T _{0.05} Value	Differences in Averages	T _{0.05} Value	Differences in Averages	T _{0.05} Value
$\bar{y}_1 - \bar{y}_2$	-3.12	5.97	-5.96	8.20	-4.46	19.00	1.96	4.68	4.58	29.52	-0.19	5.08	1.81	3.82	1.31	15.02
$\bar{y}_1 - \bar{y}_3$	-4.31	5.91	-5.74	8.13	-7.91	18.82	-1.70	4.63	-3.81	29.25	-3.13	5.03	0.87	3.79	1.45	14.88
$\bar{y}_1 - \bar{y}_4$	-5.05	5.91	-5.04	8.13	-13.36	18.82	0.93	4.63	-6.14	29.25	-1.68	5.03	1.35	3.79	-4.03	14.88
$\bar{y}_1 - \bar{y}_5$	-6.24	5.91	* -6.63	8.13	-19.14	18.82	* -1.70	4.63	-8.84	29.25	-4.13	5.03	0.06	3.79	-13.18	14.88
$\bar{y}_1 - \bar{y}_6$	-12.15	5.97	* -14.42	8.20	* -38.15	19.00	* -7.27	4.68	* -22.27	29.52	-3.50	5.08	-3.08	3.82	-47.65	15.02
$\bar{y}_1 - \bar{y}_7$	1.54	5.97	5.12	8.20	33.69	19.00	* 6.46	4.68	* 34.85	29.52	* 3.81	5.08	3.27	3.82	-2.04	15.02
$\bar{y}_2 - \bar{y}_3$	-1.20	5.91	0.22	8.13	-3.45	18.82	-3.66	4.63	-8.38	29.25	-2.93	5.03	-0.93	3.79	0.14	14.88
$\bar{y}_2 - \bar{y}_4$	-1.94	5.91	0.92	8.13	-8.90	18.82	-1.03	4.63	-10.72	29.25	-1.49	5.03	-0.45	3.79	-5.34	14.88
$\bar{y}_2 - \bar{y}_5$	-3.12	5.91	-0.67	8.13	-14.68	18.82	-3.66	4.63	-13.42	29.25	-3.93	5.03	-1.75	3.79	-14.49	14.88
$\bar{y}_2 - \bar{y}_6$	-9.04	5.97	* -8.46	8.20	* -33.69	19.00	* -9.23	4.68	* -26.85	29.52	-3.31	5.08	-4.88	3.82	* -48.96	15.02
$\bar{y}_2 - \bar{y}_7$	4.65	5.97	11.08	8.20	* 38.15	19.00	* 4.50	4.68	30.27	29.52	* 4.00	5.08	1.46	3.82	-3.35	15.02
$\bar{y}_3 - \bar{y}_4$	-0.74	5.86	0.70	8.05	-5.44	18.64	2.63	4.59	-2.33	28.97	1.44	4.98	0.48	3.75	-5.48	14.74
$\bar{y}_3 - \bar{y}_5$	-1.93	5.86	-0.89	8.05	-11.22	18.64	0.00	4.59	-5.04	28.97	-1.00	4.98	-0.81	3.75	-14.63	14.74
$\bar{y}_3 - \bar{y}_6$	-7.84	5.91	* -8.68	8.13	* -30.24	18.82	* -5.57	4.63	* -18.46	29.25	-0.37	5.03	-3.95	3.79	* -49.10	14.88
$\bar{y}_3 - \bar{y}_7$	5.85	5.91	10.86	8.13	* 41.61	18.82	* 8.16	4.63	* 38.65	29.25	* 6.93	5.03	* 2.40	3.79	-3.49	14.88
$\bar{y}_4 - \bar{y}_5$	-1.19	5.86	-1.59	8.05	-5.78	18.64	-2.63	4.59	-2.70	28.97	-2.44	4.98	-1.30	3.75	-9.15	14.74
$\bar{y}_4 - \bar{y}_6$	-7.10	5.91	* -9.39	8.13	* -24.79	18.82	* -8.20	4.63	* -16.13	29.25	-1.82	5.03	-4.43	3.79	* -43.62	14.88
$\bar{y}_4 - \bar{y}_7$	6.59	5.91	* 10.15	8.13	* 47.05	18.82	* 5.53	4.63	* 40.99	29.25	* 5.49	5.03	* 1.91	3.79	1.99	14.88
$\bar{y}_5 - \bar{y}_6$	-5.91	5.91	* -7.79	8.13	-19.02	18.82	* -5.57	4.63	* -13.42	29.25	0.63	5.03	-3.14	3.79	-34.47	14.88
$\bar{y}_5 - \bar{y}_7$	7.78	5.91	* 11.75	8.13	* 52.83	18.82	* 8.16	4.63	* 43.69	29.25	* 7.93	5.03	* 3.21	3.79	11.14	14.88
$\bar{y}_6 - \bar{y}_7$	13.69	5.97	* 19.54	8.20	* 71.85	19.00	* 13.73	4.68	* 57.12	29.52	* 7.31	5.08	* 6.35	3.82	* 45.62	15.02

Table A.55. LSD test tables of AHL store

	Campaign Period						No Discount Period														
	Education Book			Foreign Video			Research Book			Pop / Rock Music		Turkish Pop Music		Turkish Video		Foreign Video					
	Differences in Averages	T _{0.05} Value		Differences in Averages	T _{0.05} Value		Differences in Averages	T _{0.05} Value		Differences in Averages	T _{0.05} Value		Differences in Averages	T _{0.05} Value		Differences in Averages	T _{0.05} Value				
$\overline{y_1} - \overline{y_2}$	-0.32	3.60		2.23	1.75	*	1.87	2.83		1.25	1.44		13.09	7.15	*	0.48	2.44		1.05	1.58	
$\overline{y_1} - \overline{y_3}$	0.10	3.56		1.72	1.73		1.70	2.83		0.95	1.44		8.77	7.13	*	2.03	2.44		0.46	1.57	
$\overline{y_1} - \overline{y_4}$	-1.67	3.56		1.24	1.73		2.99	2.83	*	0.60	1.44		8.79	7.13	*	0.60	2.44		0.24	1.57	
$\overline{y_1} - \overline{y_5}$	0.38	3.56		1.19	1.73		0.60	2.83		0.39	1.44		6.96	7.13		1.26	2.44		-0.56	1.57	
$\overline{y_1} - \overline{y_6}$	0.05	3.56		1.19	1.73		1.13	2.84		0.34	1.44		4.25	7.17		0.28	2.45		0.25	1.58	
$\overline{y_1} - \overline{y_7}$	-5.14	3.56	*	-1.52	1.73		-5.84	2.83	*	-1.85	1.44	*	-21.33	7.15	*	-3.19	2.44	*	-1.50	1.58	
$\overline{y_2} - \overline{y_3}$	0.41	3.60		-0.46	1.75		-0.17	2.83		-0.30	1.44		-4.32	7.13		1.55	2.44		-0.59	1.57	
$\overline{y_2} - \overline{y_4}$	-1.35	3.60		-0.99	1.75		1.12	2.83		-0.65	1.44		-4.30	7.13		0.11	2.44		-0.81	1.57	
$\overline{y_2} - \overline{y_5}$	0.70	3.60		-1.04	1.75		-1.26	2.83		-0.86	1.44		-6.12	7.13		0.78	2.44		-1.61	1.57	*
$\overline{y_2} - \overline{y_6}$	0.37	3.60		-1.04	1.75		-0.73	2.84		-0.91	1.44		-8.83	7.17	*	-0.20	2.45		-0.80	1.58	
$\overline{y_2} - \overline{y_7}$	-4.82	3.60	*	-3.75	1.75	*	-7.70	2.83	*	-3.10	1.44	*	-34.41	7.15	*	-3.67	2.44	*	-2.55	1.58	*
$\overline{y_3} - \overline{y_4}$	-1.76	3.56		-0.52	1.73		1.29	2.82		-0.35	1.43		0.02	7.12		-1.44	2.43		-0.22	1.57	
$\overline{y_3} - \overline{y_5}$	0.29	3.56		-0.57	1.73		-1.10	2.82		-0.56	1.43		-1.81	7.12		-0.77	2.43		-1.02	1.57	
$\overline{y_3} - \overline{y_6}$	-0.05	3.56		-0.57	1.73		-0.57	2.83		-0.61	1.44		-4.52	7.15		-1.76	2.44		-0.21	1.58	
$\overline{y_3} - \overline{y_7}$	-5.24	3.56	*	-3.29	1.73	*	-7.54	2.83	*	-2.80	1.44	*	-30.10	7.13	*	-5.23	2.44	*	-1.96	1.57	*
$\overline{y_4} - \overline{y_5}$	2.05	3.56		-0.05	1.73		-2.38	2.82		-0.21	1.43		-1.83	7.12		0.67	2.43		-0.80	1.57	
$\overline{y_4} - \overline{y_6}$	1.71	3.56		-0.05	1.73		-1.85	2.83		-0.26	1.44		-4.54	7.15		-0.32	2.44		0.01	1.58	
$\overline{y_4} - \overline{y_7}$	-3.57	3.56	*	-2.79	1.73	*	-8.82	2.83	*	-2.45	1.44	*	-30.12	7.13	*	-3.79	2.44	*	-1.74	1.57	*
$\overline{y_5} - \overline{y_6}$	-0.33	3.56		0.00	1.73		0.53	2.83		-0.05	1.44		-2.71	7.15		-0.98	2.44		0.81	1.58	
$\overline{y_5} - \overline{y_7}$	-5.52	3.56	*	-2.71	1.73	*	-6.44	2.83	*	-2.24	1.44	*	-28.29	7.13	*	-4.45	2.44	*	-0.94	1.57	
$\overline{y_6} - \overline{y_7}$	-5.19	3.56	*	-2.71	1.73	*	-6.97	2.84	*	-2.18	1.44	*	-25.58	7.17	*	-3.47	2.45	*	-1.75	1.58	*

Table A.56. LSD test tables of ERENKOY store

	Campaign Period						No Discount Period		
	Literature Book		Pop Rock Music		Turkish Video		Turkish Pop Music		
	Differences in Averages	T _{0,05} Value	Differences in Averages	T _{0,05} Value	Differences in Averages	T _{0,05} Value	Differences in Averages	T _{0,05} Value	
$\bar{y}_{1.} - \bar{y}_{2.}$	-4.38	20.62	-2.88	6.00	0.96	4.25	4.82	18.33	
$\bar{y}_{1.} - \bar{y}_{3.}$	5.55	20.43	-1.17	5.95	2.96	4.21	0.97	18.29	
$\bar{y}_{1.} - \bar{y}_{4.}$	-1.16	20.43	-3.25	5.95	1.40	4.21	-3.02	18.29	
$\bar{y}_{1.} - \bar{y}_{5.}$	-33.41	20.43	* -11.39	5.95	* 1.48	4.21	-23.51	18.29	*
$\bar{y}_{1.} - \bar{y}_{6.}$	-126.46	20.62	* -35.27	6.00	* -6.38	4.25	* -123.18	18.33	*
$\bar{y}_{1.} - \bar{y}_{7.}$	-109.58	20.62	* -30.81	6.00	* -6.81	4.25	* -87.38	18.33	*
$\bar{y}_{2.} - \bar{y}_{3.}$	9.93	20.43	1.71	5.95	2.00	4.21	-3.85	18.29	
$\bar{y}_{2.} - \bar{y}_{4.}$	3.23	20.43	-0.36	5.95	0.44	4.21	-7.84	18.29	
$\bar{y}_{2.} - \bar{y}_{5.}$	-29.03	20.43	* -8.51	5.95	* 0.51	4.21	-28.33	18.29	*
$\bar{y}_{2.} - \bar{y}_{6.}$	-122.08	20.62	* -32.38	6.00	* -7.35	4.25	* -128.00	18.33	*
$\bar{y}_{2.} - \bar{y}_{7.}$	-105.19	20.62	* -27.92	6.00	* -7.77	4.25	* -92.19	18.33	*
$\bar{y}_{3.} - \bar{y}_{4.}$	-6.70	20.24	-2.07	5.89	-1.56	4.17	-3.99	18.24	
$\bar{y}_{3.} - \bar{y}_{5.}$	-38.96	20.24	* -10.22	5.89	* -1.48	4.17	-24.49	18.24	*
$\bar{y}_{3.} - \bar{y}_{6.}$	-132.01	20.43	* -34.10	5.95	* -9.34	4.21	* -124.15	18.29	*
$\bar{y}_{3.} - \bar{y}_{7.}$	-115.13	20.43	* -29.64	5.95	* -9.76	4.21	* -88.35	18.29	*
$\bar{y}_{4.} - \bar{y}_{5.}$	-32.26	20.24	* -8.15	5.89	* 0.07	4.17	-20.50	18.24	*
$\bar{y}_{4.} - \bar{y}_{6.}$	-125.31	20.43	* -32.02	5.95	* -7.79	4.21	* -120.16	18.29	*
$\bar{y}_{4.} - \bar{y}_{7.}$	-108.42	20.43	* -27.56	5.95	* -8.21	4.21	* -84.36	18.29	*
$\bar{y}_{5.} - \bar{y}_{6.}$	-93.05	20.43	* -23.87	5.95	* -7.86	4.21	* -99.67	18.29	*
$\bar{y}_{5.} - \bar{y}_{7.}$	-76.16	20.43	* -19.41	5.95	* -8.28	4.21	* -63.86	18.29	*
$\bar{y}_{6.} - \bar{y}_{7.}$	16.88	20.62	4.46	6.00	-0.42	4.25	35.81	18.33	*

Table A.57. LSD test tables of NST store in no discount period

No Discount Period											
	Research Book			Turkish Pop Music			Other Music			Turkish Video	
	Differences in Averages	T _{0,05} Value		Differences in Averages	T _{0,05} Value		Differences in Averages	T _{0,05} Value		Differences in Averages	T _{0,05} Value
$\bar{y}_1 - \bar{y}_2$	-1.32	2.30		4.08	8.15		0.05	1.93		0.90	1.38
$\bar{y}_1 - \bar{y}_3$	-0.73	2.30		1.34	8.14		-0.69	1.93		1.41	1.38 *
$\bar{y}_1 - \bar{y}_4$	-0.68	2.30		-1.00	8.14		-0.82	1.93		0.69	1.38
$\bar{y}_1 - \bar{y}_5$	-2.75	2.30	*	-7.79	8.14		-2.57	1.93	*	-0.52	1.38
$\bar{y}_1 - \bar{y}_6$	-10.11	2.30	*	-18.60	8.15	*	-3.84	1.93	*	-2.13	1.38 *
$\bar{y}_1 - \bar{y}_7$	2.81	2.30	*	25.42	8.15	*	3.69	1.93	*	1.13	1.38
$\bar{y}_2 - \bar{y}_3$	0.59	2.30		-2.74	8.14		-0.73	1.93		0.51	1.38
$\bar{y}_2 - \bar{y}_4$	0.63	2.30		-5.08	8.14		-0.87	1.93		-0.22	1.38
$\bar{y}_2 - \bar{y}_5$	-1.43	2.30		-11.86	8.14	*	-2.62	1.93	*	-1.43	1.38 *
$\bar{y}_2 - \bar{y}_6$	-8.79	2.30	*	-22.67	8.15	*	-3.88	1.93	*	-3.04	1.38 *
$\bar{y}_2 - \bar{y}_7$	4.13	2.30	*	21.35	8.15	*	3.64	1.93	*	0.22	1.38
$\bar{y}_3 - \bar{y}_4$	0.05	2.29		-2.34	8.12		-0.13	1.92		-0.72	1.38
$\bar{y}_3 - \bar{y}_5$	-2.02	2.29		-9.12	8.12	*	-1.89	1.92		-1.93	1.38 *
$\bar{y}_3 - \bar{y}_6$	-9.37	2.30	*	-19.93	8.14	*	-3.15	1.93	*	-3.54	1.38 *
$\bar{y}_3 - \bar{y}_7$	3.54	2.30	*	24.08	8.14	*	4.38	1.93	*	-0.28	1.38
$\bar{y}_4 - \bar{y}_5$	-2.07	2.29		-6.78	8.12		-1.75	1.92		-1.21	1.38
$\bar{y}_4 - \bar{y}_6$	-9.42	2.30	*	-17.59	8.14	*	-3.02	1.93	*	-2.82	1.38 *
$\bar{y}_4 - \bar{y}_7$	3.49	2.30	*	26.43	8.14	*	4.51	1.93	*	0.44	1.38
$\bar{y}_5 - \bar{y}_6$	-7.35	2.30	*	-10.81	8.14	*	-1.26	1.93		-1.61	1.38 *
$\bar{y}_5 - \bar{y}_7$	5.56	2.30	*	33.21	8.14	*	6.26	1.93	*	1.65	1.38 *
$\bar{y}_6 - \bar{y}_7$	12.91	2.30	*	44.02	8.15	*	7.53	1.93	*	3.26	1.38 *

Table A.58. LSD test tables of NST store in campaign period

Campaign Period																	
	Research Book			Literature Book			Education Book			Pop / Rock Music			Other Music		Turkish Video		
	Differences in Averages	T _{0,05} Value		Differences in Averages	T _{0,05} Value		Differences in Averages	T _{0,05} Value	*	Differences in Averages	T _{0,05} Value		Differences in Averages	T _{0,05} Value		Differences in Averages	T _{0,05} Value
$\overline{y_{1.}} - \overline{y_{2.}}$	-3.12	3.97		-4.46	12.63		-5.96	5.45	*	1.96	3.11		-0.19	3.37		1.81	2.54
$\overline{y_{1.}} - \overline{y_{3.}}$	-4.31	3.93	*	-7.91	12.51		-5.74	5.40	*	-1.70	3.08		-3.13	3.34		0.87	2.52
$\overline{y_{1.}} - \overline{y_{4.}}$	-5.05	3.93	*	-13.36	12.51	*	-5.04	5.40		0.93	3.08		-1.68	3.34		1.35	2.52
$\overline{y_{1.}} - \overline{y_{5.}}$	-6.24	3.93	*	-19.14	12.51	*	-6.63	5.40	*	-1.70	3.08		-4.13	3.34	*	0.06	2.52
$\overline{y_{1.}} - \overline{y_{6.}}$	-12.15	3.97	*	-38.15	12.63	*	-14.42	5.45	*	-7.27	3.11	*	-3.50	3.37	*	-3.08	2.54
$\overline{y_{1.}} - \overline{y_{7.}}$	1.54	3.97		33.69	12.63	*	5.12	5.45		6.46	3.11	*	3.81	3.37	*	3.27	2.54
$\overline{y_{2.}} - \overline{y_{3.}}$	-1.20	3.93		-3.45	12.51		0.22	5.40		-3.66	3.08	*	-2.93	3.34		-0.93	2.52
$\overline{y_{2.}} - \overline{y_{4.}}$	-1.94	3.93		-8.90	12.51		0.92	5.40		-1.03	3.08		-1.49	3.34		-0.45	2.52
$\overline{y_{2.}} - \overline{y_{5.}}$	-3.12	3.93		-14.68	12.51	*	-0.67	5.40		-3.66	3.08	*	-3.93	3.34	*	-1.75	2.52
$\overline{y_{2.}} - \overline{y_{6.}}$	-9.04	3.97	*	-33.69	12.63	*	-8.46	5.45	*	-9.23	3.11	*	-3.31	3.37		-4.88	2.54
$\overline{y_{2.}} - \overline{y_{7.}}$	4.65	3.97	*	38.15	12.63	*	11.08	5.45	*	4.50	3.11	*	4.00	3.37	*	1.46	2.54
$\overline{y_{3.}} - \overline{y_{4.}}$	-0.74	3.89		-5.44	12.39		0.70	5.35		2.63	3.05		1.44	3.31		0.48	2.49
$\overline{y_{3.}} - \overline{y_{5.}}$	-1.93	3.89		-11.22	12.39		-0.89	5.35		0.00	3.05		-1.00	3.31		-0.81	2.49
$\overline{y_{3.}} - \overline{y_{6.}}$	-7.84	3.93	*	-30.24	12.51	*	-8.68	5.40	*	-5.57	3.08	*	-0.37	3.34		-3.95	2.52
$\overline{y_{3.}} - \overline{y_{7.}}$	5.85	3.93	*	41.61	12.51	*	10.86	5.40	*	8.16	3.08	*	6.93	3.34	*	2.40	2.52
$\overline{y_{4.}} - \overline{y_{5.}}$	-1.19	3.89		-5.78	12.39		-1.59	5.35		-2.63	3.05		-2.44	3.31		-1.30	2.49
$\overline{y_{4.}} - \overline{y_{6.}}$	-7.10	3.93	*	-24.79	12.51	*	-9.39	5.40	*	-8.20	3.08	*	-1.82	3.34		-4.43	2.52
$\overline{y_{4.}} - \overline{y_{7.}}$	6.59	3.93	*	47.05	12.51	*	10.15	5.40	*	5.53	3.08	*	5.49	3.34	*	1.91	2.52
$\overline{y_{5.}} - \overline{y_{6.}}$	-5.91	3.93	*	-19.02	12.51	*	-7.79	5.40	*	-5.57	3.08	*	0.63	3.34		-3.14	2.52
$\overline{y_{5.}} - \overline{y_{7.}}$	7.78	3.93	*	52.83	12.51	*	11.75	5.40	*	8.16	3.08	*	7.93	3.34	*	3.21	2.52
$\overline{y_{6.}} - \overline{y_{7.}}$	13.69	3.97	*	71.85	12.63	*	19.54	5.45	*	13.73	3.11	*	7.31	3.37	*	6.35	2.54

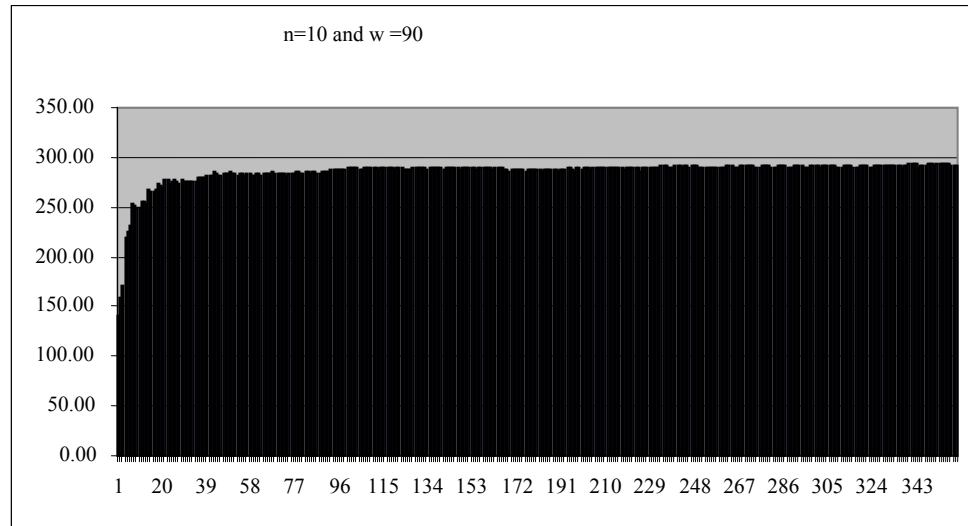
APPENDIX B: WELCH PROCEDURE

Figure B.1. Moving averages for daily profit of distribution system with AHL store

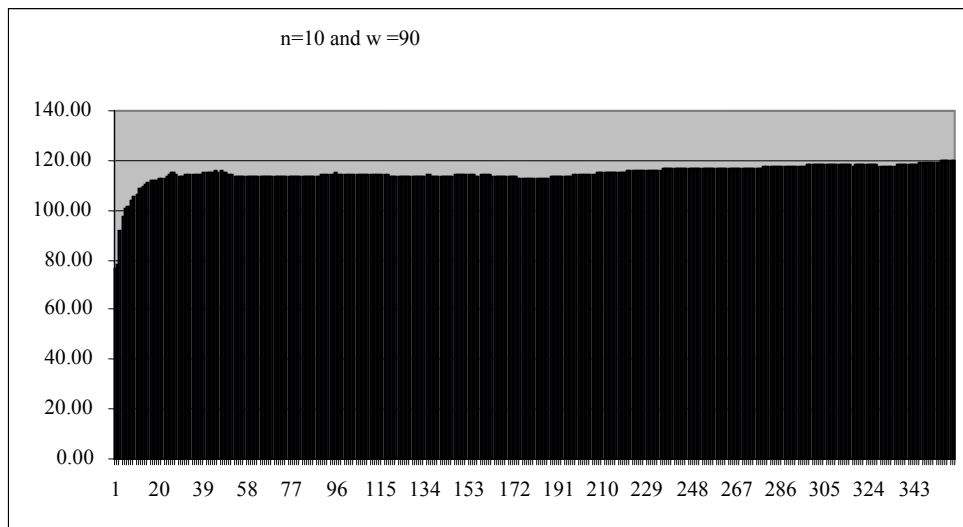


Figure B.2. Moving averages for AHL store's daily inventory of research book

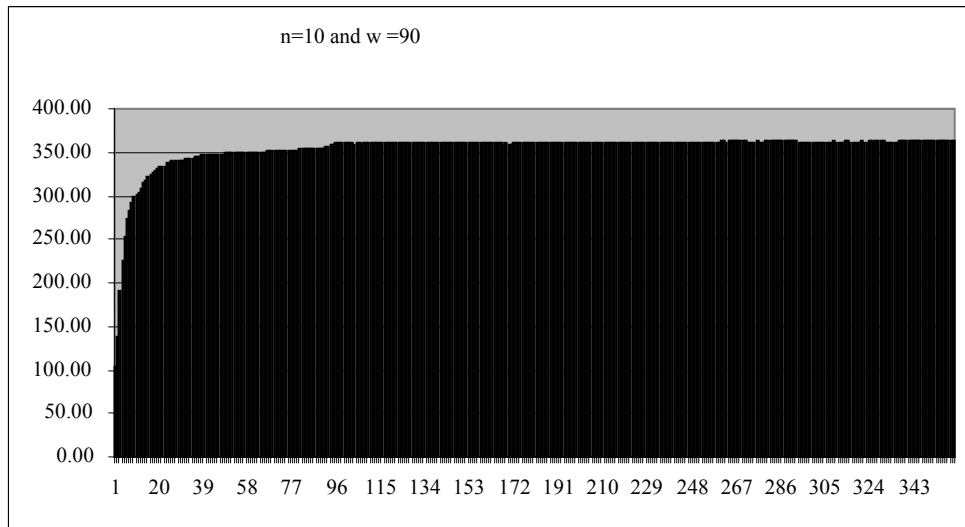


Figure B.3. Moving averages for AHL store's daily inventory of literature book

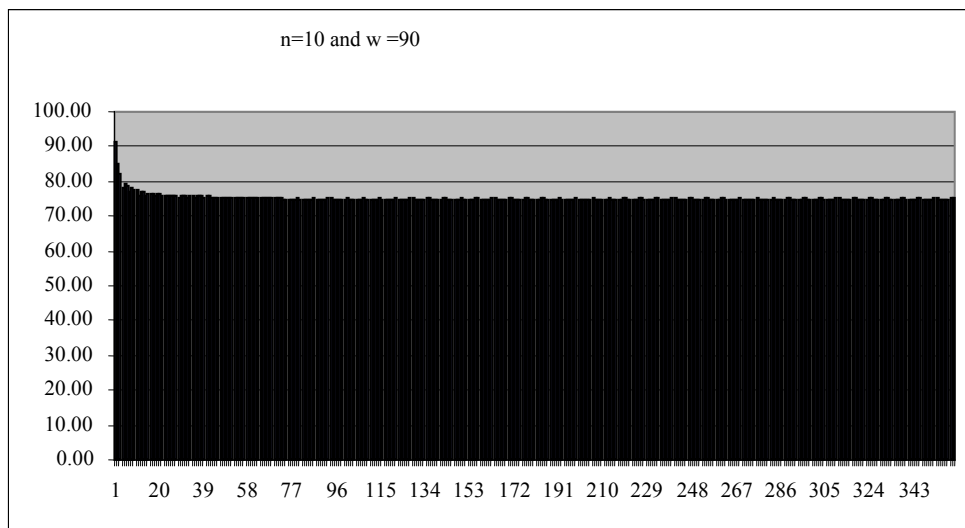


Figure B.4. Moving averages for AHL store's daily inventory of education book

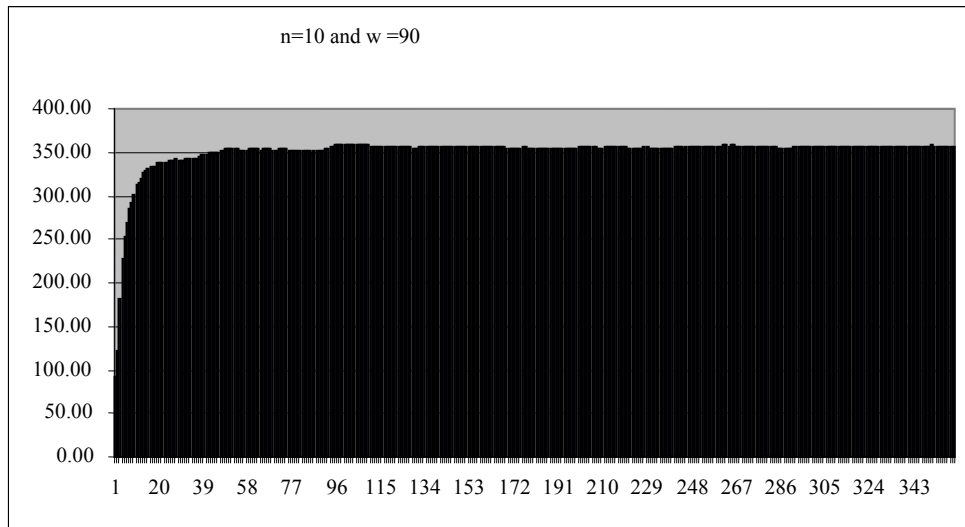


Figure B.5. Moving averages for AHL store's daily inventory of pop/rock music

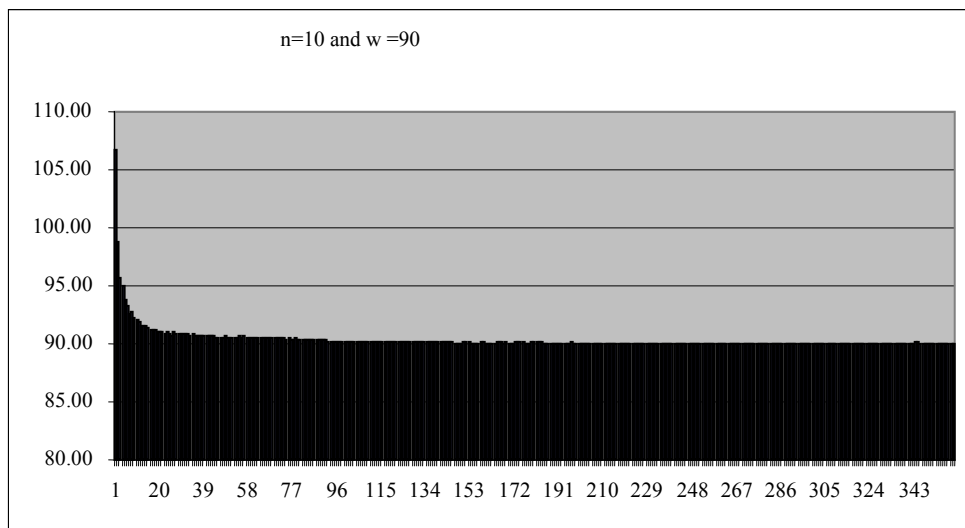


Figure B.6. Moving averages for AHL store's daily inventory of Turkish pop music

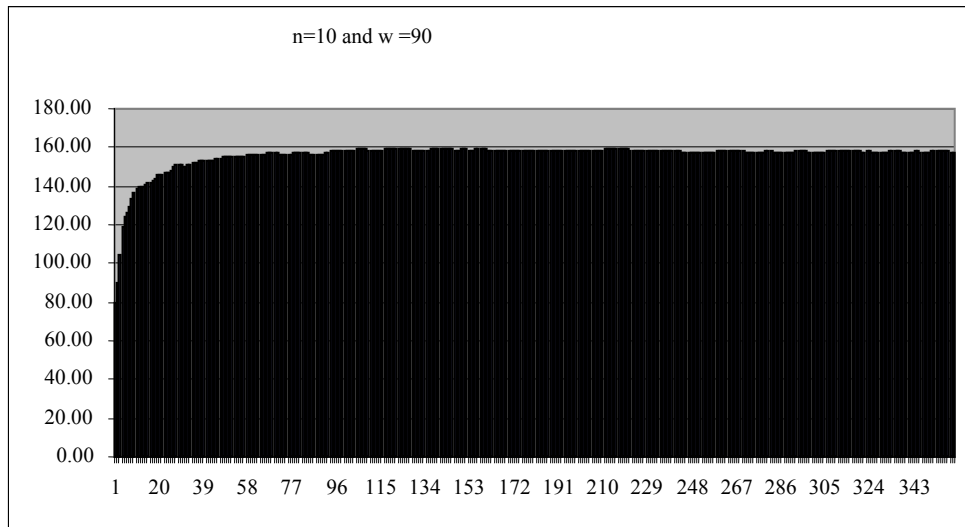


Figure B.7. Moving averages for AHL store's daily inventory of other music

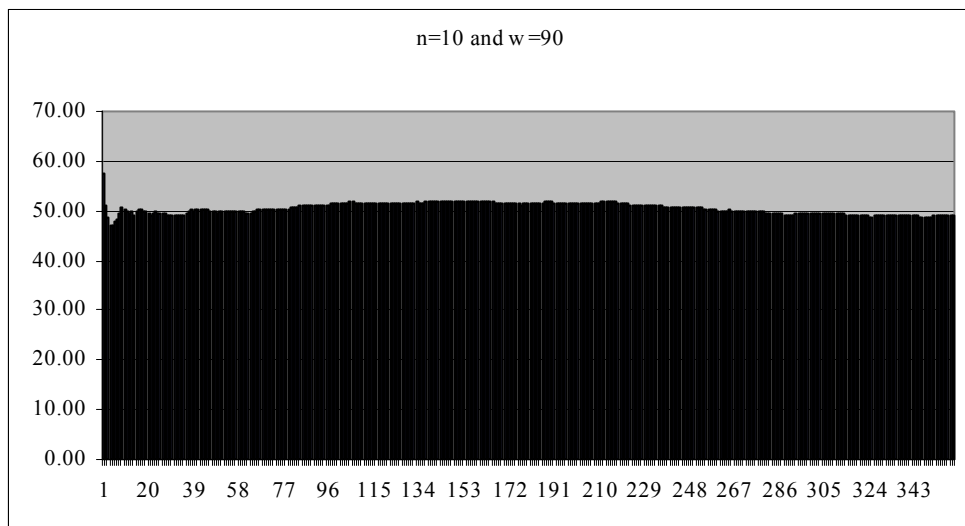


Figure B.8. Moving averages for AHL store's daily inventory of Turkish video

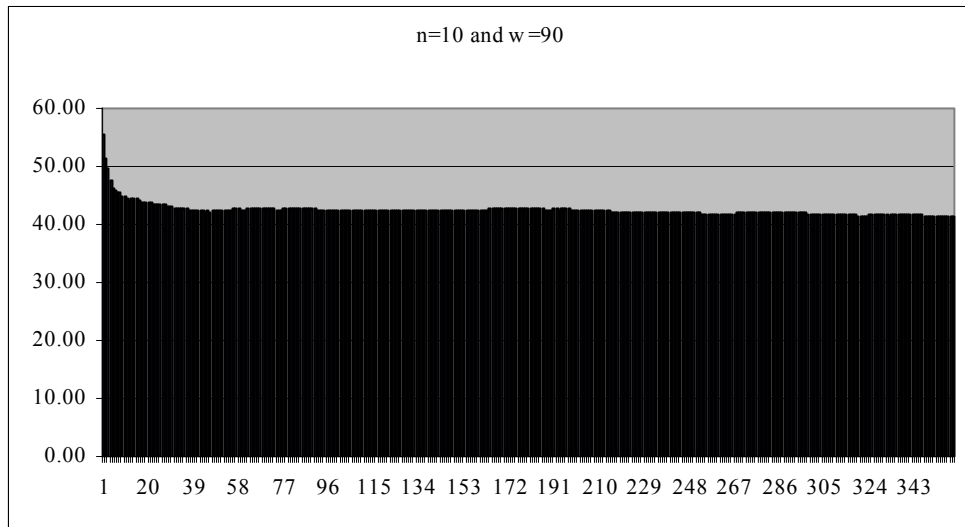


Figure B.9. Moving averages for AHL store's daily inventory of foreign video

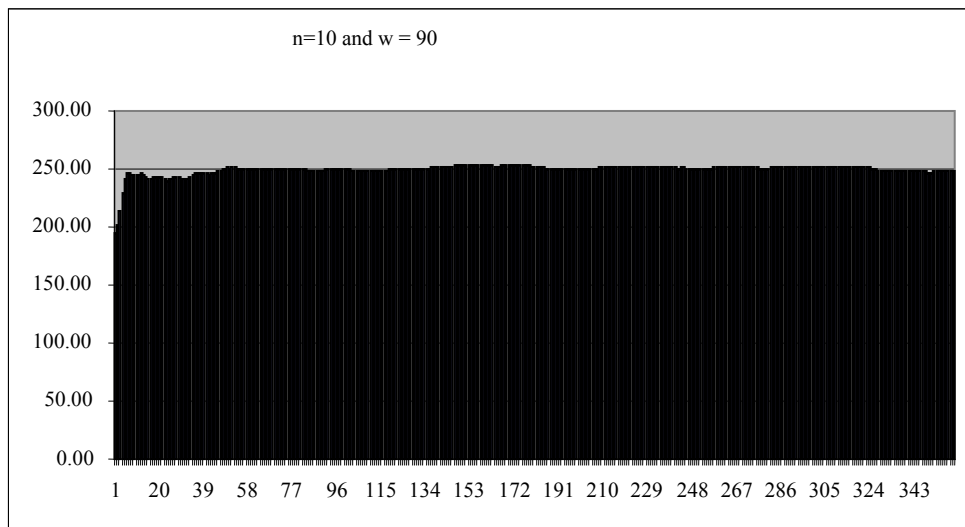


Figure B.10. Moving averages for warehouse's daily inventory of research book

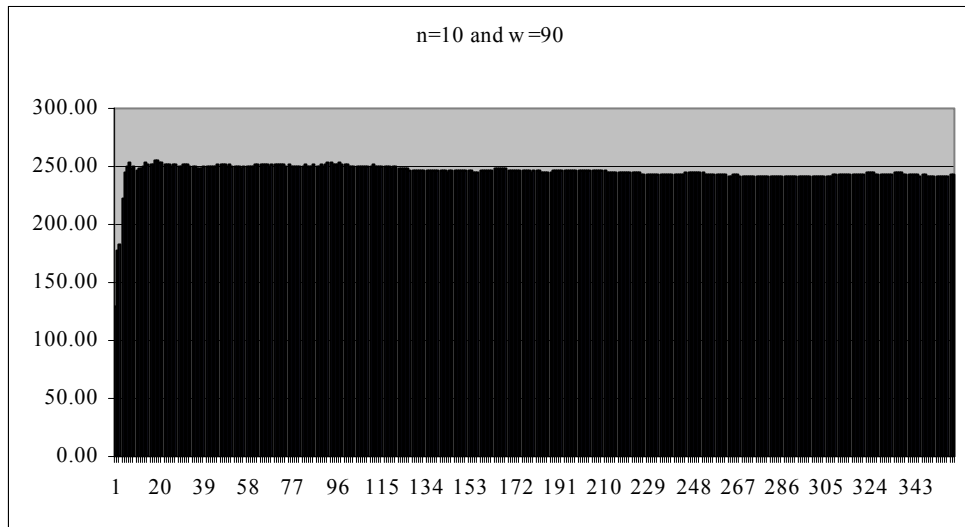


Figure B.11. Moving averages for warehouse's daily inventory of literature book

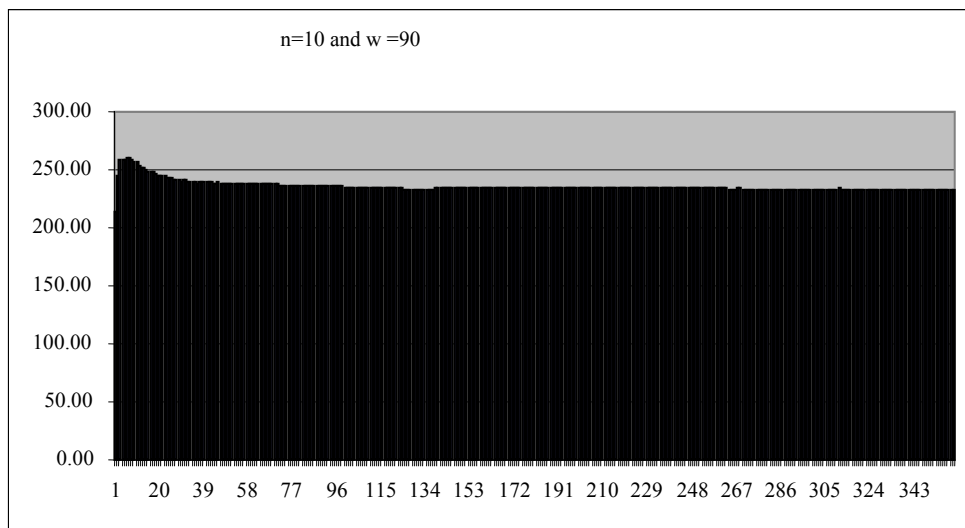


Figure B.12. Moving averages for warehouse's daily inventory of education book

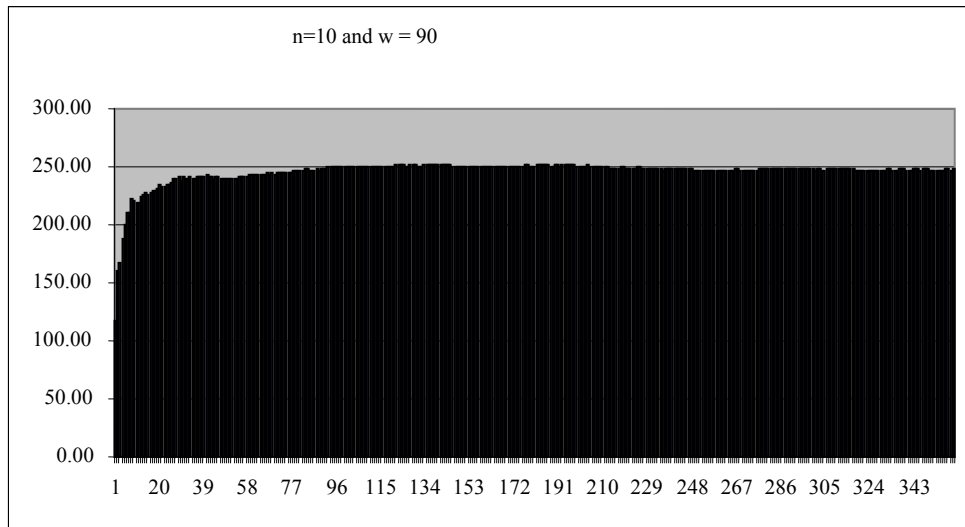


Figure B.13. Moving averages for warehouse's daily inventory of pop/rock music

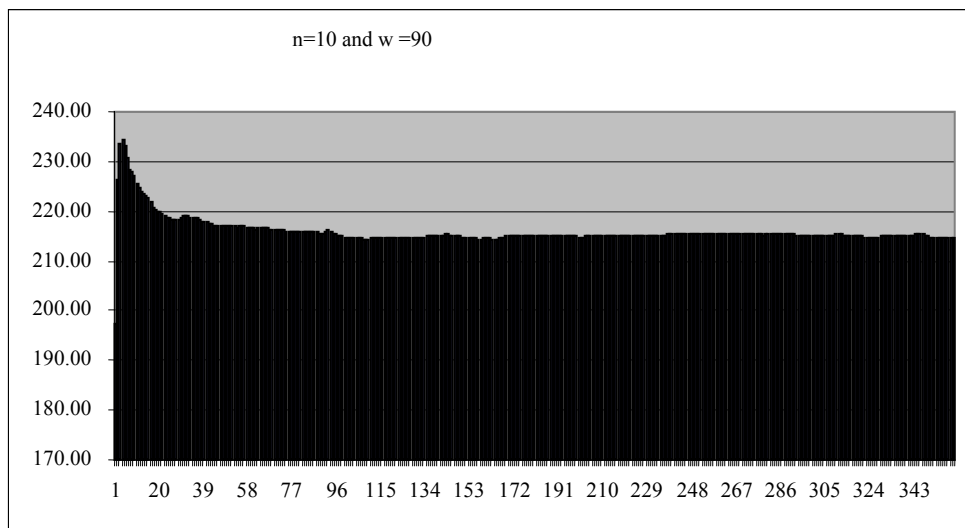


Figure B.14. Moving averages for warehouse's daily inventory of Turkish pop music

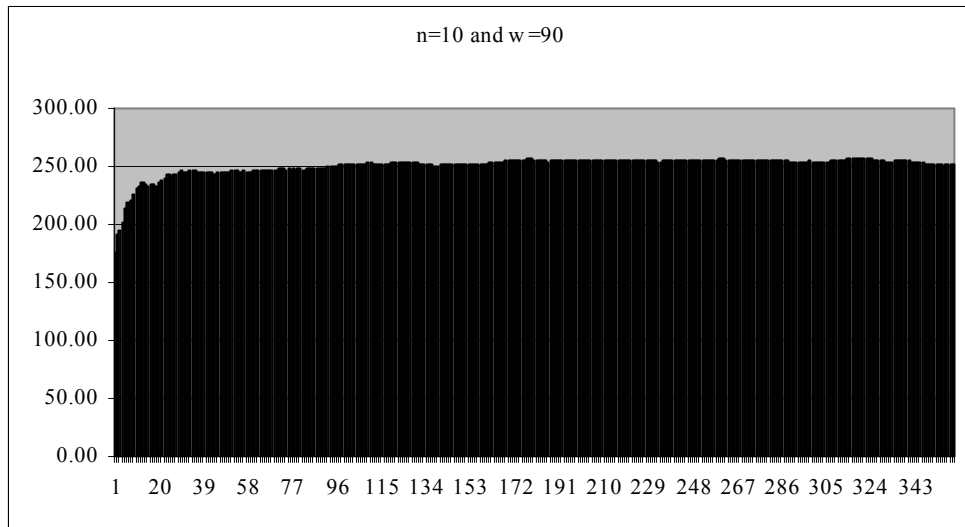


Figure B.15. Moving averages for warehouse's daily inventory of other music

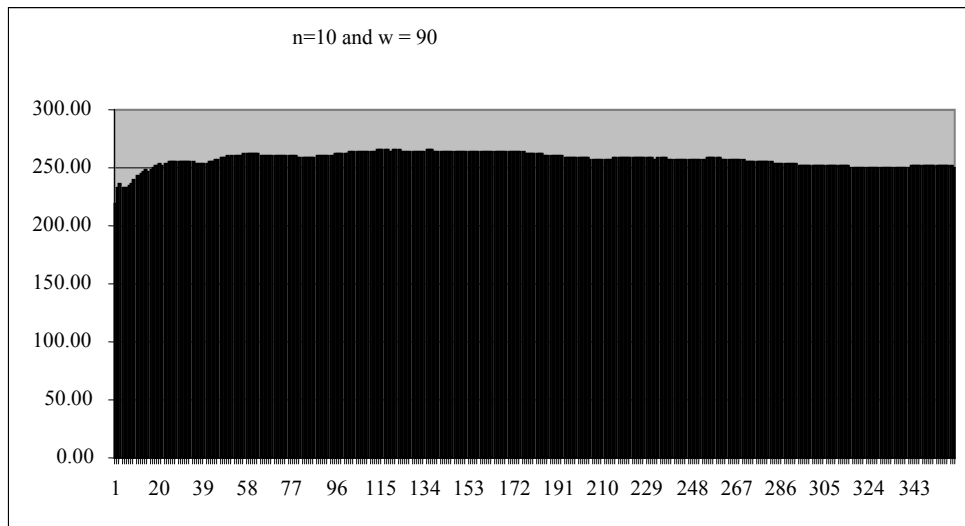


Figure B.16. Moving averages for warehouse's daily inventory of Turkish video

APPENDIX C: PRODUCT FLOWS

Product groups are defined by numbers as shown below. The remaining results are given in the CD accompanied with the Thesis.

Table C.1. Numbers representing product groups

number	group
11	Research book
12	Literature book
13	Education book
21	Turkish pop music
22	Pop rock music
23	Other music
31	Turkish video
32	Foreign video

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Table C.2. Daily product flow of AHL store in no discount period

$z =$	11 days	10 days	9 days	8 days	7 days	6 days	5 days	4 days	3 days	2 days	1 day
average shipment AHL 11	22,16	23,12	23,93	24,19	23,57	22,79	22,67	22,63	21,15	18,72	18,06
average shipment AHL 12	59,61	59,59	60,29	62,58	66,22	70,11	71,58	72,64	68,24	58,23	53,67
average shipment AHL 13	5,92	5,92	5,92	5,91	5,91	5,91	5,91	5,91	5,91	5,91	5,91
average shipment AHL 21	62,03	62,76	63,75	67,47	70,92	74,48	77,19	75,10	69,33	57,63	46,94
average shipment AHL 22	8,43	8,26	8,13	8,02	7,95	7,91	7,92	7,92	7,92	7,91	7,91
average shipment AHL 23	29,50	31,46	33,07	33,47	32,98	32,51	31,93	31,61	28,96	23,93	20,94
average shipment AHL 31	12,26	11,84	11,46	11,06	10,49	9,82	9,27	8,91	8,52	8,16	8,09
average shipment AHL 32	7,22	6,98	6,65	6,41	6,18	5,92	5,74	5,60	5,49	5,37	5,33
average return AHL 11	5,87	6,87	7,65	7,88	7,25	6,48	6,52	6,61	5,20	2,78	2,10
average return AHL 12	3,44	3,41	4,13	6,40	9,98	13,91	15,51	16,85	13,86	5,90	1,60
average return AHL 13	3,01	3,01	3,01	3,01	3,00	3,00	3,00	3,00	3,00	3,00	3,00
average return AHL 21	5,99	6,71	7,62	11,41	14,99	18,55	21,58	20,52	16,95	9,40	1,14
average return AHL 22	1,97	1,81	1,68	1,56	1,48	1,45	1,45	1,46	1,45	1,45	1,45
average return AHL 23	6,82	8,78	10,40	10,78	10,32	10,01	9,84	10,22	8,61	4,36	1,58
average return AHL 31	6,44	6,01	5,64	5,24	4,67	3,99	3,45	3,10	2,72	2,36	2,29
average return AHL 32	3,60	3,37	3,06	2,81	2,58	2,32	2,13	2,00	1,89	1,77	1,72
average shipment WH 11	16,37	16,34	16,31	16,27	16,28	16,31	16,12	16,02	15,95	15,94	15,97
average shipment WH 12	56,13	56,13	56,13	56,19	56,16	56,17	56,04	55,65	54,33	52,37	52,03
average shipment WH 13	2,98	2,98	2,98	2,99	2,99	2,99	2,99	2,99	2,99	2,99	2,99
average shipment WH 21	56,01	56,01	56,09	56,11	56,03	56,08	55,57	54,68	52,39	48,19	45,74
average shipment WH 22	6,48	6,48	6,48	6,48	6,48	6,49	6,49	6,49	6,49	6,49	6,49
average shipment WH 23	22,70	22,70	22,67	22,64	22,65	22,56	22,11	21,40	20,39	19,54	19,36
average shipment WH 31	5,95	5,94	5,90	5,90	5,87	5,85	5,86	5,86	5,85	5,85	5,85
average shipment WH 32	3,60	3,56	3,53	3,57	3,58	3,59	3,59	3,59	3,60	3,61	3,61
average sales AHL 11	16,37	16,37	16,37	16,36	16,35	16,33	16,21	16,08	15,99	15,96	15,97
average sales AHL 12	56,07	56,07	56,07	56,07	56,07	56,04	55,94	55,63	54,21	52,18	51,94
average sales AHL 13	2,95	2,95	2,95	2,95	2,95	2,95	2,95	2,95	2,95	2,95	2,95
average sales AHL 21	55,98	55,98	55,99	55,98	55,96	55,94	55,64	54,68	52,39	48,17	45,71
average sales AHL 22	6,47	6,47	6,47	6,47	6,47	6,47	6,47	6,47	6,47	6,47	6,47
average sales AHL 23	22,72	22,72	22,71	22,71	22,66	22,54	22,12	21,40	20,38	19,57	19,34
average sales AHL 31	5,85	5,84	5,83	5,82	5,81	5,81	5,79	5,79	5,79	5,79	5,79
average sales AHL 32	3,64	3,62	3,61	3,61	3,61	3,61	3,60	3,60	3,60	3,60	3,60
average salesloss AHL 11	0,00	0,00	0,00	0,01	0,02	0,04	0,15	0,29	0,38	0,40	0,40
average salesloss AHL 12	0,00	0,00	0,00	0,00	0,00	0,03	0,13	0,44	1,86	3,89	4,12
average salesloss AHL 13	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
average salesloss AHL 21	0,02	0,02	0,01	0,01	0,04	0,06	0,36	1,32	3,61	7,83	10,29
average salesloss AHL 22	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
average salesloss AHL 23	0,00	0,00	0,01	0,02	0,06	0,18	0,60	1,32	2,34	3,16	3,38
average salesloss AHL 31	0,04	0,04	0,06	0,07	0,07	0,08	0,09	0,10	0,10	0,10	0,10
average salesloss AHL 32	0,20	0,22	0,23	0,23	0,23	0,23	0,23	0,23	0,24	0,24	0,24
average inventory AHL 11	173,33	160,85	146,35	130,72	114,49	98,12	81,66	66,80	56,03	50,98	50,08
average inventory AHL 12	396,58	396,19	394,06	385,28	361,98	320,76	268,35	211,46	154,82	111,21	100,23
average inventory AHL 13	75,07	75,06	75,06	75,05	75,05	75,05	75,05	75,05	75,05	75,05	75,05
average inventory AHL 21	413,59	412,07	406,43	391,51	361,98	318,19	263,50	205,03	147,97	96,28	71,95
average inventory AHL 22	92,07	91,16	90,60	90,30	90,15	90,08	90,05	90,04	90,03	90,03	90,03
average inventory AHL 23	223,55	211,58	195,78	177,16	156,33	134,04	109,92	85,38	62,13	45,68	40,47
average inventory AHL 31	66,52	61,41	56,61	52,33	48,60	45,58	43,22	41,58	40,58	40,09	40,01
average inventory AHL 32	48,62	46,66	44,96	43,60	42,47	41,60	40,97	40,53	40,23	40,08	40,03
average inventory WH 11	231,97	238,15	240,97	241,65	241,93	242,99	243,33	239,16	226,54	212,43	208,84
average inventory WH 12	213,97	213,94	216,40	219,99	228,46	243,19	256,81	262,73	248,34	219,46	204,03
average inventory WH 13	223,95	223,93	223,89	223,86	223,87	223,87	223,87	223,87	223,87	223,87	223,87
average inventory WH 21	201,30	202,41	204,88	213,09	226,31	241,08	254,49	253,72	237,88	211,13	187,10
average inventory WH 22	211,31	209,32	207,76	206,68	205,97	205,59	205,40	205,32	205,28	205,22	205,22
average inventory WH 23	223,88	230,40	237,16	241,99	244,23	245,37	245,55	241,64	230,47	209,50	199,27
average inventory WH 31	256,92	255,08	254,01	250,43	245,59	241,11	235,54	232,00	225,88	219,71	218,61
average inventory WH 32	270,43	259,87	251,37	247,04	244,52	241,78	237,44	233,02	228,68	224,35	222,47

Table C.3. Daily product flow of AHL store in 12 % discount period

12 % discount												
	$z =$	11 days	10 days	9 days	8 days	7 days	6 days	5 days	4 days	3 days	2 days	1 day
average shipment AHL 11		32,94	32,93	32,95	33,20	33,92	35,02	37,15	38,65	37,70	32,70	29,42
average shipment AHL 12		69,08	68,98	68,87	68,88	69,05	72,31	79,12	80,44	78,57	68,78	64,47
average shipment AHL 13		20,60	20,95	21,31	21,27	20,72	19,84	19,95	19,39	18,58	18,55	18,55
average shipment AHL 21		90,72	90,29	90,52	90,48	90,35	90,99	95,82	104,83	101,02	88,97	68,74
average shipment AHL 22		11,10	10,58	10,18	9,86	9,66	9,60	9,58	9,58	9,58	9,58	9,58
average shipment AHL 23		28,23	29,21	30,90	31,92	31,42	30,67	31,69	32,98	31,75	27,22	24,13
average shipment AHL 31		11,75	11,60	11,51	11,30	10,76	9,98	9,45	9,08	8,66	8,45	8,44
average shipment AHL 32		4,90	4,72	4,52	4,38	4,28	4,21	4,19	4,17	4,16	4,16	4,16
average return AHL 11		1,86	1,86	1,88	2,14	2,84	3,98	6,20	7,87	7,45	3,71	0,55
average return AHL 12		1,39	1,31	1,23	1,23	1,40	4,57	11,36	12,80	11,57	4,15	0,14
average return AHL 13		3,00	3,33	3,69	3,65	3,08	2,22	2,34	1,76	0,94	0,90	0,90
average return AHL 21		3,78	3,38	3,59	3,58	3,40	4,06	8,76	18,04	15,97	7,43	0,00
average return AHL 22		2,87	2,37	1,97	1,65	1,44	1,38	1,36	1,36	1,36	1,36	1,36
average return AHL 23		2,21	3,20	4,87	5,87	5,36	4,64	5,73	7,12	6,49	3,27	0,40
average return AHL 31		4,92	4,77	4,69	4,47	3,92	3,14	2,61	2,24	1,83	1,61	1,61
average return AHL 32		1,70	1,51	1,31	1,17	1,07	1,00	0,97	0,95	0,95	0,94	0,94
average shipment WH 11		31,07	31,07	31,07	31,05	31,12	31,17	31,14	30,94	30,40	29,03	28,82
average shipment WH 12		67,73	67,72	67,68	67,69	67,65	68,02	68,03	67,88	67,26	64,68	64,20
average shipment WH 13		17,58	17,58	17,59	17,57	17,61	17,68	17,64	17,62	17,65	17,65	17,65
average shipment WH 21		86,87	86,82	86,80	86,79	86,84	86,81	86,85	86,58	84,98	81,36	68,75
average shipment WH 22		8,26	8,26	8,23	8,23	8,23	8,24	8,24	8,24	8,24	8,24	8,24
average shipment WH 23		26,03	26,07	26,06	26,10	26,11	26,13	26,11	25,97	25,31	23,91	23,67
average shipment WH 31		6,89	6,86	6,84	6,86	6,85	6,87	6,88	6,87	6,86	6,85	6,85
average shipment WH 32		3,19	3,19	3,20	3,20	3,20	3,21	3,21	3,21	3,21	3,21	3,21
average sales AHL 11		31,10	31,10	31,10	31,10	31,10	31,10	31,10	30,97	30,38	29,04	28,87
average sales AHL 12		67,55	67,55	67,55	67,55	67,55	67,55	67,55	67,53	66,99	64,58	64,29
average sales AHL 13		17,60	17,60	17,60	17,60	17,60	17,60	17,60	17,60	17,60	17,60	17,60
average sales AHL 21		86,64	86,64	86,64	86,64	86,64	86,64	86,63	86,45	84,89	81,36	68,56
average sales AHL 22		8,20	8,20	8,20	8,20	8,20	8,20	8,20	8,20	8,20	8,20	8,20
average sales AHL 23		26,00	26,00	26,00	26,00	26,00	26,00	25,99	25,87	25,23	23,93	23,68
average sales AHL 31		6,82	6,82	6,82	6,82	6,82	6,82	6,82	6,81	6,81	6,81	6,81
average sales AHL 32		3,22	3,22	3,22	3,22	3,22	3,22	3,22	3,22	3,22	3,22	3,22
average lost of sales AHL 11		0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,14	0,72	2,06	2,24
average lost of sales AHL 12		0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,02	0,56	2,97	3,25
average lost of sales AHL 13		0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
average lost of sales AHL 21		0,00	0,00	0,00	0,00	0,00	0,00	0,01	0,18	1,75	5,28	18,08
average lost of sales AHL 22		0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
average lost of sales AHL 23		0,00	0,00	0,00	0,00	0,00	0,00	0,01	0,12	0,77	2,07	2,32
average lost of sales AHL 31		0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,01	0,01	0,01	0,01
average lost of sales AHL 32		0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
average inventory AHL 11		200,06	200,06	200,02	199,39	195,58	181,14	154,73	123,59	91,24	60,53	50,24
average inventory AHL 12		395,56	395,67	395,76	395,83	395,01	379,31	324,38	256,27	189,13	125,19	100,08
average inventory AHL 13		193,75	176,10	158,49	140,89	123,27	105,72	89,05	77,54	75,04	75,00	75,00
average inventory AHL 21		406,86	406,99	406,84	406,77	406,82	405,68	386,56	318,08	227,96	148,44	73,90
average inventory AHL 22		97,63	93,99	91,78	90,65	90,20	90,05	90,02	90,02	90,02	90,02	90,02
average inventory AHL 23		239,00	234,84	224,15	205,55	181,59	155,77	129,65	103,22	75,67	49,64	40,23
average inventory AHL 31		75,40	68,79	62,39	56,35	50,96	46,47	43,21	41,19	40,27	40,01	40,00
average inventory AHL 32		42,95	41,91	41,14	40,64	40,34	40,17	40,08	40,03	40,01	40,01	40,01
average inventory WH 11		208,71	208,71	208,85	209,44	212,87	222,39	235,40	240,32	231,43	213,70	200,93
average inventory WH 12		203,22	203,22	203,13	202,76	203,37	210,15	231,96	241,26	235,29	214,85	195,21
average inventory WH 13		213,20	214,63	215,11	213,45	211,68	211,02	212,55	207,86	203,82	203,71	203,71
average inventory WH 21		181,34	181,28	181,83	181,98	181,24	182,99	196,43	223,47	218,40	193,78	170,65
average inventory WH 22		212,80	210,03	207,34	204,91	203,72	203,24	203,14	203,13	203,13	203,13	203,13
average inventory WH 23		200,97	204,98	210,17	213,41	213,36	215,13	222,30	224,55	216,44	203,08	193,88
average inventory WH 31		234,17	234,18	235,10	233,21	229,75	225,90	221,91	218,51	213,99	211,54	211,42
average inventory WH 32		220,64	218,16	215,89	213,42	211,65	210,42	209,77	209,42	209,16	209,06	209,02

Table C.4. Daily product flow of ERENKOY store in no discount period

no discount												
	$z =$	11 days	10 days	9 days	8 days	7 days	6 days	5 days	4 days	3 days	2 days	1 day
average shipment ERENKOY 11		42,56	42,04	39,18	34,41	30,80	32,41	31,76	29,78	28,53	28,13	28,10
average shipment ERENKOY 12		73,36	71,72	57,83	59,88	53,83	55,68	52,43	50,25	49,95	49,94	49,94
average shipment ERENKOY 13		142,79	142,78	142,71	142,91	143,24	143,23	144,45	152,10	143,00	107,93	82,12
average shipment ERENKOY 21		158,12	158,59	161,33	165,37	168,05	191,13	204,00	183,32	148,48	112,19	96,33
average shipment ERENKOY 22		66,95	66,00	61,50	53,75	47,65	55,41	58,92	55,74	50,47	43,11	41,06
average shipment ERENKOY 23		31,95	33,90	35,49	35,81	35,07	36,92	38,34	36,49	32,73	26,72	22,70
average shipment ERENKOY 31		18,20	18,22	18,06	17,28	16,47	15,97	15,29	14,79	13,68	12,46	12,16
average shipment ERENKOY 32		140,87	140,97	141,81	143,50	146,47	170,46	191,83	169,97	139,74	103,56	89,20
average return ERENKOY 11		19,76	19,14	16,17	11,29	7,64	9,37	8,78	6,71	5,42	5,00	4,97
average return ERENKOY 12		30,28	28,68	14,51	16,45	10,36	12,28	9,07	6,83	6,51	6,50	6,50
average return ERENKOY 13		22,62	22,69	22,64	22,85	23,19	23,16	24,96	38,58	39,55	15,11	0,21
average return ERENKOY 21		25,54	26,04	28,83	33,02	36,06	60,11	78,88	64,95	41,29	16,14	2,77
average return ERENKOY 22		30,77	29,79	25,14	17,23	11,04	19,02	24,06	21,74	16,13	8,23	6,08
average return ERENKOY 23		5,94	7,89	9,47	9,74	8,98	11,03	13,21	12,33	9,71	4,86	1,08
average return ERENKOY 31		7,83	7,85	7,67	6,87	6,08	5,70	5,16	4,70	3,59	2,35	2,06
average return ERENKOY 32		25,66	25,73	26,52	28,35	31,42	55,76	82,48	67,54	44,92	15,88	3,16
average shipment WH 11		23,26	23,27	23,31	23,30	23,37	23,38	23,27	23,27	23,27	23,27	23,27
average shipment WH 12		43,55	43,47	43,50	43,40	43,62	43,65	43,54	43,50	43,51	43,50	43,50
average shipment WH 13		119,47	119,40	119,40	119,39	119,36	119,36	118,78	113,08	103,16	92,51	81,58
average shipment WH 21		132,07	132,13	132,07	132,14	132,07	130,85	125,64	118,36	107,01	95,78	93,39
average shipment WH 22		36,49	36,50	36,47	36,47	36,57	36,52	35,18	34,27	34,46	34,88	34,97
average shipment WH 23		26,02	26,04	26,06	26,09	26,02	25,98	25,30	24,36	23,17	21,97	21,58
average shipment WH 31		10,44	10,43	10,40	10,34	10,34	10,28	10,15	10,13	10,13	10,11	10,09
average shipment WH 32		114,47	114,47	114,47	114,38	114,45	114,01	109,30	102,62	95,13	87,40	85,54
average sales ERENKOY 11		23,24	23,24	23,24	23,24	23,24	23,22	23,22	23,23	23,23	23,23	23,23
average sales ERENKOY 12		43,61	43,61	43,61	43,61	43,61	43,61	43,61	43,61	43,61	43,61	43,61
average sales ERENKOY 13		119,64	119,58	119,56	119,54	119,52	119,53	118,90	113,31	103,50	92,71	81,75
average sales ERENKOY 21		131,78	131,77	131,75	131,72	131,49	130,36	125,35	118,62	107,34	96,05	93,38
average sales ERENKOY 22		36,59	36,59	36,59	36,59	36,59	36,53	35,21	34,38	34,60	34,99	35,07
average sales ERENKOY 23		26,11	26,11	26,11	26,11	26,09	25,95	25,32	24,38	23,16	21,93	21,62
average sales ERENKOY 31		10,48	10,47	10,47	10,43	10,40	10,30	10,17	10,13	10,13	10,13	10,13
average sales ERENKOY 32		114,39	114,39	114,39	114,38	114,35	113,93	109,48	102,90	95,12	87,52	85,93
average lost of sales ERENKOY 11		0,00	0,00	0,00	0,00	0,00	0,01	0,02	0,01	0,01	0,01	0,01
average lost of sales ERENKOY 12		0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
average lost of sales ERENKOY 13		3,77	3,83	3,85	3,87	3,89	3,88	4,51	10,10	19,91	30,70	41,66
average lost of sales ERENKOY 21		0,05	0,06	0,08	0,11	0,34	1,47	6,48	13,21	24,49	35,77	38,45
average lost of sales ERENKOY 22		0,00	0,00	0,00	0,00	0,00	0,06	1,38	2,20	1,98	1,60	1,52
average lost of sales ERENKOY 23		0,00	0,00	0,00	0,00	0,02	0,16	0,79	1,73	2,95	4,19	4,49
average lost of sales ERENKOY 31		0,00	0,01	0,02	0,06	0,09	0,19	0,31	0,35	0,36	0,36	0,36
average lost of sales ERENKOY 32		0,00	0,00	0,00	0,01	0,04	0,46	4,92	11,49	19,27	26,87	28,46
average inventory ERENKOY 11		254,95	231,66	208,65	185,76	163,46	144,32	132,83	127,25	125,36	125,04	125,02
average inventory ERENKOY 12		472,38	429,33	374,09	344,07	302,88	267,76	252,53	249,12	248,82	248,83	248,83
average inventory ERENKOY 13		354,05	354,21	354,21	354,20	354,32	354,22	351,66	325,96	253,99	157,32	102,62
average inventory ERENKOY 21		832,69	831,22	824,57	803,83	758,34	668,40	535,53	396,65	263,25	168,40	140,11
average inventory ERENKOY 22		395,92	359,46	323,31	287,94	252,96	213,99	171,60	136,90	113,66	101,85	99,94
average inventory ERENKOY 23		236,21	229,88	218,71	201,84	179,94	153,90	125,33	96,94	69,64	47,57	40,24
average inventory ERENKOY 31		115,30	104,75	94,19	83,43	72,96	62,56	53,24	46,36	42,13	40,35	40,02
average inventory ERENKOY 32		705,97	705,94	704,91	700,56	679,31	606,91	486,42	359,78	246,84	163,91	139,71
average inventory WH 11		289,78	288,24	276,80	259,32	249,36	256,45	250,84	238,05	229,32	226,23	226,03
average inventory WH 12		311,38	309,61	263,30	264,07	245,57	254,08	245,45	237,80	236,23	236,14	236,14
average inventory WH 13		243,79	243,76	243,94	243,98	244,13	244,38	246,90	280,42	319,02	265,90	187,80
average inventory WH 21		244,59	245,75	251,62	267,37	288,50	340,19	376,62	361,32	307,70	228,91	179,63
average inventory WH 22		297,55	296,73	278,58	250,62	234,16	257,74	274,67	271,55	253,01	225,36	217,38
average inventory WH 23		219,52	225,97	231,51	233,30	235,69	247,12	253,23	246,88	234,21	212,10	198,60
average inventory WH 31		260,98	261,01	259,52	253,57	249,17	244,30	241,32	236,92	226,62	216,73	214,39
average inventory WH 32		278,12	278,19	279,69	285,32	297,00	356,82	445,14	443,73	391,40	293,29	228,30

Table C.5. Daily product flow of ERENKOY store in 12 % discount period

	12 % discount											
	$z =$	11 days	10 days	9 days	8 days	7 days	6 days	5 days	4 days	3 days	2 days	1 day
average shipment ERENKOY 11		40,32	40,15	37,84	33,48	30,35	32,18	31,53	29,23	28,19	28,01	28,00
average shipment ERENKOY 12		168,20	168,42	168,08	169,33	171,76	202,89	239,16	212,71	172,71	129,50	127,71
average shipment ERENKOY 13		50,48	53,53	57,54	57,42	54,11	60,05	65,79	62,12	55,93	48,59	45,09
average shipment ERENKOY 21		190,92	190,86	190,74	191,26	192,71	204,45	243,75	232,26	186,20	138,59	114,78
average shipment ERENKOY 22		59,24	58,02	53,63	47,16	41,01	47,82	53,49	51,71	46,92	39,72	38,41
average shipment ERENKOY 23		29,97	31,21	33,01	33,72	33,11	34,34	36,66	36,46	33,67	28,02	23,93
average shipment ERENKOY 31		21,17	21,43	21,45	20,82	19,91	19,80	19,81	19,74	18,58	16,07	15,38
average shipment ERENKOY 32		161,33	161,36	161,30	161,10	161,48	175,14	220,07	198,46	158,25	118,54	100,17
average return ERENKOY 11		16,51	16,31	13,89	9,42	6,23	8,17	7,58	5,19	4,10	3,92	3,91
average return ERENKOY 12		23,72	23,93	23,63	25,01	27,37	58,72	95,92	75,48	49,60	18,85	10,08
average return ERENKOY 13		7,80	10,90	14,83	14,68	11,25	17,31	23,91	21,58	15,96	7,91	4,35
average return ERENKOY 21		20,47	20,41	20,29	20,81	22,28	34,43	76,92	74,46	43,35	15,15	0,99
average return ERENKOY 22		26,54	25,26	20,67	14,00	7,86	14,79	21,30	20,05	14,69	7,13	5,80
average return ERENKOY 23		3,31	4,55	6,36	7,02	6,35	7,65	10,30	10,65	8,70	4,42	0,60
average return ERENKOY 31		6,98	7,24	7,23	6,53	5,65	5,60	5,84	5,94	4,81	2,28	1,60
average return ERENKOY 32		26,04	26,04	25,97	25,77	26,20	39,87	87,05	73,02	43,84	15,57	1,07
average shipment WH 11		24,20	24,19	24,23	24,24	24,28	24,29	24,22	24,20	24,21	24,20	24,20
average shipment WH 12		143,53	143,51	143,55	143,58	143,74	143,71	142,16	136,51	122,53	109,97	116,97
average shipment WH 13		42,70	42,67	42,70	42,61	42,73	42,82	41,93	40,50	39,97	40,60	40,60
average shipment WH 21		169,94	169,94	169,94	169,92	169,88	169,44	166,53	157,79	142,68	123,28	113,66
average shipment WH 22		33,05	32,97	32,99	33,02	33,15	33,14	32,44	31,91	32,34	32,57	32,58
average shipment WH 23		26,68	26,70	26,70	26,68	26,72	26,84	26,57	25,97	25,08	23,68	23,29
average shipment WH 31		14,22	14,22	14,19	14,23	14,23	14,18	14,00	13,81	13,79	13,77	13,77
average shipment WH 32		134,73	134,70	134,69	134,66	134,55	134,64	131,97	124,49	113,76	102,47	98,68
average sales ERENKOY 11		24,18	24,18	24,18	24,18	24,18	24,18	24,17	24,18	24,18	24,18	24,18
average sales ERENKOY 12		143,45	143,45	143,45	143,45	143,45	143,45	142,49	136,89	123,15	110,37	117,03
average sales ERENKOY 13		42,88	42,88	42,88	42,88	42,88	42,85	42,19	40,89	40,23	40,83	40,85
average sales ERENKOY 21		169,50	169,50	169,50	169,50	169,50	169,04	166,20	157,88	142,88	123,35	113,56
average sales ERENKOY 22		33,24	33,24	33,24	33,24	33,24	33,23	32,57	32,08	32,51	32,70	32,70
average sales ERENKOY 23		26,74	26,74	26,74	26,74	26,74	26,73	26,51	26,02	25,11	23,65	23,33
average sales ERENKOY 31		14,32	14,32	14,32	14,31	14,30	14,25	14,07	13,87	13,82	13,80	13,80
average sales ERENKOY 32		134,25	134,25	134,25	134,25	134,24	134,16	131,98	124,87	114,21	102,71	98,85
average lost of sales ERENKOY 11		0,00	0,00	0,00	0,00	0,00	0,00	0,01	0,00	0,00	0,00	0,00
average lost of sales ERENKOY 12		0,00	0,00	0,00	0,00	0,00	0,00	0,96	6,57	20,30	33,09	26,42
average lost of sales ERENKOY 13		0,00	0,00	0,00	0,00	0,00	0,03	0,69	1,98	2,65	2,05	2,03
average lost of sales ERENKOY 21		0,11	0,11	0,11	0,11	0,11	0,57	3,40	11,73	26,73	46,26	56,05
average lost of sales ERENKOY 22		0,00	0,00	0,00	0,00	0,00	0,01	0,67	1,16	0,73	0,54	0,54
average lost of sales ERENKOY 23		0,00	0,00	0,00	0,00	0,00	0,01	0,23	0,73	1,63	3,09	3,41
average lost of sales ERENKOY 31		0,00	0,00	0,00	0,00	0,02	0,06	0,25	0,44	0,49	0,51	0,51
average lost of sales ERENKOY 32		0,00	0,00	0,00	0,00	0,01	0,09	2,27	9,38	20,04	31,54	35,40
average inventory ERENKOY 11		265,73	241,54	217,47	193,49	169,60	147,53	133,31	126,78	125,19	125,02	125,01
average inventory ERENKOY 12		941,98	942,22	941,80	936,52	902,17	778,81	619,04	455,10	305,00	221,05	216,55
average inventory ERENKOY 13		395,58	387,39	368,33	336,64	296,49	251,07	204,53	158,87	121,73	103,51	99,92
average inventory ERENKOY 21		800,32	800,35	800,13	798,70	791,67	759,43	665,19	509,15	331,57	193,45	142,02
average inventory ERENKOY 22		362,18	329,27	296,64	264,20	231,68	196,72	160,45	129,80	110,57	101,23	99,96
average inventory ERENKOY 23		239,09	235,69	226,44	209,40	186,13	159,62	131,84	103,67	75,30	49,42	40,19
average inventory ERENKOY 31		156,65	142,95	128,79	114,48	100,12	85,63	70,57	56,47	46,00	40,88	40,02
average inventory ERENKOY 32		698,85	698,88	699,12	698,94	697,13	670,05	571,98	430,24	289,93	180,45	141,00
average inventory WH 11		274,28	271,48	261,94	245,90	235,88	247,27	242,42	228,25	221,72	220,45	220,35
average inventory WH 12		244,58	244,42	243,99	248,53	261,90	330,96	391,08	410,57	363,56	243,09	214,68
average inventory WH 13		239,32	249,45	258,86	256,23	244,00	267,73	291,97	288,94	269,27	238,54	224,60
average inventory WH 21		247,49	247,45	247,61	248,64	254,04	281,08	356,34	379,27	327,17	237,06	166,41
average inventory WH 22		285,02	282,54	265,91	241,03	225,39	248,95	269,39	266,45	246,78	221,73	216,83
average inventory WH 23		207,64	212,34	218,05	219,79	219,72	231,16	240,21	238,37	227,25	209,28	196,04
average inventory WH 31		249,84	252,12	250,55	245,71	242,51	243,47	245,24	241,08	230,54	216,04	211,67
average inventory WH 32		270,29	270,25	270,47	270,41	272,61	302,84	398,74	435,66	389,25	292,24	211,00

Table C.6. Daily product flow of NST store in no discount period

no discount												
	$z =$	11 days	10 days	9 days	8 days	7 days	6 days	5 days	4 days	3 days	2 days	1 day
average shipment NST 11		23,31	23,66	24,03	23,81	22,73	21,31	20,25	19,63	19,27	19,22	19,22
average shipment NST 12		94,99	96,05	99,88	103,97	105,40	108,56	112,98	112,88	107,19	92,39	89,27
average shipment NST 13		32,70	34,22	36,52	36,95	35,52	34,49	35,56	37,45	36,98	32,37	31,74
average shipment NST 21		75,89	75,62	74,34	73,62	72,21	74,03	73,63	71,69	65,41	58,15	56,89
average shipment NST 22		21,67	21,71	21,72	21,01	19,43	18,49	18,05	17,96	17,94	17,94	17,94
average shipment NST 23		15,10	15,24	15,57	15,47	14,90	14,07	13,52	13,14	12,31	11,72	11,65
average shipment NST 31		9,24	9,20	9,06	8,78	8,37	7,72	7,27	6,99	6,69	6,46	6,42
average shipment NST 32		79,67	79,56	79,70	79,59	79,70	83,05	95,48	99,10	89,76	72,65	57,59
average return NST 11		6,00	6,35	6,65	6,41	5,33	3,96	2,90	2,26	1,89	1,84	1,84
average return NST 12		7,68	8,73	12,51	16,70	18,04	21,21	26,08	26,56	22,43	7,75	4,25
average return NST 13		2,07	3,53	5,83	6,34	4,95	3,90	4,95	6,82	6,49	2,01	1,35
average return NST 21		22,68	22,31	20,96	20,39	19,21	21,09	20,73	19,17	13,34	5,92	4,62
average return NST 22		5,07	5,08	5,06	4,35	2,78	1,83	1,39	1,29	1,28	1,28	1,28
average return NST 23		4,97	5,12	5,45	5,37	4,81	3,99	3,45	3,08	2,24	1,64	1,58
average return NST 31		4,11	4,09	3,96	3,69	3,28	2,64	2,20	1,91	1,61	1,38	1,34
average return NST 32		7,14	7,02	7,15	7,08	7,12	10,55	23,31	28,33	21,71	10,12	0,36
average shipment WH 11		17,26	17,22	17,26	17,32	17,31	17,30	17,26	17,22	17,24	17,24	17,24
average shipment WH 12		87,13	87,13	87,02	87,26	87,25	87,20	86,92	86,32	84,54	84,36	84,84
average shipment WH 13		30,57	30,55	30,60	30,58	30,55	30,50	30,46	30,45	30,32	30,33	30,38
average shipment WH 21		53,02	53,10	53,24	53,11	53,02	52,88	52,60	52,16	51,90	52,17	52,26
average shipment WH 22		16,61	16,62	16,61	16,62	16,59	16,62	16,63	16,63	16,63	16,63	16,63
average shipment WH 23		10,10	10,12	10,11	10,09	10,06	10,06	10,06	10,05	10,05	10,05	10,04
average shipment WH 31		5,17	5,19	5,18	5,15	5,13	5,13	5,07	5,08	5,10	5,11	5,10
average shipment WH 32		72,43	72,41	72,43	72,46	72,46	72,24	71,93	70,89	68,07	62,40	57,08
average sales NST 11		17,29	17,29	17,29	17,29	17,29	17,29	17,29	17,29	17,29	17,29	17,29
average sales NST 12		87,11	87,11	87,11	87,11	87,11	87,11	86,97	86,46	84,67	84,42	84,90
average sales NST 13		30,53	30,53	30,53	30,53	30,53	30,53	30,53	30,52	30,36	30,27	30,29
average sales NST 21		53,01	53,01	53,01	53,00	52,95	52,94	52,66	52,17	51,77	51,99	52,03
average sales NST 22		16,63	16,63	16,63	16,63	16,63	16,63	16,63	16,63	16,63	16,63	16,63
average sales NST 23		10,08	10,08	10,08	10,08	10,08	10,07	10,07	10,05	10,05	10,05	10,05
average sales NST 31		5,15	5,13	5,13	5,12	5,11	5,11	5,10	5,10	5,09	5,09	5,09
average sales NST 32		72,48	72,48	72,48	72,48	72,48	72,45	72,22	71,06	68,22	62,57	57,10
average lost of sales NST 11		0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
average lost of sales NST 12		0,00	0,00	0,00	0,00	0,00	0,00	0,14	0,65	2,44	2,69	2,22
average lost of sales NST 13		0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,01	0,17	0,26	0,23
average lost of sales NST 21		0,00	0,00	0,00	0,00	0,05	0,07	0,35	0,84	1,24	1,02	0,97
average lost of sales NST 22		0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
average lost of sales NST 23		0,00	0,00	0,00	0,00	0,00	0,01	0,01	0,03	0,03	0,03	0,03
average lost of sales NST 31		0,01	0,02	0,03	0,04	0,04	0,05	0,06	0,06	0,07	0,07	0,07
average lost of sales NST 32		0,00	0,00	0,00	0,00	0,00	0,03	0,26	1,42	4,26	9,91	15,38
average inventory NST 11		190,34	172,97	155,66	138,49	122,09	108,25	99,27	95,70	94,99	94,94	94,94
average inventory NST 12		743,95	738,65	716,72	665,11	586,09	498,81	408,68	317,93	231,07	182,82	177,40
average inventory NST 13		297,93	290,20	271,56	243,93	213,55	183,01	152,44	121,75	92,46	76,12	75,01
average inventory NST 21		567,76	514,88	462,21	409,63	356,66	303,42	249,97	200,79	167,40	157,02	156,29
average inventory NST 22		183,17	166,49	149,93	134,08	120,72	113,03	110,41	110,00	109,98	109,98	109,98
average inventory NST 23		110,80	100,73	90,66	80,64	70,77	61,57	53,75	48,38	45,78	45,05	44,97
average inventory NST 31		56,93	51,87	47,07	42,57	38,58	35,25	32,78	31,18	30,34	30,05	30,00
average inventory NST 32		364,60	364,48	364,48	364,60	363,61	355,67	323,83	263,70	189,96	119,88	77,58
average inventory WH 11		230,11	232,24	231,31	229,39	225,65	222,69	217,29	211,70	208,79	208,45	208,44
average inventory WH 12		209,12	213,27	222,50	234,54	243,55	253,24	263,61	269,30	259,47	214,15	202,06
average inventory WH 13		209,59	215,59	222,98	223,12	220,88	220,60	229,00	233,57	226,79	207,92	205,73
average inventory WH 21		259,25	255,38	254,49	255,01	256,21	259,39	260,31	252,50	227,61	203,65	199,86
average inventory WH 22		217,59	215,67	214,44	211,38	206,89	202,96	200,76	200,09	199,99	199,99	199,99
average inventory WH 23		221,82	222,14	222,48	222,39	222,14	219,91	218,44	214,01	207,17	203,47	203,08
average inventory WH 31		238,94	237,05	236,82	235,33	233,03	229,25	223,93	219,66	214,32	210,75	210,00
average inventory WH 32		241,15	241,20	241,19	240,91	240,74	247,93	280,97	311,53	297,67	254,10	204,26

Table C.7. Daily product flow of NST store in 12 % discount period

12 % discount

	$z =$	11 days	10 days	9 days	8 days	7 days	6 days	5 days	4 days	3 days	2 days	1 day
average shipment NST 11		21,99	22,09	22,37	22,28	21,30	20,13	19,46	18,78	18,53	18,50	18,49
average shipment NST 12		107,23	106,94	107,55	110,39	113,17	117,02	121,14	121,78	117,99	103,74	99,68
average shipment NST 13		32,87	34,08	36,15	37,23	36,08	34,89	35,64	37,40	37,20	32,71	32,05
average shipment NST 21		100,55	102,56	100,54	99,18	97,23	98,89	100,69	96,60	88,00	75,01	71,03
average shipment NST 22		18,71	18,96	19,04	18,26	16,77	16,15	16,02	16,02	16,02	16,02	16,02
average shipment NST 23		15,38	15,50	15,74	15,54	14,95	14,29	13,85	13,51	12,56	11,96	11,90
average shipment NST 31		10,79	10,90	10,91	10,81	10,55	10,06	9,81	9,58	8,89	8,36	8,32
average shipment NST 32		75,59	75,64	75,58	75,67	75,65	77,05	84,70	90,91	85,93	73,15	61,84
average return NST 11		4,85	4,93	5,21	5,15	4,20	2,97	2,28	1,61	1,36	1,34	1,33
average return NST 12		5,90	5,63	6,24	9,08	11,99	15,87	20,03	20,85	19,12	6,72	1,90
average return NST 13		1,80	3,00	5,04	6,18	5,09	3,88	4,62	6,35	6,28	1,90	1,23
average return NST 21		30,17	31,99	30,01	28,85	27,30	28,97	31,12	28,50	21,75	9,12	4,81
average return NST 22		3,76	3,99	4,07	3,32	1,86	1,24	1,11	1,10	1,10	1,10	1,10
average return NST 23		4,90	5,01	5,28	5,11	4,54	3,86	3,43	3,11	2,16	1,56	1,50
average return NST 31		3,51	3,62	3,63	3,54	3,28	2,78	2,56	2,32	1,61	1,07	1,03
average return NST 32		3,25	3,28	3,23	3,31	3,30	4,66	12,44	18,98	15,31	6,22	0,03
average shipment WH 11		17,03	17,04	17,07	17,06	17,02	17,06	17,09	17,11	17,12	17,13	17,13
average shipment WH 12		101,28	101,28	101,25	101,17	101,11	100,91	101,04	100,81	98,67	97,07	97,80
average shipment WH 13		30,94	30,98	30,90	30,84	30,81	30,82	30,76	30,79	30,67	30,72	30,76
average shipment WH 21		70,28	70,40	70,38	70,32	69,99	69,84	69,30	67,80	66,03	65,85	66,24
average shipment WH 22		14,85	14,85	14,87	14,87	14,86	14,88	14,87	14,87	14,87	14,87	14,87
average shipment WH 23		10,44	10,47	10,43	10,43	10,40	10,41	10,42	10,39	10,37	10,36	10,36
average shipment WH 31		7,31	7,33	7,31	7,30	7,29	7,31	7,29	7,28	7,28	7,29	7,29
average shipment WH 32		72,07	72,08	72,09	72,09	72,12	72,09	72,17	71,90	70,34	66,73	61,63
average sales NST 11		17,13	17,13	17,13	17,13	17,13	17,13	17,13	17,13	17,13	17,13	17,13
average sales NST 12		101,03	101,03	101,03	101,03	101,03	101,03	101,00	100,80	98,61	96,79	97,54
average sales NST 13		30,94	30,94	30,94	30,94	30,94	30,94	30,94	30,91	30,78	30,69	30,71
average sales NST 21		70,04	70,04	70,04	70,02	69,95	69,86	69,25	67,69	65,78	65,52	65,90
average sales NST 22		14,83	14,83	14,83	14,83	14,83	14,83	14,83	14,83	14,83	14,83	14,83
average sales NST 23		10,38	10,38	10,38	10,38	10,38	10,38	10,37	10,35	10,35	10,35	10,35
average sales NST 31		7,32	7,32	7,32	7,32	7,32	7,32	7,30	7,30	7,30	7,30	7,30
average sales NST 32		72,23	72,23	72,23	72,23	72,23	72,23	72,20	71,95	70,53	66,74	61,67
average lost of sales NST 11		0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
average lost of sales NST 12		0,00	0,00	0,00	0,00	0,00	0,00	0,03	0,23	2,42	4,24	3,49
average lost of sales NST 13		0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,03	0,16	0,26	0,23
average lost of sales NST 21		0,00	0,00	0,00	0,02	0,09	0,18	0,79	2,35	4,26	4,52	4,14
average lost of sales NST 22		0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
average lost of sales NST 23		0,00	0,00	0,00	0,00	0,00	0,00	0,01	0,03	0,03	0,03	0,03
average lost of sales NST 31		0,00	0,00	0,00	0,00	0,00	0,01	0,02	0,02	0,02	0,02	0,02
average lost of sales NST 32		0,00	0,00	0,00	0,00	0,00	0,00	0,04	0,28	1,70	5,49	10,57
average inventory NST 11		188,47	171,32	154,18	137,11	120,62	106,82	98,24	95,42	95,02	94,99	94,98
average inventory NST 12		742,22	742,27	740,57	725,65	671,58	576,37	473,93	370,63	265,71	187,08	176,81
average inventory NST 13		298,22	291,39	274,04	246,88	216,28	185,34	154,27	123,20	93,47	76,27	74,96
average inventory NST 21		736,54	669,54	601,24	532,16	462,25	391,83	319,65	247,45	186,22	156,77	152,41
average inventory NST 22		162,82	148,11	133,90	121,59	113,40	110,48	109,98	109,96	109,96	109,96	109,96
average inventory NST 23		114,06	103,69	93,33	82,97	72,68	62,91	54,45	48,60	45,81	45,03	44,97
average inventory NST 31		80,72	73,39	66,05	58,71	51,45	44,42	38,08	33,30	30,78	30,05	30,00
average inventory NST 32		367,96	367,88	367,85	367,91	367,85	364,09	335,13	271,36	197,78	127,84	76,98
average inventory WH 11		222,71	223,58	224,00	224,80	222,88	218,37	213,11	208,24	206,41	206,11	206,07
average inventory WH 12		203,47	203,53	205,32	212,71	228,15	244,63	250,37	253,72	247,51	209,76	193,62
average inventory WH 13		207,53	212,70	219,67	222,07	220,50	220,11	227,19	231,37	225,95	207,38	204,65

average inventory WH 21	270,51	276,64	275,60	272,68	276,42	281,24	285,79	270,86	245,33	206,12	194,23
average inventory WH 22	210,96	210,99	210,53	206,95	202,49	200,34	199,72	199,72	199,72	199,72	199,72
average inventory WH 23	220,55	221,05	220,76	220,17	220,03	218,80	217,69	213,10	206,74	203,20	202,88
average inventory WH 31	224,37	224,43	224,10	223,58	223,14	222,73	221,57	218,16	212,35	208,06	207,50
average inventory WH 32	225,51	225,55	226,30	225,97	225,93	228,52	252,68	279,02	272,26	239,79	198,21

Table C.8. Daily product flow of 2 stores without transfer in no discount period

no transfer, no discount									
z values of AHL store	7 days	7 days	7 days	6 days	6 days	6 days	5 days	5 days	5 days
z values of ERENKOY store	8 days	7 days	6 days	8 days	7 days	6 days	8 days	7 days	6 days
average shipment AHL(11)	23,32	23,28	23,42	22,75	22,80	23,06	22,81	22,83	23,06
average shipment AHL(12)	68,26	67,80	68,13	72,64	71,81	72,43	74,88	74,22	74,06
average shipment AHL(13)	6,68	6,67	6,67	6,68	6,67	6,67	6,68	6,67	6,67
average shipment AHL(21)	68,13	68,16	70,14	72,09	71,94	73,24	73,94	73,91	75,18
average shipment AHL(22)	7,95	7,98	8,01	7,92	7,96	7,98	7,93	7,96	7,98
average shipment AHL(23)	32,90	33,11	33,16	33,11	33,32	33,50	32,46	32,60	32,67
average shipment AHL(31)	10,48	10,49	10,47	9,82	9,82	9,81	9,25	9,26	9,26
average shipment AHL(32)	6,24	6,32	6,28	6,00	6,10	6,06	5,82	5,89	5,89
average return AHL(11)	6,98	6,94	7,06	6,43	6,45	6,69	6,63	6,63	6,84
average return AHL(12)	11,90	11,40	11,70	16,33	15,41	16,02	18,68	17,94	17,72
average return AHL(13)	3,71	3,70	3,69	3,71	3,70	3,69	3,71	3,70	3,69
average return AHL(21)	11,83	11,90	13,84	15,93	15,79	17,07	18,40	18,40	19,81
average return AHL(22)	1,47	1,51	1,52	1,44	1,48	1,50	1,45	1,48	1,49
average return AHL(23)	10,24	10,43	10,48	10,64	10,83	11,04	10,43	10,58	10,59
average return AHL(31)	4,66	4,66	4,65	3,99	4,00	3,99	3,44	3,45	3,45
average return AHL(32)	2,64	2,73	2,69	2,41	2,51	2,48	2,23	2,30	2,30
average sales AHL(11,1)	16,35	16,35	16,35	16,33	16,33	16,32	16,21	16,21	16,20
average sales AHL(12,1)	56,07	56,07	56,06	56,03	56,03	56,03	55,89	55,92	55,91
average sales AHL(13,1)	2,95	2,95	2,95	2,95	2,95	2,95	2,95	2,95	2,95
average sales AHL(21,1)	55,95	55,96	55,95	55,84	55,87	55,84	55,22	55,28	55,12
average sales AHL(22,1)	6,47	6,47	6,47	6,47	6,47	6,47	6,47	6,47	6,47
average sales AHL(23,1)	22,66	22,66	22,65	22,52	22,52	22,50	22,08	22,05	22,08
average sales AHL(31,1)	5,81	5,81	5,81	5,81	5,81	5,81	5,79	5,79	5,79
average sales AHL(32,1)	3,59	3,59	3,58	3,58	3,58	3,57	3,58	3,58	3,57
lost of sales AHL(11)	0,02	0,02	0,02	0,04	0,04	0,05	0,16	0,16	0,17
lost of sales AHL(12)	0,00	0,00	0,01	0,04	0,04	0,04	0,18	0,15	0,16
lost of sales AHL(13)	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
lost of sales AHL(21)	0,05	0,04	0,04	0,16	0,13	0,16	0,78	0,72	0,88
lost of sales AHL(22)	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
lost of sales AHL(23)	0,06	0,06	0,07	0,21	0,20	0,22	0,65	0,68	0,64
lost of sales AHL(31)	0,07	0,07	0,07	0,08	0,08	0,08	0,09	0,09	0,09
lost of sales AHL(32)	0,24	0,25	0,26	0,25	0,26	0,27	0,26	0,26	0,27
average inventory AHL(11)	113,16	113,38	113,21	96,85	96,93	96,66	80,35	80,51	80,23
average inventory AHL(12)	354,28	354,51	354,28	312,93	313,05	312,67	259,89	259,94	259,39
average inventory AHL(13)	72,13	72,12	72,12	72,13	72,12	72,12	72,13	72,12	72,12
average inventory AHL(21)	339,60	340,10	342,32	293,16	294,39	296,49	236,28	238,19	239,76
average inventory AHL(22)	89,58	89,68	89,48	89,52	89,61	89,42	89,49	89,59	89,40
average inventory AHL(23)	153,93	153,87	153,57	131,18	131,15	130,76	106,98	106,84	106,64
average inventory AHL(31)	48,58	48,59	48,59	45,56	45,56	45,57	43,20	43,21	43,21
average inventory AHL(32)	41,33	41,28	41,23	40,46	40,43	40,41	39,91	39,84	39,83
average shipment ERENKOY(11)	34,16	30,50	32,57	34,18	30,65	32,73	34,25	30,76	32,72
average shipment ERENKOY(12)	59,71	54,61	57,79	59,60	54,75	57,94	59,78	54,98	57,71
average shipment ERENKOY(13)	143,05	142,99	142,86	143,05	142,99	142,86	143,05	142,99	142,86
average shipment ERENKOY(21)	156,64	158,45	182,52	157,42	158,26	181,62	157,59	159,13	183,42
average shipment ERENKOY(22)	54,14	47,42	56,04	54,13	47,41	56,03	54,13	47,41	56,01
average shipment ERENKOY(23)	35,67	35,33	37,78	35,67	35,27	37,82	35,44	34,95	37,34
average shipment ERENKOY(31)	17,24	16,44	15,96	17,25	16,43	15,96	17,24	16,44	15,97
average shipment ERENKOY(32)	143,01	147,07	170,37	143,20	146,50	169,99	143,51	146,86	169,84

z values of AHL store	7 days	7 days	7 days	6 days	6 days	6 days	5 days	5 days	5 days
z values of ERENKOY store	8 days	7 days	6 days	8 days	7 days	6 days	8 days	7 days	6 days
average return ERENKOY(11)	11,07	7,37	9,50	11,08	7,46	9,61	11,15	7,56	9,59
average return ERENKOY(12)	16,20	11,01	14,21	16,14	11,17	14,38	16,24	11,35	14,03
average return ERENKOY(13)	22,66	22,63	22,47	22,66	22,63	22,47	22,66	22,63	22,47
average return ERENKOY(21)	24,26	26,24	51,58	25,03	26,08	50,73	25,17	26,94	52,65
average return ERENKOY(22)	17,58	10,80	19,60	17,57	10,79	19,58	17,57	10,79	19,56
average return ERENKOY(23)	9,61	9,24	11,89	9,61	9,17	11,90	9,38	8,85	11,42
average return ERENKOY(31)	6,83	6,05	5,70	6,84	6,05	5,70	6,83	6,06	5,70
average return ERENKOY(32)	27,96	32,10	55,65	28,14	31,53	55,29	28,45	31,91	55,14
average sales ERENKOY(11,1)	23,24	23,24	23,22	23,24	23,24	23,22	23,24	23,24	23,22
average sales ERENKOY(12,1)	43,61	43,61	43,61	43,61	43,61	43,61	43,61	43,61	43,61
average sales ERENKOY(13,1)	119,85	119,84	119,85	119,85	119,84	119,85	119,85	119,84	119,85
average sales ERENKOY(21,1)	131,71	131,47	130,29	131,68	131,46	130,14	131,66	131,41	130,09
average sales ERENKOY(22,1)	36,59	36,59	36,53	36,59	36,59	36,53	36,59	36,59	36,53
average sales ERENKOY(23,1)	26,11	26,09	25,94	26,11	26,09	25,96	26,11	26,09	25,96
average sales ERENKOY(31,1)	10,43	10,40	10,30	10,43	10,40	10,30	10,43	10,40	10,30
average sales ERENKOY(32,1)	114,39	114,36	113,94	114,39	114,37	113,94	114,39	114,36	113,93
lost of sales ERENKOY(11)	0,00	0,00	0,01	0,00	0,00	0,01	0,00	0,00	0,01
lost of sales ERENKOY(12)	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
lost of sales ERENKOY(13)	3,56	3,57	3,56	3,56	3,57	3,56	3,56	3,57	3,56
lost of sales ERENKOY(21)	0,12	0,36	1,53	0,15	0,36	1,68	0,17	0,42	1,73
lost of sales ERENKOY(22)	0,00	0,00	0,06	0,00	0,00	0,06	0,00	0,00	0,06
lost of sales ERENKOY(23)	0,00	0,02	0,17	0,00	0,02	0,16	0,00	0,02	0,15
lost of sales ERENKOY(31)	0,06	0,09	0,19	0,06	0,09	0,19	0,06	0,09	0,19
lost of sales ERENKOY(32)	0,00	0,03	0,45	0,00	0,02	0,45	0,00	0,03	0,46
average inventory ERENKOY(11)	184,27	162,40	142,95	184,41	162,38	142,94	184,42	162,42	142,93
average inventory ERENKOY(12)	335,99	295,08	259,27	336,35	295,19	259,21	336,46	294,39	258,42
average inventory ERENKOY(13)	354,22	354,13	353,98	354,22	354,13	353,98	354,22	354,13	353,98
average inventory ERENKOY(21)	785,83	740,22	645,67	786,93	741,71	646,10	787,67	742,30	646,86
average inventory ERENKOY(22)	286,60	251,97	212,25	286,60	251,98	212,24	286,61	251,97	212,23
average inventory ERENKOY(23)	199,75	177,81	151,47	199,80	177,76	151,50	199,87	177,72	151,50
average inventory ERENKOY(31)	83,40	72,94	62,54	83,40	72,93	62,55	83,40	72,93	62,56
average inventory ERENKOY(32)	699,76	679,36	606,24	699,77	679,07	606,60	699,97	679,07	606,51
average shipment WH(11)	39,63	39,73	39,66	39,58	39,64	39,58	39,43	39,46	39,44
average shipment WH(12)	99,58	99,72	99,79	99,60	99,62	99,64	99,39	99,52	99,52
average shipment WH(13)	122,67	122,66	122,74	122,67	122,66	122,74	122,67	122,66	122,74
average shipment WH(21)	188,26	188,16	186,92	188,18	188,03	186,63	187,42	187,36	185,75
average shipment WH(22)	42,93	43,04	43,01	42,93	43,04	43,01	42,93	43,04	43,01
average shipment WH(23)	48,67	48,69	48,66	48,54	48,56	48,53	48,09	48,07	48,08
average shipment WH(31)	16,16	16,18	16,07	16,17	16,17	16,06	16,17	16,16	16,06
average shipment WH(32)	118,02	118,02	117,47	118,04	118,00	117,47	118,03	118,01	117,46
average inventory WH(11)	245,43	237,83	245,35	245,61	238,57	247,60	247,50	240,97	249,84
average inventory WH(12)	238,03	232,68	236,18	249,10	244,62	250,86	257,35	254,61	259,12
average inventory WH(13)	246,75	246,84	246,80	246,75	246,84	246,80	246,75	246,84	246,80
average inventory WH(21)	277,66	292,25	338,61	285,15	298,19	346,02	290,29	303,59	353,19
average inventory WH(22)	240,82	225,94	247,53	240,83	225,95	247,56	240,80	225,96	247,53
average inventory WH(23)	222,35	221,06	230,41	223,11	224,09	233,15	224,91	224,99	234,56
average inventory WH(31)	250,47	247,08	246,49	248,99	245,38	244,78	247,02	243,78	242,73
average inventory WH(32)	286,94	298,39	353,72	286,22	297,76	353,71	287,13	298,15	353,87

Table C.9. Daily product flow of 2 stores without transfer in 12 % discount period

no transfer, 12 % discount

z values of AHL store	7 days	7 days	7 days	6 days	6 days	6 days	5 days	5 days	5 days
z values of ERENKOY store	8 days	7 days	6 days	8 days	7 days	6 days	8 days	7 days	6 days
average shipment AHL(11)	34,08	33,96	34,01	35,70	35,55	36,01	38,52	38,50	38,72
average shipment AHL(12)	73,24	73,14	73,67	76,51	76,49	77,10	83,57	83,41	83,54
average shipment AHL(13)	20,79	20,70	20,91	20,37	20,36	20,66	20,50	20,55	20,77
average shipment AHL(21)	88,38	88,57	89,40	88,45	88,63	89,47	91,12	91,55	92,73
average shipment AHL(22)	9,68	9,65	9,69	9,63	9,60	9,62	9,62	9,58	9,60
average shipment AHL(23)	31,29	31,30	31,41	31,42	31,36	31,66	32,45	32,32	32,79
average shipment AHL(31)	10,76	10,76	10,75	9,97	9,98	9,97	9,45	9,45	9,45
average shipment AHL(32)	4,49	4,52	4,52	4,46	4,50	4,47	4,42	4,44	4,43
average return AHL(11)	2,97	2,81	2,84	4,56	4,42	4,83	7,38	7,41	7,54
average return AHL(12)	5,12	5,03	5,62	8,36	8,30	8,99	15,36	15,25	15,47
average return AHL(13)	3,11	3,02	3,22	2,70	2,68	2,96	2,82	2,86	3,07
average return AHL(21)	1,12	1,30	2,14	1,17	1,34	2,20	3,79	4,22	5,42
average return AHL(22)	1,46	1,43	1,45	1,40	1,37	1,38	1,40	1,35	1,36
average return AHL(23)	5,18	5,19	5,30	5,33	5,27	5,59	6,43	6,31	6,73
average return AHL(31)	3,92	3,92	3,92	3,13	3,13	3,13	2,60	2,60	2,60
average return AHL(32)	1,25	1,29	1,28	1,22	1,26	1,23	1,18	1,21	1,19
average sales AHL(11,1)	31,10	31,10	31,10	31,10	31,10	31,10	31,10	31,09	31,10
average sales AHL(12,1)	67,55	67,55	67,55	67,55	67,55	67,55	67,55	67,53	67,54
average sales AHL(13,1)	17,60	17,60	17,60	17,60	17,60	17,60	17,60	17,60	17,60
average sales AHL(21,1)	86,64	86,64	86,64	86,64	86,64	86,64	86,62	86,62	86,63
average sales AHL(22,1)	8,20	8,20	8,20	8,20	8,20	8,20	8,20	8,20	8,20
average sales AHL(23,1)	26,00	26,00	26,00	26,00	26,00	26,00	25,98	25,98	25,98
average sales AHL(31,1)	6,82	6,82	6,82	6,82	6,82	6,82	6,82	6,82	6,82
average sales AHL(32,1)	3,22	3,22	3,22	3,22	3,22	3,22	3,22	3,22	3,22
lost of sales AHL(11)	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,01	0,00
lost of sales AHL(12)	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,02	0,01
lost of sales AHL(13)	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
lost of sales AHL(21)	0,00	0,00	0,00	0,00	0,00	0,00	0,02	0,02	0,01
lost of sales AHL(22)	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
lost of sales AHL(23)	0,00	0,00	0,00	0,00	0,00	0,00	0,02	0,01	0,01
lost of sales AHL(31)	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
lost of sales AHL(32)	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
average inventory AHL(11)	193,27	193,73	193,14	178,16	178,50	177,77	150,81	151,28	150,77
average inventory AHL(12)	367,59	367,33	370,42	351,43	351,90	355,15	296,32	296,82	300,10
average inventory AHL(13)	121,48	121,70	121,14	103,94	104,12	103,51	87,04	87,32	86,72
average inventory AHL(21)	367,54	367,81	368,34	366,84	367,02	367,69	347,17	347,48	348,93
average inventory AHL(22)	89,83	89,91	89,66	89,68	89,77	89,53	89,66	89,75	89,50
average inventory AHL(23)	179,43	179,53	179,06	153,37	153,45	152,73	126,62	126,80	126,11
average inventory AHL(31)	50,95	50,95	50,94	46,46	46,46	46,46	43,19	43,20	43,19
average inventory AHL(32)	39,22	39,22	39,26	39,04	39,04	39,09	38,95	38,96	39,00
average shipment ERENKOY(11)	33,28	30,07	32,62	33,30	30,15	32,66	33,35	30,40	32,95
average shipment ERENKOY(12)	162,47	164,33	194,41	163,14	163,73	194,53	165,23	165,87	195,22
average shipment ERENKOY(13)	57,04	53,56	60,94	57,00	53,96	60,69	57,07	54,07	61,11
average shipment ERENKOY(21)	178,52	180,10	191,63	178,67	180,18	191,80	180,41	182,17	193,26
average shipment ERENKOY(22)	47,22	40,76	48,35	47,25	40,76	48,34	47,25	40,76	48,33
average shipment ERENKOY(23)	33,55	33,06	35,06	33,53	32,94	35,35	33,49	33,06	35,57
average shipment ERENKOY(31)	20,80	19,90	19,78	20,80	19,88	19,77	20,79	19,88	19,77
average shipment ERENKOY(32)	160,34	160,65	174,93	160,47	160,50	174,97	160,29	160,67	175,25

z values of AHL store	7 days	7 days	7 days	6 days	6 days	6 days	5 days	5 days	5 days
z values of ERENKOY store	8 days	7 days	6 days	8 days	7 days	6 days	8 days	7 days	6 days
average return ERENKOY(11)	9,18	5,88	8,47	9,17	5,98	8,53	9,19	6,19	8,78
average return ERENKOY(12)	18,22	20,11	50,20	18,92	19,59	50,42	21,04	21,75	51,15
average return ERENKOY(13)	14,27	10,69	18,03	14,22	11,05	17,76	14,28	11,15	18,16
average return ERENKOY(21)	7,84	9,50	21,39	7,97	9,55	21,58	9,64	11,46	23,02
average return ERENKOY(22)	14,05	7,62	15,31	14,07	7,62	15,29	14,08	7,61	15,28
average return ERENKOY(23)	6,82	6,28	8,30	6,82	6,15	8,60	6,78	6,28	8,80
average return ERENKOY(31)	6,52	5,63	5,58	6,52	5,61	5,57	6,51	5,61	5,57
average return ERENKOY(32)	25,15	25,38	39,60	25,26	25,22	39,65	25,01	25,42	39,93
average sales ERENKOY(11,1)	24,18	24,18	24,18	24,18	24,18	24,18	24,18	24,18	24,17
average sales ERENKOY(12,1)	143,45	143,45	143,45	143,45	143,45	143,45	143,45	143,45	143,45
average sales ERENKOY(13,1)	42,88	42,88	42,85	42,88	42,88	42,85	42,88	42,88	42,85
average sales ERENKOY(21,1)	169,57	169,52	169,03	169,57	169,52	169,03	169,59	169,57	169,02
average sales ERENKOY(22,1)	33,24	33,24	33,23	33,24	33,24	33,23	33,24	33,24	33,23
average sales ERENKOY(23,1)	26,74	26,74	26,72	26,74	26,74	26,72	26,74	26,74	26,72
average sales ERENKOY(31,1)	14,31	14,30	14,25	14,31	14,30	14,25	14,31	14,30	14,25
average sales ERENKOY(32,1)	134,24	134,25	134,16	134,24	134,25	134,16	134,24	134,25	134,16
lost of sales ERENKOY(11)	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
lost of sales ERENKOY(12)	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
lost of sales ERENKOY(13)	0,00	0,00	0,03	0,00	0,00	0,02	0,00	0,00	0,03
lost of sales ERENKOY(21)	0,04	0,09	0,58	0,04	0,09	0,58	0,02	0,04	0,59
lost of sales ERENKOY(22)	0,00	0,00	0,01	0,00	0,00	0,01	0,00	0,00	0,01
lost of sales ERENKOY(23)	0,00	0,00	0,02	0,00	0,00	0,02	0,00	0,00	0,02
lost of sales ERENKOY(31)	0,00	0,02	0,06	0,00	0,02	0,06	0,00	0,02	0,06
lost of sales ERENKOY(32)	0,01	0,00	0,09	0,01	0,00	0,09	0,01	0,00	0,09
average inventory ERENKOY(11)	191,12	167,71	144,88	191,29	167,70	144,72	191,04	167,38	144,33
average inventory ERENKOY(12)	913,69	879,19	754,95	915,25	881,01	757,38	915,59	881,89	758,32
average inventory ERENKOY(13)	333,25	293,74	247,31	333,32	293,70	247,33	333,15	293,76	247,11
average inventory ERENKOY(21)	762,95	755,37	719,44	762,98	755,36	719,52	765,52	757,86	722,02
average inventory ERENKOY(22)	262,82	230,88	195,07	262,83	230,88	195,07	262,83	230,88	195,07
average inventory ERENKOY(23)	207,09	183,98	156,57	207,31	183,94	156,34	207,01	183,59	155,92
average inventory ERENKOY(31)	114,47	100,11	85,58	114,47	100,10	85,59	114,45	100,09	85,58
average inventory ERENKOY(32)	698,53	697,38	669,18	698,34	697,21	669,17	698,32	697,33	669,10
average shipment WH(11)	55,20	55,27	55,29	55,17	55,29	55,29	55,15	55,23	55,26
average shipment WH(12)	211,67	211,76	211,80	211,86	211,84	211,76	211,73	211,82	211,69
average shipment WH(13)	60,23	60,28	60,43	60,19	60,31	60,46	60,16	60,35	60,42
average shipment WH(21)	256,79	256,70	256,37	256,81	256,74	256,37	256,89	256,81	256,35
average shipment WH(22)	41,24	41,36	41,37	41,24	41,35	41,37	41,24	41,35	41,37
average shipment WH(23)	52,71	52,81	52,92	52,75	52,84	52,89	52,74	52,82	52,91
average shipment WH(31)	21,07	21,11	21,06	21,07	21,09	21,06	21,09	21,11	21,05
average shipment WH(32)	137,72	137,80	137,79	137,72	137,82	137,81	137,85	137,74	137,82
average inventory WH(11)	224,01	218,76	227,86	226,66	223,54	234,12	234,11	231,14	242,72
average inventory WH(12)	272,58	283,33	332,21	277,26	287,19	336,09	289,88	299,41	352,58
average inventory WH(13)	238,66	228,45	244,83	237,37	228,45	246,10	237,65	228,53	246,98
average inventory WH(21)	283,84	287,87	308,87	284,14	288,31	309,15	290,50	294,97	315,01
average inventory WH(22)	229,82	215,49	235,92	229,89	215,52	235,90	229,86	215,50	235,85
average inventory WH(23)	202,83	202,03	209,37	203,84	204,47	214,21	207,92	209,30	219,41
average inventory WH(31)	240,63	237,67	238,91	240,08	236,96	238,64	238,67	235,82	237,86
average inventory WH(32)	271,55	272,66	303,72	271,71	272,17	303,92	271,62	272,94	303,92

Table C.10. Daily product flow of 2 stores without transfer in 9 % discount period

no transfer, 9 % discount

z values of AHL store	7 days	7 days	7 days	6 days	6 days	6 days	5 days	5 days	5 days
z values of ERENKOY store	8 days	7 days	6 days	8 days	7 days	6 days	8 days	7 days	6 days
average shipment AHL(11)	25,23	25,14	25,37	24,74	24,77	25,13	24,91	24,96	25,17
average shipment AHL(12)	74,88	74,17	75,36	78,79	79,04	79,20	84,59	83,84	84,43
average shipment AHL(13)	23,05	22,82	23,20	22,33	21,97	22,46	21,62	21,45	21,79
average shipment AHL(21)	71,98	71,76	73,53	76,65	76,84	78,03	80,52	80,27	81,64
average shipment AHL(22)	9,45	9,42	9,49	9,38	9,34	9,41	9,35	9,33	9,39
average shipment AHL(23)	36,68	36,52	36,27	36,77	36,80	37,16	36,44	36,33	36,70
average shipment AHL(31)	11,84	11,84	11,81	11,11	11,10	11,08	10,39	10,40	10,39
average shipment AHL(32)	5,65	5,68	5,73	5,51	5,52	5,55	5,37	5,36	5,41
average return AHL(11)	7,56	7,48	7,69	7,10	7,10	7,44	7,43	7,45	7,66
average return AHL(12)	9,82	9,10	10,34	13,68	13,98	14,26	19,82	19,10	19,64
average return AHL(13)	6,32	6,08	6,44	5,58	5,22	5,69	4,91	4,71	5,03
average return AHL(21)	9,55	9,35	11,18	14,39	14,63	15,87	19,16	18,93	20,27
average return AHL(22)	1,68	1,64	1,71	1,60	1,55	1,63	1,57	1,55	1,62
average return AHL(23)	11,25	11,12	10,82	11,55	11,59	11,88	11,67	11,56	11,87
average return AHL(31)	5,44	5,44	5,41	4,72	4,71	4,70	4,03	4,03	4,02
average return AHL(32)	2,30	2,34	2,38	2,16	2,17	2,21	2,02	2,01	2,06
average sales AHL(11,1)	17,67	17,67	17,67	17,64	17,64	17,63	17,49	17,50	17,48
average sales AHL(12,1)	64,52	64,52	64,52	64,51	64,50	64,46	64,19	64,23	64,27
average sales AHL(13,1)	16,67	16,67	16,67	16,67	16,67	16,67	16,66	16,66	16,66
average sales AHL(21,1)	61,93	61,92	61,91	61,78	61,76	61,75	60,96	60,98	61,03
average sales AHL(22,1)	7,77	7,77	7,77	7,77	7,77	7,77	7,77	7,77	7,77
average sales AHL(23,1)	25,42	25,41	25,43	25,21	25,23	25,27	24,77	24,78	24,79
average sales AHL(31,1)	6,39	6,39	6,39	6,37	6,37	6,37	6,35	6,35	6,35
average sales AHL(32,1)	3,34	3,34	3,34	3,34	3,34	3,33	3,34	3,34	3,33
lost of sales AHL(11)	0,03	0,03	0,03	0,06	0,06	0,06	0,21	0,20	0,22
lost of sales AHL(12)	0,00	0,00	0,00	0,01	0,02	0,05	0,33	0,29	0,24
lost of sales AHL(13)	0,01	0,00	0,00	0,01	0,00	0,00	0,02	0,01	0,02
lost of sales AHL(21)	0,05	0,06	0,07	0,20	0,22	0,23	1,02	1,00	0,95
lost of sales AHL(22)	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
lost of sales AHL(23)	0,08	0,10	0,08	0,29	0,28	0,23	0,73	0,72	0,71
lost of sales AHL(31)	0,12	0,12	0,12	0,13	0,13	0,13	0,16	0,16	0,16
lost of sales AHL(32)	0,17	0,18	0,18	0,18	0,18	0,18	0,18	0,18	0,19
average inventory AHL(11)	121,96	122,23	121,98	104,36	104,42	104,12	86,23	86,42	86,07
average inventory AHL(12)	358,88	359,53	362,12	329,47	329,61	333,03	277,32	278,03	282,03
average inventory AHL(13)	114,69	115,00	114,44	99,12	99,42	98,67	85,65	85,83	85,22
average inventory AHL(21)	352,44	353,38	355,15	311,34	312,19	314,58	253,27	254,49	257,87
average inventory AHL(22)	89,53	89,61	89,49	89,38	89,46	89,33	89,34	89,42	89,30
average inventory AHL(23)	170,08	169,99	169,87	145,84	145,75	145,43	119,33	119,12	118,78
average inventory AHL(31)	51,41	51,41	51,39	47,57	47,56	47,57	44,46	44,47	44,47
average inventory AHL(32)	40,66	40,71	40,71	40,04	40,10	40,08	39,61	39,65	39,64
average shipment ERENKOY(11)	35,14	31,41	33,90	35,19	31,63	34,02	35,37	31,69	33,95
average shipment ERENKOY(12)	165,65	163,51	192,36	165,08	165,52	191,80	166,67	166,08	192,70
average shipment ERENKOY(13)	58,22	53,29	60,96	57,95	53,16	60,66	57,72	53,38	60,86
average shipment ERENKOY(21)	178,04	180,65	199,63	180,00	182,53	199,40	180,91	183,27	200,82
average shipment ERENKOY(22)	67,96	67,87	68,47	68,05	67,85	68,30	68,00	67,85	68,33
average shipment ERENKOY(23)	36,47	35,88	38,52	36,40	35,85	38,70	36,32	35,65	38,46
average shipment ERENKOY(31)	21,34	20,35	20,01	21,34	20,33	20,02	21,31	20,33	20,00
average shipment ERENKOY(32)	159,49	161,13	180,60	159,29	160,93	180,55	158,90	160,52	180,76

z values of AHL store	7 days	7 days	7 days	6 days	6 days	6 days	5 days	5 days	5 days
z values of ERENKOY store	8 days	7 days	6 days	8 days	7 days	6 days	8 days	7 days	6 days
average return ERENKOY(11)	11,39	7,61	10,17	11,43	7,78	10,26	11,59	7,81	10,17
average return ERENKOY(12)	27,69	25,49	54,84	27,18	27,61	54,27	28,80	28,07	55,09
average return ERENKOY(13)	15,47	10,38	18,02	15,18	10,21	17,73	14,98	10,44	17,86
average return ERENKOY(21)	18,54	21,32	41,66	20,45	23,13	41,44	21,30	23,85	42,86
average return ERENKOY(22)	7,82	7,80	8,36	7,90	7,78	8,19	7,85	7,78	8,24
average return ERENKOY(23)	9,99	9,45	12,34	9,92	9,41	12,50	9,85	9,21	12,27
average return ERENKOY(31)	8,36	7,42	7,29	8,36	7,40	7,29	8,34	7,40	7,27
average return ERENKOY(32)	29,43	31,22	51,23	29,18	31,02	51,18	28,77	30,57	51,39
average sales ERENKOY(11,1)	23,90	23,90	23,87	23,90	23,90	23,87	23,90	23,90	23,87
average sales ERENKOY(12,1)	137,60	137,60	137,35	137,60	137,55	137,34	137,58	137,60	137,32
average sales ERENKOY(13,1)	42,97	42,97	42,96	42,97	42,97	42,96	42,97	42,97	42,96
average sales ERENKOY(21,1)	158,55	158,36	156,94	158,58	158,38	156,94	158,59	158,34	156,90
average sales ERENKOY(22,1)	60,02	60,02	60,02	60,02	60,02	60,02	60,02	60,02	60,02
average sales ERENKOY(23,1)	26,53	26,50	26,37	26,53	26,50	26,37	26,53	26,50	26,35
average sales ERENKOY(31,1)	13,00	12,96	12,77	13,00	12,96	12,77	13,00	12,96	12,77
average sales ERENKOY(32,1)	129,22	129,20	128,53	129,22	129,21	128,53	129,23	129,21	128,54
lost of sales ERENKOY(11)	0,00	0,00	0,03	0,00	0,00	0,03	0,00	0,00	0,03
lost of sales ERENKOY(12)	0,00	0,00	0,25	0,00	0,05	0,25	0,01	0,00	0,27
lost of sales ERENKOY(13)	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
lost of sales ERENKOY(21)	0,53	0,72	2,14	0,51	0,70	2,14	0,50	0,75	2,19
lost of sales ERENKOY(22)	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
lost of sales ERENKOY(23)	0,01	0,05	0,18	0,01	0,04	0,18	0,01	0,04	0,19
lost of sales ERENKOY(31)	0,08	0,12	0,31	0,08	0,12	0,31	0,08	0,12	0,31
lost of sales ERENKOY(32)	0,01	0,03	0,70	0,00	0,02	0,69	0,00	0,01	0,69
average inventory ERENKOY(11)	189,11	166,34	145,34	189,26	166,34	145,30	189,26	166,38	145,32
average inventory ERENKOY(12)	893,39	837,63	714,26	895,65	838,90	716,52	897,63	840,93	718,25
average inventory ERENKOY(13)	334,34	295,08	248,70	334,59	295,09	248,59	334,58	295,00	248,48
average inventory ERENKOY(21)	778,54	762,51	706,81	780,28	764,72	709,25	781,94	766,42	710,98
average inventory ERENKOY(22)	471,41	412,25	351,23	471,40	412,07	351,29	471,40	412,08	351,31
average inventory ERENKOY(23)	202,01	179,59	153,19	202,22	179,76	153,15	202,33	179,79	153,13
average inventory ERENKOY(31)	103,83	90,70	76,84	103,83	90,68	76,84	103,83	90,70	76,86
average inventory ERENKOY(32)	695,59	689,69	645,58	695,52	689,49	645,75	695,46	689,74	645,57
average shipment WH(11)	41,62	41,69	41,59	41,57	41,60	41,52	41,38	41,41	41,32
average shipment WH(12)	202,68	202,99	202,19	202,80	202,96	202,13	202,28	202,68	201,99
average shipment WH(13)	59,36	59,41	59,53	59,34	59,38	59,53	59,29	59,42	59,54
average shipment WH(21)	221,20	221,09	219,78	220,97	220,91	219,60	220,15	219,98	218,80
average shipment WH(22)	67,88	67,81	67,74	67,88	67,80	67,74	67,88	67,81	67,74
average shipment WH(23)	51,89	51,94	51,82	51,75	51,76	51,65	51,23	51,27	51,11
average shipment WH(31)	19,31	19,32	19,14	19,32	19,31	19,13	19,28	19,27	19,11
average shipment WH(32)	132,60	132,54	131,72	132,67	132,56	131,72	132,69	132,62	131,72
average inventory WH(11)	246,39	238,97	247,06	247,07	240,02	249,83	248,86	242,53	252,70
average inventory WH(12)	294,81	304,45	361,47	301,27	314,57	365,87	310,93	323,98	378,63
average inventory WH(13)	244,15	232,73	251,70	242,68	231,38	251,69	242,57	231,08	250,98
average inventory WH(21)	287,32	295,13	329,66	295,75	303,66	337,00	303,70	311,44	345,34
average inventory WH(22)	197,21	197,69	200,79	197,37	197,66	200,46	197,40	197,74	200,59
average inventory WH(23)	223,74	226,12	234,31	226,40	228,28	237,14	228,11	229,24	238,36
average inventory WH(31)	259,86	255,90	256,19	259,18	254,67	254,16	257,49	253,28	252,10
average inventory WH(32)	288,33	293,54	334,18	288,43	294,15	334,09	287,59	292,94	334,74

Table C.11. Daily product flow of 2 stores without transfer in 6 % discount period

no transfer, 6 % discount

z values of AHL store	7 days	7 days	7 days	6 days	6 days	6 days	5 days	5 days	5 days
z values of ERENKOY store	8 days	7 days	6 days	8 days	7 days	6 days	8 days	7 days	6 days
average shipment AHL(11)	24,65	24,55	24,76	24,10	24,16	24,46	24,21	24,19	24,44
average shipment AHL(12)	71,88	71,28	72,41	75,71	74,98	76,32	79,94	79,86	81,29
average shipment AHL(13)	23,10	22,82	23,16	22,37	22,00	22,45	21,63	21,47	21,77
average shipment AHL(21)	70,42	71,16	72,64	75,04	75,52	76,58	78,10	78,54	79,79
average shipment AHL(22)	8,99	8,94	9,11	8,95	8,89	9,07	8,95	8,88	9,05
average shipment AHL(23)	35,59	35,47	35,22	35,55	35,59	35,98	35,04	35,01	35,36
average shipment AHL(31)	11,41	11,42	11,40	10,70	10,70	10,69	10,04	10,03	10,03
average shipment AHL(32)	5,93	5,97	5,97	5,73	5,79	5,78	5,59	5,61	5,64
average return AHL(11)	7,45	7,35	7,55	6,93	6,96	7,25	7,21	7,17	7,40
average return AHL(12)	9,71	9,15	10,29	13,63	12,93	14,27	18,15	18,00	19,42
average return AHL(13)	6,36	6,08	6,40	5,63	5,25	5,68	4,92	4,73	5,01
average return AHL(21)	9,99	10,77	12,30	14,73	15,32	16,43	18,66	19,14	20,32
average return AHL(22)	1,64	1,59	1,73	1,60	1,54	1,69	1,60	1,54	1,68
average return AHL(23)	11,14	11,04	10,74	11,29	11,35	11,66	11,24	11,19	11,50
average return AHL(31)	5,21	5,21	5,20	4,50	4,50	4,48	3,85	3,85	3,85
average return AHL(32)	2,45	2,51	2,51	2,26	2,32	2,32	2,12	2,14	2,17
average sales AHL(11,1)	17,20	17,20	17,20	17,17	17,17	17,15	17,02	17,03	17,01
average sales AHL(12,1)	61,69	61,69	61,67	61,64	61,64	61,60	61,34	61,39	61,36
average sales AHL(13,1)	16,67	16,67	16,67	16,67	16,67	16,67	16,66	16,66	16,66
average sales AHL(21,1)	59,97	59,97	59,96	59,85	59,82	59,79	59,09	59,10	59,15
average sales AHL(22,1)	7,34	7,34	7,34	7,34	7,34	7,34	7,34	7,34	7,34
average sales AHL(23,1)	24,45	24,44	24,46	24,26	24,26	24,31	23,81	23,83	23,83
average sales AHL(31,1)	6,19	6,19	6,19	6,18	6,18	6,18	6,16	6,16	6,16
average sales AHL(32,1)	3,47	3,46	3,46	3,46	3,46	3,45	3,46	3,46	3,45
lost of sales AHL(11)	0,02	0,02	0,03	0,06	0,05	0,07	0,20	0,20	0,21
lost of sales AHL(12)	0,01	0,01	0,03	0,06	0,06	0,10	0,36	0,31	0,33
lost of sales AHL(13)	0,01	0,00	0,00	0,01	0,00	0,00	0,02	0,01	0,02
lost of sales AHL(21)	0,05	0,05	0,06	0,17	0,20	0,23	0,94	0,93	0,87
lost of sales AHL(22)	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
lost of sales AHL(23)	0,09	0,10	0,07	0,28	0,27	0,23	0,72	0,71	0,71
lost of sales AHL(31)	0,10	0,10	0,10	0,11	0,11	0,11	0,13	0,13	0,13
lost of sales AHL(32)	0,21	0,22	0,23	0,22	0,22	0,23	0,22	0,22	0,23
average inventory AHL(11)	118,80	119,05	118,85	101,62	101,70	101,41	84,08	84,23	83,95
average inventory AHL(12)	356,60	356,55	358,39	322,40	322,93	325,33	269,13	269,15	271,18
average inventory AHL(13)	114,65	114,98	114,44	99,13	99,40	98,66	85,66	85,81	85,21
average inventory AHL(21)	349,27	350,09	351,88	306,03	306,81	309,66	248,19	249,09	252,68
average inventory AHL(22)	89,59	89,73	89,46	89,50	89,64	89,37	89,48	89,63	89,35
average inventory AHL(23)	164,45	164,38	164,25	140,75	140,57	140,29	114,91	114,78	114,35
average inventory AHL(31)	50,46	50,45	50,45	46,89	46,89	46,90	44,04	44,04	44,05
average inventory AHL(32)	40,95	40,91	40,91	40,21	40,22	40,20	39,75	39,73	39,70
average shipment ERENKOY(11)	34,84	31,11	33,48	34,84	31,27	33,62	34,99	31,34	33,60
average shipment ERENKOY(12)	162,95	161,64	186,60	162,47	161,51	185,81	163,00	162,26	189,32
average shipment ERENKOY(13)	58,40	53,65	61,15	58,22	53,47	60,94	57,99	53,63	61,08
average shipment ERENKOY(21)	170,07	174,15	195,30	171,99	175,20	195,14	172,59	176,26	195,16
average shipment ERENKOY(22)	50,67	44,44	52,80	50,67	44,41	52,80	50,67	44,41	52,79
average shipment ERENKOY(23)	36,27	35,70	38,20	36,15	35,58	38,45	36,02	35,39	38,14
average shipment ERENKOY(31)	19,85	18,87	18,54	19,84	18,85	18,53	19,83	18,86	18,53
average shipment ERENKOY(32)	153,91	155,29	179,25	153,33	155,55	178,46	154,24	155,44	178,63

z values of AHL store	7 days	7 days	7 days	6 days	6 days	6 days	5 days	5 days	5 days
z values of ERENKOY store	8 days	7 days	6 days	8 days	7 days	6 days	8 days	7 days	6 days
average return ERENKOY(11)	11,40	7,62	10,04	11,39	7,72	10,15	11,53	7,78	10,12
average return ERENKOY(12)	29,58	28,23	53,51	29,04	28,14	52,64	29,50	28,62	55,95
average return ERENKOY(13)	15,44	10,53	18,00	15,25	10,30	17,80	15,04	10,47	17,88
average return ERENKOY(21)	19,49	23,74	46,17	21,37	24,81	46,04	21,85	25,79	46,26
average return ERENKOY(22)	16,17	9,96	18,36	16,17	9,93	18,36	16,17	9,92	18,35
average return ERENKOY(23)	9,92	9,39	12,14	9,79	9,26	12,36	9,67	9,07	12,06
average return ERENKOY(31)	7,81	6,86	6,71	7,80	6,84	6,70	7,79	6,85	6,70
average return ERENKOY(32)	28,72	30,37	54,71	28,15	30,56	53,91	29,05	30,43	54,07
average sales ERENKOY(11,1)	23,60	23,60	23,58	23,60	23,60	23,58	23,60	23,60	23,58
average sales ERENKOY(12,1)	132,90	132,90	132,60	132,90	132,90	132,63	132,90	132,90	132,69
average sales ERENKOY(13,1)	43,17	43,17	43,17	43,17	43,17	43,17	43,17	43,17	43,17
average sales ERENKOY(21,1)	149,72	149,48	148,16	149,71	149,47	148,07	149,74	149,46	147,93
average sales ERENKOY(22,1)	34,63	34,63	34,56	34,63	34,63	34,56	34,63	34,63	34,56
average sales ERENKOY(23,1)	26,42	26,38	26,25	26,42	26,39	26,26	26,42	26,39	26,25
average sales ERENKOY(31,1)	12,07	12,03	11,87	12,07	12,03	11,87	12,07	12,03	11,87
average sales ERENKOY(32,1)	124,36	124,34	123,75	124,34	124,35	123,76	124,36	124,34	123,77
lost of sales ERENKOY(11)	0,00	0,00	0,02	0,00	0,00	0,02	0,00	0,00	0,02
lost of sales ERENKOY(12)	0,00	0,00	0,30	0,00	0,00	0,27	0,00	0,00	0,21
lost of sales ERENKOY(13)	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
lost of sales ERENKOY(21)	0,31	0,54	1,86	0,32	0,55	1,95	0,29	0,56	2,09
lost of sales ERENKOY(22)	0,00	0,00	0,07	0,00	0,00	0,07	0,00	0,00	0,07
lost of sales ERENKOY(23)	0,01	0,04	0,17	0,01	0,04	0,17	0,01	0,04	0,18
lost of sales ERENKOY(31)	0,07	0,11	0,27	0,07	0,11	0,27	0,07	0,11	0,27
lost of sales ERENKOY(32)	0,00	0,02	0,60	0,02	0,01	0,60	0,00	0,01	0,59
average inventory ERENKOY(11)	186,87	164,59	144,32	187,02	164,57	144,32	187,03	164,62	144,33
average inventory ERENKOY(12)	887,61	818,48	693,71	889,59	820,59	695,68	889,29	821,99	696,68
average inventory ERENKOY(13)	335,73	296,42	249,84	336,01	296,49	249,75	336,00	296,32	249,62
average inventory ERENKOY(21)	784,64	761,92	691,78	786,40	764,18	693,77	787,68	764,92	695,34
average inventory ERENKOY(22)	272,31	239,34	201,80	272,33	239,34	201,80	272,33	239,34	201,79
average inventory ERENKOY(23)	201,58	179,10	152,75	201,80	179,29	152,76	201,91	179,35	152,73
average inventory ERENKOY(31)	96,46	84,24	71,59	96,44	84,23	71,59	96,45	84,24	71,60
average inventory ERENKOY(32)	697,83	689,00	634,99	698,21	688,79	635,03	697,87	688,75	634,92
average shipment WH(11)	40,84	40,94	40,85	40,78	40,84	40,77	40,61	40,64	40,60
average shipment WH(12)	194,86	194,98	194,60	194,65	194,84	194,55	194,59	194,67	194,36
average shipment WH(13)	59,56	59,62	59,73	59,53	59,60	59,74	59,49	59,65	59,74
average shipment WH(21)	210,37	210,24	209,01	210,21	210,03	208,71	209,37	209,27	207,83
average shipment WH(22)	41,77	41,85	41,80	41,77	41,85	41,80	41,77	41,85	41,80
average shipment WH(23)	50,79	50,87	50,74	50,67	50,68	50,59	50,17	50,21	50,04
average shipment WH(31)	18,19	18,22	18,04	18,21	18,20	18,04	18,17	18,17	18,02
average shipment WH(32)	127,92	127,78	127,07	127,92	127,86	127,07	127,94	127,91	127,07
average inventory WH(11)	246,47	238,64	246,55	246,70	239,65	249,32	248,65	242,06	251,90
average inventory WH(12)	294,50	310,74	360,89	302,86	317,97	365,88	312,06	325,99	378,77
average inventory WH(13)	243,87	232,82	251,76	242,39	231,25	251,76	242,45	230,83	251,05
average inventory WH(21)	282,00	292,18	334,45	290,17	300,96	341,11	297,41	308,29	348,09
average inventory WH(22)	237,50	223,61	242,42	237,44	223,58	242,34	237,41	223,55	242,29
average inventory WH(23)	224,29	226,45	234,37	226,50	228,18	237,05	227,92	228,58	237,85
average inventory WH(31)	256,36	252,25	252,26	255,31	250,97	250,25	253,72	249,46	248,18
average inventory WH(32)	286,33	293,38	341,13	285,14	293,54	340,66	286,89	293,36	340,98

Table C.12. Daily product flow of 2 stores with transfer in no discount period

transfer , no discount												
z values of AHL store	8 DAYS	7 DAYS	7 DAYS	7 DAYS	6 DAYS	6 DAYS	6 DAYS	5 DAYS	5 DAYS	5 DAYS	5 DAYS	5 DAYS
z values of ERENKOY store	8 DAYS	8 DAYS	7 DAYS	6 DAYS	8 DAYS	7 DAYS	6 DAYS	8 DAYS	7 DAYS	6 DAYS	5 DAYS	5 DAYS
transfer AHL(11)	2,71	3,02	2,52	3,03	3,15	2,47	2,95	3,01	2,36	2,72	3,82	
transfer AHL(12)	4,98	5,02	3,23	4,31	4,45	3,15	3,67	3,90	2,98	3,74	5,69	
transfer AHL(13)	0,00	0,00	0,00	0,04	0,00	0,00	0,04	0,00	0,00	0,05	0,52	
transfer AHL(21)	2,77	2,86	4,18	7,35	2,57	4,14	7,35	2,36	4,24	6,97	8,78	
transfer AHL(22)	2,49	2,64	2,44	2,98	2,89	2,69	3,18	3,18	2,80	3,43	3,86	
transfer AHL(23)	2,56	2,72	2,81	3,34	2,80	2,64	3,01	2,74	2,51	2,78	3,32	
transfer AHL(31)	1,68	1,70	1,59	1,67	1,81	1,69	1,72	1,82	1,77	1,80	1,63	
transfer AHL(32)	0,57	0,55	1,03	1,69	0,64	1,10	1,76	0,66	1,11	1,86	2,19	
average shipment AHL(11)	20,57	19,86	20,41	20,05	19,52	20,27	20,09	19,60	20,37	20,37	19,19	
average shipment AHL(12)	60,75	63,54	64,85	64,05	67,78	68,64	69,00	70,34	70,76	70,52	68,42	
average shipment AHL(13)	12,55	13,80	13,88	13,74	13,81	13,84	13,70	13,78	13,81	13,67	13,94	
average shipment AHL(21)	63,29	65,30	63,95	62,96	69,63	67,58	66,59	71,62	69,30	68,84	68,80	
average shipment AHL(22)	11,72	12,45	12,88	11,86	13,26	13,62	12,49	13,81	14,27	13,16	12,88	
average shipment AHL(23)	30,38	30,39	30,72	29,65	30,14	30,71	30,49	29,64	29,94	29,80	27,67	
average shipment AHL(31)	9,54	9,12	9,22	9,12	8,74	8,76	8,71	8,52	8,51	8,46	8,70	
average shipment AHL(32)	7,53	7,72	7,15	6,15	7,71	7,21	6,23	8,02	7,36	6,34	5,46	
average return AHL(11)	4,51	3,93	3,74	4,25	3,73	3,72	4,43	4,03	4,07	4,87	4,72	
average return AHL(12)	8,02	9,63	9,27	9,89	11,73	11,95	12,86	13,96	13,83	14,67	14,23	
average return AHL(13)	0,74	1,79	1,81	1,78	1,78	1,79	1,77	1,78	1,79	1,76	1,95	
average return AHL(21)	6,87	7,24	7,08	10,13	8,94	8,94	11,76	11,24	11,35	15,17	16,58	
average return AHL(22)	1,86	1,82	1,55	2,09	1,99	1,64	2,13	2,00	1,61	2,27	3,03	
average return AHL(23)	7,02	6,83	7,22	7,09	6,48	7,02	7,81	6,77	6,94	7,55	7,55	
average return AHL(31)	3,33	2,86	2,84	2,75	2,52	2,40	2,36	2,29	2,19	2,14	2,25	
average return AHL(32)	1,26	1,18	1,30	1,64	1,10	1,22	1,52	0,99	1,15	1,45	1,43	
average sales AHL(11,1)	16,36	16,35	16,35	16,35	16,32	16,33	16,32	16,20	16,19	16,19	16,18	
average sales AHL(12,1)	56,07	56,06	56,06	56,06	56,03	56,05	56,02	55,75	55,84	55,80	55,88	
average sales AHL(13,1)	2,95	2,95	2,95	2,95	2,95	2,95	2,95	2,95	2,95	2,95	2,95	
average sales AHL(21,1)	55,99	55,93	55,97	55,95	55,86	55,87	55,79	55,31	55,16	55,14	55,01	
average sales AHL(22,1)	6,47	6,47	6,46	6,47	6,46	6,47	6,47	6,46	6,47	6,47	6,47	
average sales AHL(23,1)	22,70	22,66	22,64	22,65	22,54	22,49	22,46	22,11	22,06	22,02	20,64	
average sales AHL(31,1)	5,82	5,81	5,80	5,80	5,80	5,79	5,79	5,77	5,77	5,77	5,77	
average sales AHL(32,1)	3,55	3,53	3,53	3,53	3,51	3,54	3,53	3,52	3,53	3,52	3,54	
lost of sales AHL(11)	0,01	0,02	0,02	0,02	0,04	0,04	0,05	0,17	0,17	0,18	0,18	
lost of sales AHL(12)	0,00	0,01	0,01	0,01	0,04	0,02	0,05	0,32	0,23	0,27	0,19	
lost of sales AHL(13)	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	
lost of sales AHL(21)	0,01	0,06	0,02	0,05	0,14	0,12	0,21	0,69	0,83	0,85	0,99	
lost of sales AHL(22)	0,00	0,01	0,01	0,00	0,01	0,01	0,00	0,01	0,01	0,00	0,00	
lost of sales AHL(23)	0,02	0,06	0,08	0,07	0,18	0,23	0,26	0,61	0,66	0,70	2,08	
lost of sales AHL(31)	0,07	0,08	0,08	0,08	0,08	0,09	0,10	0,11	0,12	0,11	0,12	
lost of sales AHL(32)	0,28	0,30	0,30	0,31	0,33	0,30	0,30	0,32	0,31	0,32	0,30	
average inventory AHL(11)	129,24	113,15	113,37	113,13	96,81	96,90	96,58	80,17	80,29	79,94	79,90	
average inventory AHL(12)	376,26	353,75	354,06	353,61	312,86	312,77	311,92	258,81	258,77	258,69	259,28	
average inventory AHL(13)	64,44	63,85	63,73	63,89	63,86	63,77	63,91	63,87	63,79	63,92	62,95	
average inventory AHL(21)	368,09	338,57	339,71	340,75	291,75	293,67	294,72	236,13	236,85	238,70	239,03	
average inventory AHL(22)	84,04	82,86	83,02	83,16	81,88	82,10	82,29	81,10	81,43	81,48	81,39	
average inventory AHL(23)	174,13	153,66	153,52	153,16	131,14	130,86	130,14	106,83	106,63	106,15	100,70	
average inventory AHL(31)	51,94	48,05	48,03	48,01	44,77	44,76	44,74	42,09	42,11	42,10	42,04	
average inventory AHL(32)	40,12	38,61	38,74	39,03	37,49	37,64	37,94	36,50	36,69	36,98	37,32	
transfer ERENKOY(11)	2,46	2,63	2,89	2,52	2,65	2,70	2,28	2,44	2,51	2,04	2,12	
transfer ERENKOY(12)	1,38	2,68	2,48	2,08	4,28	3,51	3,45	4,30	3,82	3,41	3,63	
transfer ERENKOY(13)	8,77	8,97	9,03	8,96	8,98	9,00	8,93	8,95	8,97	8,91	9,47	
transfer ERENKOY(21)	2,83	4,66	4,83	3,92	7,14	6,70	6,09	7,21	6,90	5,24	5,74	
transfer ERENKOY(22)	5,92	6,84	7,33	6,26	7,75	8,22	7,04	8,57	9,00	7,82	7,22	
transfer ERENKOY(23)	3,24	3,64	3,67	3,26	3,99	3,87	3,30	3,53	3,45	3,05	2,83	
transfer ERENKOY(31)	2,08	2,14	2,16	2,23	2,22	2,24	2,26	2,27	2,31	2,34	2,31	
transfer ERENKOY(32)	3,28	3,54	3,34	2,65	3,72	3,53	2,92	4,14	3,77	3,20	2,68	

z values of AHL store	8 DAYS	7 DAYS	7 DAYS	7 DAYS	6 DAYS	6 DAYS	6 DAYS	5 DAYS	5 DAYS	5 DAYS	5 DAYS
z values of ERENKOY store	8 DAYS	8 DAYS	7 DAYS	6 DAYS	8 DAYS	7 DAYS	6 DAYS	8 DAYS	7 DAYS	6 DAYS	5 DAYS
average shipment ERENKOY(11)	31,40	31,07	27,57	30,26	30,90	27,57	30,43	31,50	28,14	31,20	31,78
average shipment ERENKOY(12)	58,45	56,59	51,97	56,30	54,12	51,12	54,21	54,39	51,30	55,08	54,52
average shipment ERENKOY(13)	133,42	133,75	133,49	133,56	133,70	133,60	133,54	133,92	133,82	133,69	134,30
average shipment ERENKOY(21)	154,23	152,05	152,59	178,01	148,69	151,66	173,79	149,72	152,44	179,47	190,09
average shipment ERENKOY(22)	46,65	45,32	38,93	47,90	44,09	37,77	46,77	43,20	36,70	45,57	50,59
average shipment ERENKOY(23)	32,08	31,51	31,56	34,36	30,87	30,80	34,13	31,50	31,41	34,55	35,83
average shipment ERENKOY(31)	14,88	14,77	13,98	13,70	14,68	13,86	13,57	14,54	13,73	13,52	12,98
average shipment ERENKOY(32)	138,30	137,69	142,11	167,11	137,88	142,42	167,00	138,47	142,09	166,77	185,71
average return ERENKOY(11)	8,04	7,60	4,78	6,65	7,30	4,64	6,62	7,81	5,08	7,37	7,01
average return ERENKOY(12)	11,35	10,77	7,53	10,37	10,39	7,81	10,31	11,27	8,52	11,02	8,79
average return ERENKOY(13)	21,71	21,94	21,62	21,71	21,90	21,76	21,67	22,16	22,02	21,88	23,27
average return ERENKOY(21)	21,90	21,47	21,08	43,57	20,77	21,98	41,26	22,10	22,79	46,56	60,96
average return ERENKOY(22)	13,48	12,93	7,20	14,69	12,35	6,70	14,14	11,99	6,29	13,46	18,57
average return ERENKOY(23)	6,70	6,37	6,30	8,31	5,99	5,89	8,41	6,25	6,25	8,84	10,09
average return ERENKOY(31)	4,85	4,80	4,15	3,97	4,67	4,03	3,83	4,57	3,88	3,78	3,50
average return ERENKOY(32)	25,91	25,57	29,36	53,28	25,83	29,77	53,39	26,86	29,65	53,32	77,66
average sales ERENKOY(11,1)	23,24	23,24	23,24	23,23	23,24	23,24	23,23	23,24	23,24	23,23	23,22
average sales ERENKOY(12,1)	43,61	43,61	43,61	43,61	43,61	43,61	43,61	43,61	43,61	43,61	43,61
average sales ERENKOY(13,1)	119,98	120,15	120,27	120,12	120,14	120,21	120,10	120,13	120,21	120,09	119,30
average sales ERENKOY(21,1)	131,69	131,70	131,43	130,34	131,72	131,45	130,49	131,64	131,50	130,41	125,82
average sales ERENKOY(22,1)	36,59	36,59	36,59	36,55	36,59	36,59	36,56	36,59	36,59	36,56	35,67
average sales ERENKOY(23,1)	26,11	26,11	26,09	26,00	26,11	26,10	26,01	26,10	26,09	25,98	25,38
average sales ERENKOY(31,1)	10,43	10,43	10,40	10,31	10,43	10,40	10,32	10,43	10,40	10,32	10,19
average sales ERENKOY(32,1)	114,39	114,39	114,34	113,98	114,39	114,37	113,96	114,39	114,37	113,97	108,78
lost of sales ERENKOY(11)	0,00	0,00	0,00	0,01	0,00	0,00	0,01	0,00	0,00	0,01	0,02
lost of sales ERENKOY(12)	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
lost of sales ERENKOY(13)	3,43	3,26	3,14	3,29	3,27	3,20	3,31	3,28	3,20	3,32	4,11
lost of sales ERENKOY(21)	0,14	0,12	0,40	1,49	0,11	0,38	1,33	0,19	0,33	1,42	6,01
lost of sales ERENKOY(22)	0,00	0,00	0,00	0,03	0,00	0,00	0,03	0,00	0,00	0,03	0,92
lost of sales ERENKOY(23)	0,01	0,01	0,02	0,12	0,00	0,01	0,10	0,01	0,03	0,14	0,73
lost of sales ERENKOY(31)	0,06	0,06	0,09	0,17	0,05	0,09	0,17	0,05	0,08	0,17	0,30
lost of sales ERENKOY(32)	0,00	0,00	0,05	0,41	0,00	0,02	0,43	0,00	0,02	0,42	5,61
average inventory ERENKOY(11)	184,12	184,09	162,21	142,44	184,32	162,25	142,47	184,17	162,27	142,48	129,81
average inventory ERENKOY(12)	334,51	334,87	294,19	257,58	335,35	294,42	257,80	335,32	293,65	257,20	239,04
average inventory ERENKOY(13)	354,52	355,84	355,73	355,86	355,90	355,79	355,86	355,75	355,64	355,73	353,10
average inventory ERENKOY(21)	784,97	786,18	740,79	646,29	787,10	741,66	648,73	788,64	742,84	648,16	519,33
average inventory ERENKOY(22)	287,12	287,30	252,39	213,35	287,58	252,65	213,58	287,82	252,76	213,91	172,61
average inventory ERENKOY(23)	199,13	199,24	177,47	151,17	199,35	177,59	151,36	199,28	177,25	151,11	122,68
average inventory ERENKOY(31)	83,45	83,46	72,96	62,59	83,47	72,97	62,61	83,47	72,98	62,59	53,12
average inventory ERENKOY(32)	699,95	699,99	679,65	606,54	700,03	679,98	606,50	700,14	679,66	606,76	483,37
average shipment WH(11)	39,65	39,60	39,69	39,61	39,56	39,67	39,55	39,48	39,51	39,44	39,39
average shipment WH(12)	99,57	99,52	99,82	99,93	99,54	99,63	99,78	99,35	99,39	99,52	99,56
average shipment WH(13)	122,79	123,12	123,23	123,05	123,11	123,17	123,04	123,02	123,08	122,94	122,27
average shipment WH(21)	188,32	188,25	188,12	186,91	188,22	188,07	186,88	187,53	187,36	186,08	181,06
average shipment WH(22)	42,90	42,93	43,04	43,00	42,90	43,03	43,01	42,90	43,04	43,02	42,15
average shipment WH(23)	48,73	48,63	48,66	48,70	48,57	48,56	48,50	48,12	48,09	48,01	46,01
average shipment WH(31)	16,21	16,20	16,22	16,10	16,17	16,16	16,08	16,14	16,17	16,08	16,03
average shipment WH(32)	117,99	117,99	117,94	117,53	117,91	117,99	117,52	117,92	117,97	117,51	111,99
average inventory WH(11)	252,92	250,81	242,74	251,08	250,70	242,85	253,26	252,89	246,08	255,60	257,13
average inventory WH(12)	235,99	242,45	235,46	240,16	253,26	247,46	252,23	259,40	257,54	261,52	256,31
average inventory WH(13)	245,36	244,81	244,67	244,44	244,61	244,72	244,46	245,09	245,21	244,94	249,30
average inventory WH(21)	273,93	279,31	293,30	340,87	288,00	301,25	344,97	291,33	306,51	355,94	381,48
average inventory WH(22)	242,63	241,91	226,06	247,96	241,05	225,13	247,18	240,33	224,41	246,30	264,89
average inventory WH(23)	226,89	226,63	226,30	234,22	227,43	226,98	235,44	228,90	229,21	237,47	245,14
average inventory WH(31)	255,79	254,43	250,71	251,76	251,90	248,56	249,13	250,64	246,21	246,72	246,39
average inventory WH(32)	285,19	283,37	295,65	354,31	284,58	296,26	353,99	285,45	296,48	353,65	437,81

Table C.13. Daily product flow of 2 stores with transfer in 12 % discount period

transfer , 12 % discount									
z values of AHL store	7 DAYS	7 DAYS	7 DAYS	6 DAYS	6 DAYS	6 DAYS	5 DAYS	5 DAYS	5 DAYS
z values of ERENKOY store	8 DAYS	7 DAYS	6 DAYS	8 DAYS	7 DAYS	6 DAYS	8 DAYS	7 DAYS	6 DAYS
transfer AHL(11)	3,63	2,56	3,22	3,54	2,50	2,79	3,02	2,10	2,31
transfer AHL(12)	0,92	2,20	4,89	0,97	2,27	4,81	0,69	1,73	3,76
transfer AHL(13)	2,81	2,35	3,01	3,00	2,28	2,83	2,91	2,26	2,74
transfer AHL(21)	0,17	0,98	3,51	0,17	0,97	3,50	0,20	0,87	3,01
transfer AHL(22)	2,19	1,72	2,39	2,35	1,79	2,57	2,57	1,97	2,83
transfer AHL(23)	2,37	2,18	2,73	2,44	2,16	2,42	2,15	1,98	2,03
transfer AHL(31)	1,60	1,53	1,71	1,57	1,54	1,75	1,58	1,54	1,76
transfer AHL(32)	0,06	0,25	0,93	0,07	0,26	1,01	0,09	0,32	1,11
average shipment AHL(11)	30,40	31,67	31,54	32,31	33,43	33,66	35,66	36,31	37,07
average shipment AHL(12)	72,14	70,97	70,48	74,82	73,85	73,36	82,48	81,28	80,12
average shipment AHL(13)	18,20	18,66	18,25	17,69	18,57	18,48	17,75	18,47	18,45
average shipment AHL(21)	88,23	87,60	86,47	88,32	87,68	86,59	90,99	90,73	90,14
average shipment AHL(22)	13,06	13,40	12,63	14,24	14,75	13,88	15,56	15,93	14,95
average shipment AHL(23)	28,60	29,11	28,60	28,83	29,18	29,78	30,24	30,24	31,20
average shipment AHL(31)	9,36	9,40	9,24	9,08	9,03	8,80	8,98	8,99	8,71
average shipment AHL(32)	7,31	7,10	6,53	7,82	7,61	6,83	8,17	7,98	7,24
average return AHL(11)	2,48	2,50	3,06	3,28	3,44	3,99	5,52	5,47	6,88
average return AHL(12)	4,79	4,88	7,09	5,69	5,61	7,81	11,84	11,86	13,32
average return AHL(13)	2,04	2,01	2,39	1,78	1,89	2,54	1,76	1,83	2,59
average return AHL(21)	1,15	1,31	2,71	1,19	1,30	2,68	2,31	2,69	4,48
average return AHL(22)	1,74	1,22	1,94	1,86	1,29	2,12	2,11	1,39	2,33
average return AHL(23)	2,99	3,25	3,67	3,15	3,28	4,47	4,33	4,22	5,72
average return AHL(31)	2,12	2,11	2,02	1,80	1,74	1,62	1,60	1,55	1,45
average return AHL(32)	0,72	0,73	0,88	0,74	0,69	0,89	0,65	0,71	0,88
average sales AHL(11,1)	31,10	31,10	31,10	31,10	31,10	31,10	31,10	31,09	31,09
average sales AHL(12,1)	67,55	67,55	67,55	67,55	67,55	67,55	67,54	67,54	67,54
average sales AHL(13,1)	17,60	17,60	17,60	17,60	17,60	17,60	17,60	17,60	17,60
average sales AHL(21,1)	86,64	86,64	86,64	86,64	86,64	86,64	86,62	86,62	86,62
average sales AHL(22,1)	8,20	8,20	8,20	8,20	8,20	8,20	8,20	8,20	8,20
average sales AHL(23,1)	26,00	26,00	26,00	26,00	26,00	26,00	25,99	25,99	25,98
average sales AHL(31,1)	6,81	6,81	6,81	6,81	6,81	6,81	6,81	6,81	6,81
average sales AHL(32,1)	3,21	3,21	3,21	3,21	3,21	3,21	3,21	3,20	3,21
lost of sales AHL(11)	0,00	0,00	0,00	0,00	0,00	0,00	0,01	0,01	0,01
lost of sales AHL(12)	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,01
lost of sales AHL(13)	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
lost of sales AHL(21)	0,00	0,00	0,00	0,00	0,00	0,00	0,02	0,02	0,01
lost of sales AHL(22)	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
lost of sales AHL(23)	0,00	0,00	0,00	0,00	0,00	0,00	0,01	0,01	0,02
lost of sales AHL(31)	0,00	0,01	0,00	0,00	0,01	0,00	0,01	0,01	0,01
lost of sales AHL(32)	0,01	0,01	0,00	0,01	0,01	0,00	0,01	0,01	0,01
average inventory AHL(11)	193,25	193,42	192,67	178,19	178,37	177,50	150,70	151,05	150,41
average inventory AHL(12)	367,48	366,86	368,27	351,71	351,67	353,46	296,20	296,82	298,87
average inventory AHL(13)	121,30	121,40	120,77	103,79	103,79	103,15	86,87	86,96	86,33
average inventory AHL(21)	367,56	367,51	366,60	366,82	366,68	365,86	346,84	346,95	347,64
average inventory AHL(22)	85,09	85,11	85,05	83,59	83,60	83,59	82,21	82,50	82,41
average inventory AHL(23)	179,11	179,24	178,84	153,15	153,09	152,42	126,30	126,45	125,74
average inventory AHL(31)	50,64	50,65	50,64	45,90	45,92	45,91	42,25	42,27	42,26
average inventory AHL(32)	36,19	36,13	35,98	35,49	35,37	35,35	34,93	34,81	34,73
transfer ERENKOY(11)	0,47	0,59	0,54	1,45	1,39	1,29	1,97	1,85	1,40
transfer ERENKOY(12)	0,15	0,22	0,22	1,96	2,41	2,26	3,17	3,03	2,52
transfer ERENKOY(13)	1,33	1,35	1,21	1,27	1,30	1,10	1,23	1,22	0,92
transfer ERENKOY(21)	0,00	0,00	0,00	0,03	0,06	0,12	1,55	1,59	1,38
transfer ERENKOY(22)	5,32	5,71	4,86	6,54	7,06	6,11	7,84	8,31	7,24
transfer ERENKOY(23)	1,90	1,97	1,60	2,06	2,01	1,69	2,02	2,00	1,50
transfer ERENKOY(31)	2,02	1,99	2,10	2,02	2,02	2,11	2,13	2,16	2,19
transfer ERENKOY(32)	3,41	3,39	3,33	3,91	3,93	3,72	4,38	4,37	4,23

z values of AHL store	7 DAYS	7 DAYS	7 DAYS	6 DAYS	6 DAYS	6 DAYS	5 DAYS	5 DAYS	5 DAYS
z values of ERENKOY store	8 DAYS	7 DAYS	6 DAYS	8 DAYS	7 DAYS	6 DAYS	8 DAYS	7 DAYS	6 DAYS
average shipment ERENKOY(11)	32,96	29,65	32,53	31,75	28,78	31,43	31,51	29,06	32,00
average shipment ERENKOY(12)	162,20	164,55	196,41	158,96	159,84	189,96	159,94	163,01	191,53
average shipment ERENKOY(13)	55,93	52,21	59,45	56,24	52,45	59,67	55,99	52,71	60,39
average shipment ERENKOY(21)	178,53	180,26	192,71	178,64	180,31	192,55	178,61	180,85	192,62
average shipment ERENKOY(22)	40,71	34,33	42,41	38,98	32,76	40,49	37,17	31,27	38,95
average shipment ERENKOY(23)	31,53	31,21	33,57	31,53	31,02	33,92	31,80	31,46	34,52
average shipment ERENKOY(31)	18,53	17,71	17,53	18,44	17,56	17,41	18,27	17,28	17,24
average shipment ERENKOY(32)	156,35	157,01	171,36	155,33	155,53	170,73	154,70	155,43	170,02
average return ERENKOY(11)	5,68	3,52	5,71	5,57	3,51	5,77	6,30	4,61	6,90
average return ERENKOY(12)	17,15	18,42	47,48	15,71	15,90	43,29	18,21	20,19	46,20
average return ERENKOY(13)	11,67	8,33	14,73	11,71	8,59	14,99	11,47	8,74	15,64
average return ERENKOY(21)	7,68	8,68	19,04	7,80	8,77	19,01	9,19	10,89	20,80
average return ERENKOY(22)	10,70	5,17	11,82	10,02	4,86	10,94	9,31	4,44	10,29
average return ERENKOY(23)	4,34	4,20	5,65	4,45	4,07	6,43	5,00	4,72	7,21
average return ERENKOY(31)	4,65	3,88	3,71	4,61	3,75	3,56	4,55	3,62	3,45
average return ERENKOY(32)	24,61	24,98	38,46	24,02	24,12	38,13	23,86	24,35	37,83
average sales ERENKOY(11,1)	24,18	24,18	24,18	24,18	24,18	24,18	24,18	24,18	24,18
average sales ERENKOY(12,1)	143,45	143,45	143,45	143,45	143,45	143,42	143,45	143,45	143,45
average sales ERENKOY(13,1)	42,88	42,88	42,85	42,88	42,88	42,86	42,88	42,88	42,85
average sales ERENKOY(21,1)	169,57	169,51	169,02	169,57	169,52	169,02	169,59	169,55	169,01
average sales ERENKOY(22,1)	33,24	33,24	33,23	33,24	33,24	33,23	33,24	33,24	33,23
average sales ERENKOY(23,1)	26,74	26,74	26,71	26,74	26,74	26,72	26,74	26,74	26,72
average sales ERENKOY(31,1)	14,31	14,30	14,26	14,31	14,30	14,26	14,31	14,30	14,26
average sales ERENKOY(32,1)	134,25	134,24	134,16	134,24	134,25	134,16	134,24	134,25	134,17
lost of sales ERENKOY(11)	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
lost of sales ERENKOY(12)	0,00	0,00	0,00	0,00	0,00	0,03	0,00	0,00	0,00
lost of sales ERENKOY(13)	0,00	0,00	0,03	0,00	0,00	0,02	0,00	0,00	0,03
lost of sales ERENKOY(21)	0,04	0,10	0,59	0,04	0,09	0,59	0,02	0,06	0,60
lost of sales ERENKOY(22)	0,00	0,00	0,01	0,00	0,00	0,01	0,00	0,00	0,01
lost of sales ERENKOY(23)	0,00	0,00	0,03	0,00	0,00	0,02	0,00	0,00	0,02
lost of sales ERENKOY(31)	0,00	0,02	0,06	0,00	0,02	0,06	0,00	0,01	0,05
lost of sales ERENKOY(32)	0,00	0,01	0,09	0,01	0,00	0,09	0,01	0,00	0,08
average inventory ERENKOY(11)	190,68	167,38	144,15	190,94	167,38	144,24	190,66	167,00	143,81
average inventory ERENKOY(12)	914,08	878,66	755,83	916,08	881,55	757,70	916,29	881,88	759,09
average inventory ERENKOY(13)	332,94	293,37	247,03	332,93	293,41	247,02	332,76	293,36	246,75
average inventory ERENKOY(21)	762,90	755,06	719,86	762,98	755,12	720,02	765,49	757,78	722,37
average inventory ERENKOY(22)	262,82	230,89	195,42	262,94	231,00	195,67	263,04	231,03	195,97
average inventory ERENKOY(23)	206,66	183,50	156,15	206,83	183,55	156,03	206,47	183,10	155,61
average inventory ERENKOY(31)	114,48	100,12	85,64	114,48	100,11	85,63	114,48	100,14	85,63
average inventory ERENKOY(32)	699,40	697,60	669,51	699,17	697,82	669,69	699,00	697,99	670,02
average shipment WH(11)	55,18	55,29	55,26	55,17	55,25	55,28	55,20	55,26	55,28
average shipment WH(12)	211,73	211,76	211,73	211,98	211,87	211,83	211,97	212,00	211,78
average shipment WH(13)	60,17	60,26	60,40	60,16	60,30	60,44	60,18	60,36	60,41
average shipment WH(21)	256,80	256,68	256,39	256,81	256,72	256,41	256,92	256,81	256,41
average shipment WH(22)	41,26	41,35	41,40	41,25	41,37	41,43	41,26	41,40	41,44
average shipment WH(23)	52,71	52,86	52,93	52,74	52,89	52,96	52,73	52,86	52,87
average shipment WH(31)	21,10	21,14	21,05	21,05	21,09	21,04	21,07	21,06	21,02
average shipment WH(32)	137,66	137,66	137,82	137,58	137,50	137,84	137,56	137,59	137,86
average inventory WH(11)	229,70	222,93	234,86	231,37	226,32	240,04	238,32	235,77	248,61
average inventory WH(12)	272,23	285,22	337,21	274,79	286,63	337,87	289,02	299,39	350,98
average inventory WH(13)	242,73	232,46	250,81	242,12	231,99	251,95	242,27	233,33	252,60
average inventory WH(21)	283,90	288,87	312,24	284,22	289,28	312,43	290,97	295,81	317,51
average inventory WH(22)	234,38	218,79	238,63	234,07	218,20	237,75	233,63	217,42	237,06
average inventory WH(23)	206,69	206,65	213,60	207,71	207,85	217,06	212,88	214,01	222,62
average inventory WH(31)	245,22	241,32	243,95	243,88	240,06	242,14	242,13	238,60	241,58
average inventory WH(32)	270,27	272,67	302,84	269,39	270,99	302,29	269,52	271,51	301,86

Table C.14. Daily product flow of 2 stores with transfer in 9 % discount period

transfer , 9 % discount										
z values of AHL store	7 DAYS	7 DAYS	7 DAYS	6 DAYS	6 DAYS	6 DAYS	5 DAYS	5 DAYS	5 DAYS	
z values of ERENKOY store	8 DAYS	7 DAYS	6 DAYS	8 DAYS	7 DAYS	6 DAYS	8 DAYS	7 DAYS	6 DAYS	
transfer AHL(11)	3,22	2,60	3,14	3,35	2,49	2,98	3,17	2,45	2,87	
transfer AHL(12)	3,36	4,30	7,31	3,37	4,26	7,23	2,94	3,82	6,33	
transfer AHL(13)	3,05	2,35	3,32	3,09	2,36	3,17	2,90	2,23	2,98	
transfer AHL(21)	0,55	1,84	5,27	0,47	1,76	4,97	0,60	1,78	4,88	
transfer AHL(22)	1,85	1,76	1,69	1,96	1,84	1,96	2,18	2,16	2,10	
transfer AHL(23)	2,76	2,81	3,33	2,92	2,63	3,22	2,94	2,91	2,99	
transfer AHL(31)	1,96	1,81	1,96	2,06	1,92	1,95	2,04	1,96	2,04	
transfer AHL(32)	0,31	0,54	1,41	0,32	0,59	1,49	0,34	0,64	1,56	
average shipment AHL(11)	21,70	22,24	22,01	21,23	22,30	22,13	21,53	22,38	22,42	
average shipment AHL(12)	70,73	70,17	68,89	74,75	74,72	72,74	80,63	80,10	78,52	
average shipment AHL(13)	19,84	20,55	19,61	19,29	19,86	19,48	18,95	19,79	19,35	
average shipment AHL(21)	71,37	69,86	68,45	75,82	74,73	73,10	80,02	78,41	76,34	
average shipment AHL(22)	13,78	13,83	13,90	15,01	14,98	14,91	16,08	15,64	16,06	
average shipment AHL(23)	33,65	33,49	32,89	33,58	34,12	33,67	33,55	33,41	34,01	
average shipment AHL(31)	10,02	10,19	10,06	9,62	9,65	9,66	9,29	9,32	9,24	
average shipment AHL(32)	7,66	7,29	6,36	7,82	7,46	6,46	8,02	7,61	6,66	
average return AHL(11)	4,35	4,08	4,83	4,10	4,19	5,04	4,62	4,61	5,59	
average return AHL(12)	7,42	7,77	9,63	8,75	9,36	11,05	12,76	12,94	15,24	
average return AHL(13)	3,54	3,44	3,95	3,12	2,87	3,88	2,63	2,61	3,73	
average return AHL(21)	5,79	5,75	8,40	7,23	7,70	9,97	11,57	11,38	13,67	
average return AHL(22)	0,79	0,72	0,92	0,77	0,73	0,90	0,75	0,70	0,83	
average return AHL(23)	7,55	7,54	7,81	7,32	7,73	8,36	7,85	7,93	9,14	
average return AHL(31)	3,21	3,18	3,10	2,89	2,73	2,71	2,56	2,43	2,42	
average return AHL(32)	1,08	1,05	1,42	1,01	0,95	1,30	0,93	0,90	1,28	
average sales AHL(11,1)	17,67	17,67	17,68	17,64	17,64	17,63	17,48	17,48	17,48	
average sales AHL(12,1)	64,52	64,52	64,51	64,50	64,48	64,46	64,20	64,22	64,27	
average sales AHL(13,1)	16,67	16,67	16,67	16,67	16,67	16,67	16,66	16,66	16,66	
average sales AHL(21,1)	61,92	61,91	61,91	61,77	61,76	61,76	60,94	60,97	60,98	
average sales AHL(22,1)	7,77	7,77	7,77	7,77	7,77	7,77	7,77	7,77	7,77	
average sales AHL(23,1)	25,42	25,40	25,42	25,22	25,26	25,17	24,76	24,77	24,78	
average sales AHL(31,1)	6,39	6,38	6,39	6,36	6,36	6,36	6,32	6,32	6,33	
average sales AHL(32,1)	3,27	3,28	3,29	3,30	3,29	3,28	3,27	3,27	3,28	
lost of sales AHL(11)	0,03	0,03	0,02	0,06	0,06	0,06	0,22	0,22	0,22	
lost of sales AHL(12)	0,00	0,00	0,01	0,02	0,03	0,06	0,32	0,29	0,25	
lost of sales AHL(13)	0,00	0,00	0,00	0,00	0,00	0,00	0,01	0,01	0,01	
lost of sales AHL(21)	0,06	0,07	0,07	0,20	0,22	0,22	1,04	1,01	1,00	
lost of sales AHL(22)	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	
lost of sales AHL(23)	0,08	0,10	0,08	0,28	0,25	0,33	0,74	0,74	0,72	
lost of sales AHL(31)	0,12	0,13	0,12	0,14	0,15	0,15	0,19	0,18	0,17	
lost of sales AHL(32)	0,24	0,24	0,22	0,22	0,23	0,23	0,25	0,25	0,23	
average inventory AHL(11)	121,96	122,20	121,86	104,30	104,34	104,03	86,02	86,23	85,84	
average inventory AHL(12)	358,33	358,00	360,21	328,79	328,98	331,34	277,01	277,09	280,32	
average inventory AHL(13)	114,58	114,75	114,12	98,90	98,98	98,29	84,99	85,04	84,59	
average inventory AHL(21)	351,98	352,55	354,28	310,35	311,20	313,92	252,21	253,52	256,59	
average inventory AHL(22)	83,21	83,36	83,29	81,71	81,96	81,89	80,44	80,94	80,52	
average inventory AHL(23)	169,60	169,43	169,38	145,51	145,39	144,53	118,78	118,53	118,34	
average inventory AHL(31)	50,96	50,90	50,95	46,84	46,83	46,86	43,36	43,44	43,48	
average inventory AHL(32)	37,81	37,92	38,01	37,08	37,06	37,03	36,16	36,21	36,26	
transfer ERENKOY(11)	2,92	3,13	2,66	2,89	2,95	2,42	2,64	2,77	2,20	
transfer ERENKOY(12)	1,62	1,67	1,56	4,31	4,59	3,98	6,08	6,29	4,87	
transfer ERENKOY(13)	2,63	2,72	2,25	2,50	2,62	2,07	2,51	2,69	1,88	
transfer ERENKOY(21)	3,72	3,55	2,96	6,81	6,60	5,96	7,79	7,53	6,25	
transfer ERENKOY(22)	7,04	7,11	6,92	8,41	8,33	8,20	9,72	9,34	9,56	
transfer ERENKOY(23)	3,48	3,39	3,01	3,99	3,81	3,36	3,89	3,63	3,08	
transfer ERENKOY(31)	2,39	2,42	2,53	2,42	2,47	2,53	2,45	2,51	2,53	
transfer ERENKOY(32)	3,60	3,49	3,03	3,81	3,79	3,33	4,13	4,07	3,61	

z values of AHL store	7 DAYS	7 DAYS	7 DAYS	6 DAYS	6 DAYS	6 DAYS	5 DAYS	5 DAYS	5 DAYS
z values of ERENKOY store	8 DAYS	7 DAYS	6 DAYS	8 DAYS	7 DAYS	6 DAYS	8 DAYS	7 DAYS	6 DAYS
average shipment ERENKOY(11)	31,75	28,18	31,28	31,67	28,26	31,45	32,26	28,89	32,20
average shipment ERENKOY(12)	163,18	162,71	190,88	158,88	159,06	185,59	157,42	159,11	185,55
average shipment ERENKOY(13)	55,10	50,65	58,34	55,46	50,41	58,61	55,18	50,30	59,44
average shipment ERENKOY(21)	173,55	176,79	198,36	170,88	174,42	193,07	172,26	175,10	194,90
average shipment ERENKOY(22)	60,08	60,41	60,66	58,62	59,07	59,27	57,40	57,97	57,67
average shipment ERENKOY(23)	32,22	32,38	35,28	31,40	31,82	34,86	32,10	32,27	35,31
average shipment ERENKOY(31)	18,55	17,54	17,33	18,54	17,45	17,28	18,43	17,30	17,30
average shipment ERENKOY(32)	155,13	156,61	176,61	154,59	156,16	175,95	154,67	155,68	176,04
average return ERENKOY(11)	7,68	4,88	7,06	7,44	4,88	7,12	7,94	5,32	7,72
average return ERENKOY(12)	23,45	21,98	47,45	21,82	21,39	44,69	22,70	23,62	46,46
average return ERENKOY(13)	11,90	8,12	14,36	12,09	7,77	14,55	11,99	7,82	15,41
average return ERENKOY(21)	17,28	19,23	38,20	17,57	19,73	35,95	19,71	21,23	38,10
average return ERENKOY(22)	5,11	5,62	5,74	4,91	5,45	5,39	4,82	5,03	5,02
average return ERENKOY(23)	6,46	6,52	8,77	5,98	6,53	8,76	6,60	6,58	9,22
average return ERENKOY(31)	6,00	5,21	5,16	5,92	5,05	5,09	5,87	4,90	5,03
average return ERENKOY(32)	28,33	29,64	48,87	28,02	29,49	48,43	28,34	29,13	48,68
average sales ERENKOY(11,1)	23,90	23,90	23,88	23,90	23,90	23,88	23,90	23,90	23,88
average sales ERENKOY(12,1)	137,60	137,60	137,32	137,60	137,56	137,36	137,60	137,59	137,36
average sales ERENKOY(13,1)	42,97	42,97	42,96	42,97	42,97	42,96	42,97	42,97	42,96
average sales ERENKOY(21,1)	158,52	158,35	156,85	158,69	158,46	157,04	158,66	158,41	157,05
average sales ERENKOY(22,1)	60,02	60,02	60,02	60,02	60,02	60,02	60,02	60,02	60,02
average sales ERENKOY(23,1)	26,53	26,49	26,36	26,54	26,51	26,41	26,53	26,50	26,36
average sales ERENKOY(31,1)	13,00	12,96	12,79	13,01	12,97	12,81	13,01	12,97	12,80
average sales ERENKOY(32,1)	129,22	129,20	128,54	129,19	129,18	128,54	129,21	129,19	128,56
lost of sales ERENKOY(11)	0,00	0,00	0,02	0,00	0,00	0,03	0,00	0,00	0,02
lost of sales ERENKOY(12)	0,00	0,00	0,27	0,00	0,03	0,23	0,00	0,01	0,23
lost of sales ERENKOY(13)	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
lost of sales ERENKOY(21)	0,56	0,74	2,23	0,40	0,63	2,04	0,43	0,68	2,04
lost of sales ERENKOY(22)	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
lost of sales ERENKOY(23)	0,01	0,05	0,18	0,00	0,03	0,14	0,01	0,04	0,18
lost of sales ERENKOY(31)	0,08	0,12	0,29	0,07	0,11	0,27	0,07	0,12	0,28
lost of sales ERENKOY(32)	0,01	0,02	0,69	0,04	0,04	0,69	0,02	0,04	0,67
average inventory ERENKOY(11)	188,91	166,18	144,84	189,14	166,20	144,93	188,99	166,23	144,90
average inventory ERENKOY(12)	894,17	837,43	715,01	896,00	839,19	717,82	898,49	840,99	719,55
average inventory ERENKOY(13)	333,76	294,57	248,31	333,91	294,67	248,28	334,00	294,51	248,20
average inventory ERENKOY(21)	778,76	763,18	706,73	781,16	765,63	709,67	782,27	766,63	711,46
average inventory ERENKOY(22)	472,33	412,60	352,17	472,63	412,98	352,46	472,80	413,14	352,65
average inventory ERENKOY(23)	201,40	179,20	152,69	201,65	179,49	152,97	201,64	179,28	152,59
average inventory ERENKOY(31)	103,88	90,72	76,96	103,94	90,75	77,07	103,93	90,74	77,04
average inventory ERENKOY(32)	696,27	691,21	645,94	696,37	691,21	645,95	696,33	690,72	646,22
average shipment WH(11)	41,57	41,67	41,57	41,50	41,62	41,50	41,44	41,45	41,37
average shipment WH(12)	202,63	203,01	202,28	202,90	202,94	202,15	202,40	202,74	202,09
average shipment WH(13)	59,38	59,43	59,52	59,35	59,43	59,54	59,27	59,44	59,53
average shipment WH(21)	221,13	221,06	219,65	221,05	220,98	219,63	220,08	220,16	218,87
average shipment WH(22)	67,83	67,78	67,78	67,83	67,75	67,79	67,88	67,78	67,78
average shipment WH(23)	51,95	51,93	51,84	51,75	51,85	51,60	51,32	51,26	51,14
average shipment WH(31)	19,35	19,39	19,14	19,31	19,33	19,14	19,25	19,27	19,11
average shipment WH(32)	132,59	132,47	131,76	132,58	132,43	131,73	132,66	132,50	131,75
average inventory WH(11)	251,43	243,46	252,33	252,03	243,97	255,34	253,62	247,79	258,33
average inventory WH(12)	294,95	309,26	364,89	302,40	317,40	369,37	310,63	327,16	381,35
average inventory WH(13)	246,63	235,70	256,04	246,13	235,54	256,24	247,20	236,24	256,61
average inventory WH(21)	287,37	295,86	334,30	295,33	303,74	338,80	304,97	313,25	348,58
average inventory WH(22)	196,59	197,50	200,01	196,32	197,36	199,46	195,66	196,79	198,75
average inventory WH(23)	226,95	229,88	237,64	228,46	231,53	239,71	232,96	233,79	241,92
average inventory WH(31)	264,22	260,09	261,50	261,81	257,69	258,89	260,21	255,41	256,60
average inventory WH(32)	286,79	289,14	333,15	286,32	289,10	333,12	286,68	290,31	332,27

Table C.15. Daily product flow of 2 stores with transfer in 6 % discount period

transfer , 6 % discount									
z values of AHL store	7 DAYS	7 DAYS	7 DAYS	6 DAYS	6 DAYS	6 DAYS	5 DAYS	5 DAYS	5 DAYS
z values of ERENKOY store	8 DAYS	7 DAYS	6 DAYS	8 DAYS	7 DAYS	6 DAYS	8 DAYS	7 DAYS	6 DAYS
transfer AHL(11)	3,18	2,61	3,15	3,28	2,52	3,02	3,11	2,43	2,84
transfer AHL(12)	3,73	5,08	7,06	3,73	5,06	7,12	3,67	4,84	6,85
transfer AHL(13)	3,09	2,35	3,36	3,17	2,37	3,13	2,96	2,24	2,98
transfer AHL(21)	0,96	2,73	6,08	0,88	2,58	6,29	0,95	2,43	5,86
transfer AHL(22)	2,70	2,22	2,78	2,86	2,46	3,07	2,98	2,57	3,39
transfer AHL(23)	2,74	2,70	3,26	2,81	2,61	3,11	2,91	2,82	2,98
transfer AHL(31)	1,86	1,72	1,86	1,96	1,83	1,85	1,97	1,88	1,95
transfer AHL(32)	0,37	0,70	1,49	0,41	0,76	1,57	0,44	0,80	1,67
average shipment AHL(11)	21,08	21,58	21,27	20,74	21,65	21,37	20,90	21,65	21,68
average shipment AHL(12)	67,59	66,10	66,34	72,28	70,07	69,55	76,61	75,06	74,98
average shipment AHL(13)	19,75	20,55	19,43	19,12	19,92	19,61	18,94	19,77	19,42
average shipment AHL(21)	69,57	68,00	66,43	74,13	72,73	70,34	77,47	75,77	73,84
average shipment AHL(22)	12,77	12,92	12,10	13,77	13,88	13,01	14,62	14,64	13,67
average shipment AHL(23)	32,73	32,60	32,03	32,45	32,85	32,55	32,33	32,07	32,55
average shipment AHL(31)	9,77	9,91	9,79	9,36	9,39	9,36	9,03	9,06	9,01
average shipment AHL(32)	7,78	7,44	6,26	7,83	7,54	6,39	8,10	7,63	6,50
average return AHL(11)	4,26	3,98	4,60	4,09	4,16	4,85	4,45	4,43	5,39
average return AHL(12)	7,49	7,17	9,52	9,11	8,74	11,20	12,81	12,00	15,46
average return AHL(13)	3,50	3,42	3,90	2,99	2,99	3,88	2,65	2,66	3,72
average return AHL(21)	5,99	6,51	9,04	7,84	8,27	10,62	11,34	11,28	14,40
average return AHL(22)	2,03	1,50	2,17	2,19	1,63	2,29	2,26	1,66	2,40
average return AHL(23)	7,48	7,46	7,81	7,06	7,51	8,20	7,57	7,52	8,68
average return AHL(31)	3,10	3,11	3,02	2,75	2,65	2,61	2,48	2,36	2,36
average return AHL(32)	1,17	1,24	1,47	1,07	1,15	1,35	0,99	1,01	1,31
average sales AHL(11,1)	17,20	17,20	17,20	17,17	17,17	17,17	17,02	17,01	17,01
average sales AHL(12,1)	61,70	61,69	61,68	61,64	61,64	61,59	61,40	61,47	61,37
average sales AHL(13,1)	16,67	16,67	16,67	16,67	16,67	16,67	16,66	16,66	16,66
average sales AHL(21,1)	59,97	59,96	59,96	59,79	59,84	59,79	59,01	59,08	59,06
average sales AHL(22,1)	7,34	7,34	7,34	7,34	7,34	7,34	7,34	7,34	7,34
average sales AHL(23,1)	24,43	24,44	24,46	24,25	24,28	24,17	23,80	23,82	23,81
average sales AHL(31,1)	6,19	6,18	6,19	6,17	6,17	6,17	6,13	6,14	6,14
average sales AHL(32,1)	3,42	3,41	3,41	3,40	3,42	3,41	3,41	3,40	3,39
lost of sales AHL(11)	0,03	0,02	0,02	0,06	0,06	0,06	0,20	0,21	0,22
lost of sales AHL(12)	0,00	0,01	0,02	0,06	0,06	0,11	0,30	0,23	0,33
lost of sales AHL(13)	0,00	0,00	0,00	0,00	0,00	0,00	0,01	0,01	0,01
lost of sales AHL(21)	0,05	0,06	0,06	0,23	0,18	0,23	1,01	0,94	0,96
lost of sales AHL(22)	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
lost of sales AHL(23)	0,10	0,10	0,08	0,28	0,26	0,37	0,73	0,71	0,72
lost of sales AHL(31)	0,10	0,11	0,11	0,12	0,13	0,13	0,16	0,16	0,15
lost of sales AHL(32)	0,26	0,27	0,27	0,28	0,26	0,28	0,27	0,28	0,29
average inventory AHL(11)	118,79	119,01	118,72	101,59	101,65	101,34	83,92	84,07	83,69
average inventory AHL(12)	355,69	355,51	356,49	321,36	322,19	323,40	268,21	268,59	269,74
average inventory AHL(13)	114,57	114,71	114,08	98,90	98,94	98,27	84,99	85,08	84,54
average inventory AHL(21)	348,58	349,39	351,04	304,62	306,00	308,57	247,08	248,29	251,22
average inventory AHL(22)	83,91	84,22	84,32	82,76	83,14	83,15	81,80	82,36	82,27
average inventory AHL(23)	163,92	163,77	163,82	140,25	140,18	139,20	114,40	114,35	113,95
average inventory AHL(31)	49,97	49,93	49,95	46,12	46,16	46,15	42,93	43,01	43,03
average inventory AHL(32)	38,21	38,22	38,46	37,22	37,22	37,41	36,27	36,38	36,59
transfer ERENKOY(11)	2,84	3,04	2,63	2,80	2,85	2,36	2,58	2,67	2,13
transfer ERENKOY(12)	1,74	1,91	1,76	4,84	4,31	3,41	5,61	5,92	4,48
transfer ERENKOY(13)	2,62	2,75	2,18	2,54	2,58	2,13	2,53	2,63	1,96
transfer ERENKOY(21)	4,13	3,88	3,14	6,96	6,85	5,90	7,78	7,59	5,93
transfer ERENKOY(22)	6,11	6,30	5,33	7,10	7,36	6,40	8,01	8,20	7,28
transfer ERENKOY(23)	3,59	3,44	3,06	3,99	3,71	3,31	3,87	3,55	3,05
transfer ERENKOY(31)	2,33	2,33	2,44	2,38	2,38	2,43	2,39	2,44	2,45
transfer ERENKOY(32)	3,54	3,49	2,86	3,75	3,72	3,18	4,11	4,00	3,45

z values of AHL store	7 DAYS	7 DAYS	7 DAYS	6 DAYS	6 DAYS	6 DAYS	5 DAYS	5 DAYS	5 DAYS
z values of ERENKOY store	8 DAYS	7 DAYS	6 DAYS	8 DAYS	7 DAYS	6 DAYS	8 DAYS	7 DAYS	6 DAYS
average shipment ERENKOY(11)	31,45	28,00	30,94	31,36	28,03	31,14	31,97	28,58	31,93
average shipment ERENKOY(12)	159,51	160,53	184,40	156,31	156,84	182,61	156,67	156,38	183,16
average shipment ERENKOY(13)	55,46	51,03	58,81	55,44	50,86	58,89	55,27	50,65	59,70
average shipment ERENKOY(21)	165,67	169,65	192,77	162,84	166,39	188,03	163,86	167,32	190,86
average shipment ERENKOY(22)	43,13	37,19	45,50	41,69	35,91	43,94	40,53	34,82	42,66
average shipment ERENKOY(23)	31,98	32,14	34,96	31,28	31,60	34,72	31,89	32,11	34,97
average shipment ERENKOY(31)	17,13	16,20	15,99	17,07	16,10	15,93	16,98	15,93	15,90
average shipment ERENKOY(32)	149,45	151,96	175,46	148,89	151,73	175,12	149,47	152,11	174,37
average return ERENKOY(11)	7,66	4,92	6,98	7,43	4,83	7,01	7,96	5,27	7,72
average return ERENKOY(12)	24,03	23,87	46,09	23,82	22,67	45,77	25,04	23,74	47,40
average return ERENKOY(13)	12,05	8,31	14,49	11,84	7,97	14,72	11,83	7,90	15,56
average return ERENKOY(21)	18,33	20,45	40,75	18,29	20,21	38,23	19,90	21,89	41,72
average return ERENKOY(22)	12,06	6,78	13,61	11,45	6,32	12,85	11,07	5,96	12,12
average return ERENKOY(23)	6,46	6,54	8,68	6,08	6,35	8,78	6,51	6,55	8,97
average return ERENKOY(31)	5,55	4,78	4,71	5,44	4,63	4,64	5,35	4,47	4,55
average return ERENKOY(32)	27,49	29,74	52,27	27,06	29,64	52,13	27,93	30,24	51,54
average sales ERENKOY(11,1)	23,60	23,60	23,58	23,60	23,60	23,58	23,60	23,60	23,59
average sales ERENKOY(12,1)	132,90	132,90	132,49	132,90	132,90	132,62	132,90	132,85	132,65
average sales ERENKOY(13,1)	43,17	43,17	43,17	43,17	43,17	43,17	43,17	43,17	43,17
average sales ERENKOY(21,1)	149,66	149,45	148,10	149,75	149,53	148,36	149,73	149,53	148,21
average sales ERENKOY(22,1)	34,63	34,63	34,58	34,63	34,63	34,58	34,63	34,63	34,59
average sales ERENKOY(23,1)	26,42	26,38	26,25	26,43	26,40	26,30	26,42	26,38	26,25
average sales ERENKOY(31,1)	12,07	12,03	11,90	12,08	12,04	11,91	12,07	12,03	11,89
average sales ERENKOY(32,1)	124,36	124,34	123,76	124,36	124,33	123,79	124,35	124,34	123,79
lost of sales ERENKOY(11)	0,00	0,00	0,01	0,00	0,00	0,01	0,00	0,00	0,01
lost of sales ERENKOY(12)	0,00	0,00	0,42	0,00	0,00	0,29	0,00	0,05	0,26
lost of sales ERENKOY(13)	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
lost of sales ERENKOY(21)	0,37	0,58	1,92	0,27	0,49	1,67	0,29	0,49	1,82
lost of sales ERENKOY(22)	0,00	0,00	0,05	0,00	0,00	0,05	0,00	0,00	0,04
lost of sales ERENKOY(23)	0,01	0,05	0,17	0,00	0,03	0,13	0,01	0,04	0,17
lost of sales ERENKOY(31)	0,07	0,10	0,24	0,06	0,10	0,23	0,07	0,11	0,24
lost of sales ERENKOY(32)	0,00	0,01	0,60	0,00	0,03	0,57	0,01	0,02	0,57
average inventory ERENKOY(11)	186,66	164,36	143,74	186,91	164,41	143,86	186,78	164,45	143,89
average inventory ERENKOY(12)	888,30	818,24	694,46	889,47	820,98	695,98	890,11	822,42	697,84
average inventory ERENKOY(13)	335,21	295,99	249,42	335,36	296,00	249,46	335,37	295,85	249,42
average inventory ERENKOY(21)	785,51	762,51	692,05	787,21	764,47	695,14	788,39	765,62	696,34
average inventory ERENKOY(22)	272,78	239,68	202,62	272,91	239,83	202,94	273,10	239,92	203,13
average inventory ERENKOY(23)	201,02	178,70	152,34	201,25	179,08	152,53	201,19	178,85	152,22
average inventory ERENKOY(31)	96,50	84,28	71,73	96,53	84,30	71,79	96,52	84,28	71,72
average inventory ERENKOY(32)	698,65	690,00	635,52	698,28	689,74	635,50	698,50	690,12	635,70
average shipment WH(11)	40,80	40,89	40,81	40,75	40,85	40,75	40,66	40,68	40,62
average shipment WH(12)	194,87	195,00	194,57	194,87	195,00	194,48	194,62	194,80	194,42
average shipment WH(13)	59,59	59,63	59,74	59,54	59,62	59,74	59,48	59,66	59,73
average shipment WH(21)	210,27	210,18	208,93	210,12	210,16	208,91	209,26	209,40	207,97
average shipment WH(22)	41,78	41,83	41,84	41,80	41,83	41,83	41,78	41,86	41,85
average shipment WH(23)	50,85	50,85	50,74	50,67	50,77	50,48	50,24	50,20	50,06
average shipment WH(31)	18,23	18,28	18,05	18,18	18,21	18,04	18,14	18,16	18,03
average shipment WH(32)	127,84	127,87	126,98	127,80	127,96	127,00	127,84	127,93	126,99
average inventory WH(11)	251,77	243,46	252,15	251,84	243,72	254,95	253,83	247,56	257,61
average inventory WH(12)	295,18	313,71	363,89	306,01	319,87	371,22	314,67	328,08	381,46
average inventory WH(13)	246,84	235,71	256,38	245,69	235,27	256,05	246,75	236,10	256,10
average inventory WH(21)	281,88	293,52	336,48	290,42	301,49	341,42	298,09	308,97	351,03
average inventory WH(22)	239,34	224,85	243,59	238,80	224,10	242,79	238,71	222,96	241,83
average inventory WH(23)	227,51	229,93	237,77	228,98	231,39	239,51	232,55	233,47	240,88
average inventory WH(31)	260,83	256,08	257,79	258,03	253,75	255,44	256,33	251,37	252,64
average inventory WH(32)	284,73	292,61	340,06	284,79	292,59	340,14	284,30	292,31	339,63

Table C.16. Daily outputs of 3 stores no transfer in no discount period

no transfer, no discount									
z values of AHL store	7 DAYS	7 DAYS	7 DAYS	7 DAYS	7 DAYS	6 DAYS	6 DAYS	6 DAYS	6 DAYS
z values of ERENKOY store	8 DAYS	7 DAYS	8 DAYS	7 DAYS	7 DAYS	7 DAYS	8 DAYS	8 DAYS	7 DAYS
z values of NST store	6 DAYS	5 DAYS	5 DAYS	6 DAYS	7 DAYS	6 DAYS	5 DAYS	6 DAYS	5 DAYS
average shipment AHL(11)	23,31	23,18	23,30	23,16	23,21	22,98	23,01	23,05	22,94
average shipment AHL(12)	66,24	65,23	66,37	65,22	64,59	69,09	69,67	69,85	68,98
average shipment AHL(13)	6,25	6,18	6,18	6,25	6,23	6,25	6,18	6,25	6,18
average shipment AHL(21)	66,51	67,28	66,26	67,05	66,94	70,51	69,69	69,72	70,60
average shipment AHL(22)	8,06	7,92	8,06	7,93	7,93	7,90	8,04	8,04	7,90
average shipment AHL(23)	32,94	32,65	32,95	32,67	32,74	32,65	32,88	32,84	32,70
average shipment AHL(31)	10,48	10,48	10,48	10,48	10,48	9,81	9,81	9,81	9,81
average shipment AHL(32)	6,14	6,17	6,10	6,15	6,17	5,93	5,86	5,89	5,92
average return AHL(11)	6,98	6,84	6,96	6,82	6,88	6,64	6,71	6,72	6,60
average return AHL(12)	9,86	8,83	10,02	8,83	8,25	12,74	13,34	13,48	12,62
average return AHL(13)	3,28	3,21	3,21	3,28	3,26	3,28	3,21	3,28	3,21
average return AHL(21)	10,19	11,02	9,98	10,76	10,60	14,34	13,53	13,52	14,49
average return AHL(22)	1,57	1,43	1,57	1,44	1,44	1,41	1,55	1,55	1,41
average return AHL(23)	10,31	10,01	10,30	10,04	10,09	10,19	10,41	10,37	10,25
average return AHL(31)	4,66	4,66	4,65	4,66	4,66	3,98	3,98	3,99	3,99
average return AHL(32)	2,54	2,58	2,52	2,55	2,56	2,35	2,29	2,31	2,34
average sales AHL(11,1)	16,35	16,35	16,35	16,35	16,35	16,32	16,32	16,32	16,32
average sales AHL(12,1)	56,06	56,07	56,06	56,06	56,06	56,03	56,00	56,04	56,03
average sales AHL(13,1)	2,95	2,95	2,95	2,95	2,95	2,95	2,95	2,95	2,95
average sales AHL(21,1)	55,95	55,95	55,97	55,96	55,97	55,83	55,85	55,84	55,83
average sales AHL(22,1)	6,47	6,47	6,47	6,47	6,47	6,47	6,47	6,47	6,47
average sales AHL(23,1)	22,63	22,64	22,65	22,64	22,65	22,50	22,49	22,50	22,49
average sales AHL(31,1)	5,81	5,81	5,81	5,81	5,81	5,81	5,81	5,81	5,81
average sales AHL(32,1)	3,58	3,56	3,56	3,58	3,59	3,56	3,55	3,57	3,55
lost of sales AHL(11)	0,02	0,02	0,02	0,02	0,02	0,05	0,05	0,05	0,04
lost of sales AHL(12)	0,01	0,00	0,01	0,01	0,01	0,04	0,07	0,03	0,04
lost of sales AHL(13)	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
lost of sales AHL(21)	0,05	0,04	0,03	0,04	0,03	0,16	0,15	0,16	0,17
lost of sales AHL(22)	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
lost of sales AHL(23)	0,09	0,08	0,08	0,08	0,07	0,23	0,23	0,22	0,23
lost of sales AHL(31)	0,07	0,07	0,07	0,07	0,07	0,08	0,08	0,08	0,08
lost of sales AHL(32)	0,26	0,28	0,28	0,26	0,25	0,28	0,29	0,27	0,29
average inventory AHL(11)	112,33	112,53	112,31	112,50	112,56	96,07	95,87	95,89	96,11
average inventory AHL(12)	342,78	343,33	343,40	342,38	342,39	300,20	301,66	300,93	301,21
average inventory AHL(13)	71,95	71,99	71,99	71,95	71,96	71,95	71,99	71,95	71,99
average inventory AHL(21)	334,50	334,78	334,78	334,74	334,28	288,51	288,04	288,13	288,64
average inventory AHL(22)	89,18	89,39	89,19	89,39	89,40	89,32	89,13	89,12	89,33
average inventory AHL(23)	152,97	153,18	153,06	153,11	153,24	130,26	130,27	130,33	130,27
average inventory AHL(31)	48,56	48,57	48,56	48,57	48,57	45,55	45,55	45,55	45,55
average inventory AHL(32)	40,62	40,58	40,62	40,62	40,69	39,85	39,87	39,86	39,84

z values of AHL store	7 DAYS	7 DAYS	7 DAYS	7 DAYS	7 DAYS	6 DAYS	6 DAYS	6 DAYS	6 DAYS
z values of ERENKOY store	8 DAYS	7 DAYS	8 DAYS	7 DAYS	7 DAYS	7 DAYS	8 DAYS	8 DAYS	7 DAYS
z values of NST store	6 DAYS	5 DAYS	5 DAYS	6 DAYS	7 DAYS	6 DAYS	5 DAYS	6 DAYS	5 DAYS
average shipment ERENKOY(11)	31,62	29,23	31,69	29,15	29,12	29,19	31,85	31,84	29,26
average shipment ERENKOY(12)	49,71	49,57	50,12	48,76	48,81	48,80	50,43	50,19	49,43
average shipment ERENKOY(13)	127,09	127,32	127,33	127,08	126,44	127,08	127,33	127,09	127,32
average shipment ERENKOY(21)	140,68	142,82	140,70	142,78	142,46	142,86	140,55	140,53	142,88
average shipment ERENKOY(22)	44,81	43,21	44,76	43,17	43,25	43,15	44,77	44,82	43,19
average shipment ERENKOY(23)	33,49	33,12	33,50	33,11	33,13	32,89	33,47	33,47	32,89
average shipment ERENKOY(31)	17,23	16,43	17,22	16,42	16,43	16,43	17,23	17,24	16,43
average shipment ERENKOY(32)	124,32	127,51	125,79	126,19	126,43	126,18	125,87	124,32	127,55
average return ERENKOY(11)	8,48	6,04	8,54	5,96	5,94	5,99	8,69	8,68	6,06
average return ERENKOY(12)	6,05	5,87	6,49	5,02	5,15	5,11	6,78	6,57	5,76
average return ERENKOY(13)	6,01	6,50	6,50	6,00	5,36	6,00	6,50	6,01	6,50
average return ERENKOY(21)	8,29	10,79	8,48	10,65	10,31	10,62	8,27	8,12	10,83
average return ERENKOY(22)	8,18	6,57	8,12	6,53	6,60	6,52	8,13	8,19	6,56
average return ERENKOY(23)	7,43	7,03	7,44	7,02	7,06	6,78	7,39	7,40	6,77
average return ERENKOY(31)	6,82	6,04	6,81	6,04	6,05	6,04	6,82	6,82	6,04
average return ERENKOY(32)	9,24	12,28	10,64	10,98	11,22	10,98	10,73	9,23	12,33
average sales ERENKOY(11,1)	23,24	23,24	23,24	23,24	23,24	23,24	23,24	23,24	23,24
average sales ERENKOY(12,1)	43,61	43,61	43,61	43,61	43,61	43,61	43,61	43,61	43,61
average sales ERENKOY(13,1)	120,67	120,46	120,47	120,67	120,65	120,67	120,47	120,67	120,46
average sales ERENKOY(21,1)	131,76	131,48	131,72	131,47	131,49	131,51	131,74	131,76	131,47
average sales ERENKOY(22,1)	36,59	36,59	36,59	36,59	36,59	36,59	36,59	36,59	36,59
average sales ERENKOY(23,1)	26,11	26,09	26,11	26,09	26,09	26,09	26,11	26,11	26,09
average sales ERENKOY(31,1)	10,43	10,40	10,43	10,40	10,40	10,40	10,43	10,43	10,40
average sales ERENKOY(32,1)	114,39	114,39	114,39	114,39	114,39	114,39	114,39	114,39	114,39
lost of sales ERENKOY(11)	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
lost of sales ERENKOY(12)	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
lost of sales ERENKOY(13)	2,74	2,95	2,94	2,74	2,76	2,74	2,94	2,74	2,95
lost of sales ERENKOY(21)	0,07	0,35	0,11	0,36	0,34	0,32	0,09	0,06	0,35
lost of sales ERENKOY(22)	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
lost of sales ERENKOY(23)	0,00	0,02	0,00	0,02	0,02	0,02	0,00	0,00	0,02
lost of sales ERENKOY(31)	0,06	0,09	0,06	0,09	0,09	0,09	0,06	0,06	0,09
lost of sales ERENKOY(32)	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
average inventory ERENKOY(11)	182,68	161,11	182,68	161,03	161,12	161,16	182,87	182,89	161,23
average inventory ERENKOY(12)	324,23	283,34	323,23	283,78	285,42	284,56	323,91	324,86	284,01
average inventory ERENKOY(13)	344,80	344,77	344,78	344,80	345,83	344,80	344,78	344,80	344,77
average inventory ERENKOY(21)	772,97	728,70	773,03	728,23	728,58	729,71	774,24	774,11	730,00
average inventory ERENKOY(22)	282,05	248,90	282,02	248,84	249,00	248,83	282,03	282,05	248,89
average inventory ERENKOY(23)	198,88	177,14	198,90	177,11	177,21	177,05	199,03	199,06	177,04
average inventory ERENKOY(31)	83,38	72,92	83,38	72,92	72,92	72,92	83,39	83,39	72,92
average inventory ERENKOY(32)	683,59	663,28	684,44	661,75	661,04	661,72	684,31	683,47	663,35

z values of AHL store	7 DAYS	7 DAYS	7 DAYS	7 DAYS	7 DAYS	6 DAYS	6 DAYS	6 DAYS	6 DAYS
z values of ERENKOY store	8 DAYS	7 DAYS	8 DAYS	7 DAYS	7 DAYS	7 DAYS	8 DAYS	8 DAYS	7 DAYS
z values of NST store	6 DAYS	5 DAYS	5 DAYS	6 DAYS	7 DAYS	6 DAYS	5 DAYS	6 DAYS	5 DAYS
average shipment NST(11)	21,65	20,40	20,44	21,62	22,62	21,52	20,42	21,61	20,33
average shipment NST(12)	105,59	108,23	109,75	103,73	98,72	103,33	109,19	105,52	107,80
average shipment NST(13)	36,50	36,58	36,58	36,52	36,23	36,52	36,58	36,50	36,58
average shipment NST(21)	69,44	69,60	69,15	69,52	67,98	69,57	69,58	69,62	69,37
average shipment NST(22)	19,13	18,19	18,42	18,79	19,39	18,78	18,43	19,13	18,20
average shipment NST(23)	14,11	13,62	13,64	14,16	14,76	14,12	13,57	14,08	13,60
average shipment NST(31)	7,71	7,27	7,27	7,71	8,36	7,71	7,27	7,72	7,27
average shipment NST(32)	85,76	95,11	95,53	85,08	81,58	85,16	95,61	85,83	95,12
average return NST(11)	4,30	3,05	3,10	4,28	5,23	4,17	3,07	4,26	2,98
average return NST(12)	18,03	21,04	22,53	16,15	11,11	15,80	21,94	18,00	20,57
average return NST(13)	5,74	5,87	5,87	5,75	5,45	5,75	5,87	5,74	5,87
average return NST(21)	16,45	17,04	16,61	16,57	14,85	16,61	16,96	16,62	16,78
average return NST(22)	2,46	1,52	1,75	2,11	2,72	2,11	1,75	2,46	1,52
average return NST(23)	4,01	3,53	3,55	4,06	4,68	4,02	3,49	3,97	3,52
average return NST(31)	2,63	2,20	2,20	2,62	3,27	2,63	2,20	2,64	2,20
average return NST(32)	12,82	22,63	23,10	12,06	8,44	12,14	23,20	12,88	22,64
average sales NST(11,1)	17,29	17,29	17,29	17,29	17,29	17,29	17,29	17,29	17,29
average sales NST(12,1)	87,08	86,93	86,98	87,11	87,11	87,11	86,99	87,10	86,98
average sales NST(13,1)	30,53	30,51	30,51	30,53	30,53	30,53	30,51	30,53	30,51
average sales NST(21,1)	52,77	52,28	52,27	52,76	52,93	52,76	52,32	52,78	52,27
average sales NST(22,1)	16,63	16,63	16,63	16,63	16,63	16,63	16,63	16,63	16,63
average sales NST(23,1)	10,07	10,06	10,06	10,07	10,08	10,07	10,06	10,07	10,06
average sales NST(31,1)	5,11	5,10	5,10	5,11	5,11	5,11	5,10	5,11	5,10
average sales NST(32,1)	72,40	72,05	72,03	72,41	72,48	72,41	72,02	72,41	72,05
lost of sales NST(11)	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
lost of sales NST(12)	0,03	0,18	0,13	0,00	0,00	0,00	0,12	0,01	0,13
lost of sales NST(13)	0,00	0,01	0,01	0,00	0,00	0,00	0,01	0,00	0,01
lost of sales NST(21)	0,23	0,73	0,73	0,25	0,07	0,24	0,69	0,23	0,73
lost of sales NST(22)	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
lost of sales NST(23)	0,01	0,02	0,02	0,01	0,00	0,01	0,02	0,01	0,02
lost of sales NST(31)	0,05	0,06	0,06	0,05	0,04	0,05	0,06	0,05	0,06
lost of sales NST(32)	0,08	0,43	0,45	0,07	0,00	0,07	0,46	0,07	0,43
average inventory NST(11)	106,66	98,18	97,91	106,92	120,68	106,99	97,93	106,69	98,23
average inventory NST(12)	475,12	386,11	386,21	476,23	565,78	477,11	386,96	476,00	387,14
average inventory NST(13)	174,43	144,10	144,11	174,43	205,22	174,43	144,11	174,43	144,10
average inventory NST(21)	273,93	220,87	220,40	274,29	329,28	275,08	221,26	274,72	221,56
average inventory NST(22)	110,54	109,00	108,16	111,44	118,95	111,44	108,16	110,54	109,00
average inventory NST(23)	60,35	52,69	52,65	60,41	69,56	60,39	52,63	60,34	52,68
average inventory NST(31)	35,23	32,76	32,76	35,23	38,56	35,24	32,77	35,24	32,77
average inventory NST(32)	338,87	305,00	304,47	339,28	347,67	339,26	304,46	339,02	305,07
average shipment WH(11)	56,76	56,85	56,72	56,90	56,93	56,84	56,69	56,72	56,81
average shipment WH(12)	187,01	187,07	186,91	187,30	187,23	187,19	186,72	186,98	186,97
average shipment WH(13)	154,08	153,77	153,78	154,08	154,07	154,08	153,78	154,08	153,77
average shipment WH(21)	240,89	240,29	240,40	240,82	241,03	240,71	240,30	240,81	240,11
average shipment WH(22)	59,54	59,62	59,52	59,65	59,68	59,65	59,52	59,54	59,62
average shipment WH(23)	58,66	58,66	58,66	58,67	58,70	58,59	58,51	58,55	58,57
average shipment WH(31)	21,27	21,27	21,24	21,30	21,27	21,31	21,25	21,27	21,28
average shipment WH(32)	190,31	189,74	189,70	190,30	190,48	190,26	189,67	190,30	189,76
average inventory WH(11)	233,73	225,52	232,54	226,02	225,81	225,98	231,96	233,00	225,21
average inventory WH(12)	286,33	287,77	293,42	281,65	269,84	287,42	297,73	292,75	293,57
average inventory WH(13)	251,98	252,30	252,27	252,00	248,40	252,00	252,27	251,98	252,30
average inventory WH(21)	310,67	318,82	308,58	321,74	319,07	326,08	313,73	315,68	323,13
average inventory WH(22)	225,82	210,89	224,79	211,55	211,42	211,58	224,78	225,84	210,91
average inventory WH(23)	214,54	212,57	213,33	213,52	213,08	216,04	214,55	215,53	215,25
average inventory WH(31)	247,00	242,13	245,64	243,76	244,75	242,25	244,52	245,79	241,01
average inventory WH(32)	313,51	345,06	336,65	321,78	315,21	321,53	336,33	313,38	345,02

Table C.17. Daily outputs of 3 stores no transfer in 12 % discount period

no transfer, 12 % discount									
z values of AHL store	6 DAYS	6 DAYS	6 DAYS	6 DAYS	5 DAYS	5 DAYS	5 DAYS	5 DAYS	5 DAYS
z values of ERENKOY store	8 DAYS	7 DAYS	8 DAYS	7 DAYS	7 DAYS	8 DAYS	8 DAYS	7 DAYS	5 DAYS
z values of NST store	5 DAYS	4 DAYS	4 DAYS	5 DAYS	5 DAYS	4 DAYS	5 DAYS	4 DAYS	5 DAYS
average shipment AHL(11)	36,31	36,04	36,22	36,15	38,73	38,93	39,02	38,61	39,58
average shipment AHL(12)	71,41	71,80	71,60	71,73	76,51	76,18	76,17	76,56	81,33
average shipment AHL(13)	20,96	20,82	21,02	20,86	20,88	21,10	21,08	20,80	21,69
average shipment AHL(21)	88,94	88,61	88,58	88,97	91,11	90,68	90,93	90,76	92,80
average shipment AHL(22)	9,61	9,56	9,61	9,56	9,55	9,60	9,60	9,55	9,76
average shipment AHL(23)	31,49	31,43	31,55	31,41	32,70	32,76	32,63	32,64	33,31
average shipment AHL(31)	9,96	9,97	9,96	9,98	9,44	9,44	9,44	9,44	9,44
average shipment AHL(32)	4,38	4,41	4,40	4,39	4,36	4,37	4,35	4,38	4,49
average return AHL(11)	5,17	4,89	5,07	5,01	7,62	7,77	7,89	7,49	8,36
average return AHL(12)	3,40	3,80	3,60	3,75	8,49	8,15	8,10	8,54	13,02
average return AHL(13)	3,28	3,14	3,34	3,17	3,20	3,43	3,40	3,12	3,94
average return AHL(21)	1,71	1,41	1,38	1,75	3,86	3,43	3,67	3,52	5,53
average return AHL(22)	1,39	1,33	1,39	1,33	1,32	1,37	1,37	1,32	1,50
average return AHL(23)	5,42	5,33	5,46	5,31	6,65	6,72	6,59	6,61	7,21
average return AHL(31)	3,12	3,13	3,12	3,13	2,60	2,59	2,59	2,60	2,60
average return AHL(32)	1,13	1,16	1,15	1,14	1,10	1,12	1,10	1,13	1,23
average sales AHL(11,1)	31,10	31,10	31,10	31,10	31,10	31,09	31,09	31,10	31,10
average sales AHL(12,1)	67,55	67,55	67,55	67,55	67,54	67,54	67,55	67,54	67,54
average sales AHL(13,1)	17,60	17,60	17,60	17,60	17,60	17,60	17,60	17,60	17,60
average sales AHL(21,1)	86,64	86,64	86,64	86,64	86,62	86,63	86,62	86,63	86,62
average sales AHL(22,1)	8,20	8,20	8,20	8,20	8,20	8,20	8,20	8,20	8,20
average sales AHL(23,1)	26,00	26,00	26,00	26,00	25,98	25,98	25,98	25,98	25,98
average sales AHL(31,1)	6,82	6,82	6,82	6,82	6,82	6,82	6,82	6,82	6,82
average sales AHL(32,1)	3,22	3,22	3,22	3,22	3,22	3,22	3,22	3,22	3,22
lost of sales AHL(11)	0,00	0,00	0,00	0,00	0,01	0,01	0,01	0,00	0,01
lost of sales AHL(12)	0,00	0,00	0,00	0,00	0,00	0,01	0,00	0,01	0,01
lost of sales AHL(13)	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
lost of sales AHL(21)	0,00	0,00	0,00	0,00	0,02	0,01	0,02	0,01	0,02
lost of sales AHL(22)	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
lost of sales AHL(23)	0,00	0,00	0,00	0,00	0,02	0,02	0,02	0,02	0,02
lost of sales AHL(31)	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
lost of sales AHL(32)	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
average inventory AHL(11)	176,15	176,75	176,38	176,68	149,28	148,69	148,68	149,30	148,20
average inventory AHL(12)	345,25	344,89	345,38	344,98	288,26	288,17	288,09	288,38	290,37
average inventory AHL(13)	102,69	103,10	102,74	103,02	86,26	85,90	85,90	86,34	84,92
average inventory AHL(21)	356,38	357,02	356,89	356,72	338,82	338,46	338,50	338,67	345,09
average inventory AHL(22)	89,31	89,54	89,31	89,55	89,52	89,29	89,28	89,52	88,83
average inventory AHL(23)	152,91	152,97	152,88	153,03	126,24	126,02	126,03	126,21	124,64
average inventory AHL(31)	46,44	46,44	46,44	46,44	43,17	43,18	43,17	43,18	43,17
average inventory AHL(32)	38,67	38,66	38,65	38,66	38,59	38,56	38,59	38,57	38,54

z values of AHL store	6 DAYS	6 DAYS	6 DAYS	6 DAYS	5 DAYS	5 DAYS	5 DAYS	5 DAYS	5 DAYS
z values of ERENKOY store	8 DAYS	7 DAYS	8 DAYS	7 DAYS	7 DAYS	8 DAYS	8 DAYS	7 DAYS	5 DAYS
z values of NST store	5 DAYS	4 DAYS	4 DAYS	5 DAYS	5 DAYS	4 DAYS	5 DAYS	4 DAYS	5 DAYS
average shipment ERENKOY(11)	30,41	28,28	30,45	28,30	28,37	30,48	30,44	28,33	28,73
average shipment ERENKOY(12)	146,53	148,32	146,84	147,94	147,66	146,63	146,34	148,15	174,35
average shipment ERENKOY(13)	49,93	49,88	50,06	49,62	49,59	50,04	50,00	49,83	54,17
average shipment ERENKOY(21)	173,43	173,08	172,73	173,80	173,79	172,78	173,45	173,14	187,21
average shipment ERENKOY(22)	40,89	38,25	40,90	38,25	38,25	40,89	40,89	38,25	43,31
average shipment ERENKOY(23)	31,84	31,26	31,81	31,31	31,23	31,70	31,77	31,20	32,95
average shipment ERENKOY(31)	20,65	19,82	20,67	19,81	19,79	20,66	20,65	19,81	19,75
average shipment ERENKOY(32)	142,32	145,69	145,48	142,47	142,47	145,45	142,35	145,68	169,94
average return ERENKOY(11)	6,28	4,09	6,32	4,11	4,16	6,33	6,28	4,13	4,64
average return ERENKOY(12)	2,58	4,42	2,93	4,08	3,86	2,79	2,43	4,32	31,33
average return ERENKOY(13)	7,08	7,00	7,23	6,74	6,69	7,18	7,13	6,97	12,17
average return ERENKOY(21)	2,94	2,69	2,21	3,45	3,41	2,24	2,94	2,72	19,83
average return ERENKOY(22)	7,71	5,09	7,71	5,09	5,10	7,71	7,71	5,10	11,01
average return ERENKOY(23)	5,10	4,46	5,07	4,51	4,45	4,97	5,04	4,41	6,47
average return ERENKOY(31)	6,37	5,55	6,39	5,54	5,53	6,38	6,36	5,54	5,77
average return ERENKOY(32)	7,04	10,26	10,07	7,16	7,16	10,03	7,07	10,25	36,46
average sales ERENKOY(11,1)	24,18	24,18	24,18	24,18	24,18	24,18	24,18	24,18	24,18
average sales ERENKOY(12,1)	143,45	143,45	143,45	143,45	143,45	143,45	143,45	143,45	142,33
average sales ERENKOY(13,1)	42,88	42,88	42,88	42,88	42,88	42,88	42,88	42,88	42,21
average sales ERENKOY(21,1)	169,59	169,51	169,61	169,47	169,47	169,60	169,57	169,53	166,61
average sales ERENKOY(22,1)	33,24	33,24	33,24	33,24	33,24	33,24	33,24	33,24	32,59
average sales ERENKOY(23,1)	26,74	26,74	26,74	26,74	26,74	26,74	26,74	26,74	26,52
average sales ERENKOY(31,1)	14,31	14,30	14,31	14,30	14,30	14,31	14,31	14,30	14,07
average sales ERENKOY(32,1)	134,25	134,25	134,25	134,25	134,25	134,25	134,25	134,25	132,30
lost of sales ERENKOY(11)	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
lost of sales ERENKOY(12)	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	1,13
lost of sales ERENKOY(13)	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,66
lost of sales ERENKOY(21)	0,02	0,10	0,00	0,13	0,14	0,01	0,04	0,08	3,00
lost of sales ERENKOY(22)	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,65
lost of sales ERENKOY(23)	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,22
lost of sales ERENKOY(31)	0,00	0,02	0,00	0,02	0,02	0,00	0,00	0,02	0,25
lost of sales ERENKOY(32)	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	1,95
average inventory ERENKOY(11)	189,50	166,31	189,70	166,18	166,01	189,65	189,51	166,10	128,88
average inventory ERENKOY(12)	887,38	854,70	889,45	853,56	855,40	890,36	889,56	856,07	565,68
average inventory ERENKOY(13)	327,58	289,82	327,57	289,53	289,60	327,49	327,59	289,93	191,90
average inventory ERENKOY(21)	752,46	745,39	752,30	745,64	747,17	754,07	753,89	747,22	613,21
average inventory ERENKOY(22)	259,36	228,88	259,37	228,88	228,89	259,38	259,37	228,89	153,32
average inventory ERENKOY(23)	206,68	183,42	206,77	183,39	183,13	206,52	206,44	183,17	126,84
average inventory ERENKOY(31)	114,36	100,04	114,39	100,03	100,02	114,39	114,36	100,04	70,48
average inventory ERENKOY(32)	680,77	679,08	680,56	679,65	679,72	680,54	680,84	679,11	546,63

z values of AHL store	6 DAYS	6 DAYS	6 DAYS	6 DAYS	5 DAYS	5 DAYS	5 DAYS	5 DAYS	5 DAYS
z values of ERENKOY store	8 DAYS	7 DAYS	8 DAYS	7 DAYS	7 DAYS	8 DAYS	8 DAYS	7 DAYS	5 DAYS
z values of NST store	5 DAYS	4 DAYS	4 DAYS	5 DAYS	5 DAYS	4 DAYS	5 DAYS	4 DAYS	5 DAYS
average shipment NST(11)	19,53	18,63	18,69	19,49	19,49	18,73	19,60	18,69	19,54
average shipment NST(12)	114,49	112,85	112,67	114,15	115,31	113,81	115,63	113,87	118,29
average shipment NST(13)	37,15	37,34	37,36	36,72	36,53	37,48	37,10	37,29	36,58
average shipment NST(21)	87,70	82,91	82,87	87,84	88,32	83,61	88,21	83,70	93,22
average shipment NST(22)	15,91	15,90	15,91	15,91	15,90	15,91	15,91	15,90	16,06
average shipment NST(23)	13,86	13,46	13,42	13,94	13,95	13,47	13,98	13,45	14,05
average shipment NST(31)	9,82	9,57	9,57	9,80	9,80	9,57	9,81	9,57	9,81
average shipment NST(32)	84,08	86,49	86,33	84,00	83,97	86,45	84,05	86,52	85,68
average return NST(11)	2,33	1,42	1,47	2,29	2,28	1,51	2,40	1,47	2,31
average return NST(12)	12,92	11,56	11,35	12,67	13,84	12,49	14,12	12,61	16,58
average return NST(13)	6,08	6,25	6,26	5,65	5,46	6,39	6,03	6,19	5,42
average return NST(21)	18,54	16,28	16,12	18,74	19,18	16,81	19,01	16,94	24,20
average return NST(22)	1,00	0,99	1,00	0,99	0,99	1,00	1,00	0,99	1,11
average return NST(23)	3,43	3,05	3,01	3,51	3,53	3,06	3,55	3,05	3,62
average return NST(31)	2,56	2,32	2,32	2,55	2,55	2,32	2,56	2,31	2,56
average return NST(32)	11,27	13,96	13,83	11,18	11,15	13,94	11,24	13,99	12,75
average sales NST(11,1)	17,13	17,13	17,13	17,13	17,13	17,13	17,13	17,13	17,13
average sales NST(12,1)	101,03	100,74	100,75	101,00	101,02	100,78	101,03	100,73	101,02
average sales NST(13,1)	30,94	30,91	30,91	30,94	30,94	30,91	30,94	30,91	30,94
average sales NST(21,1)	68,71	66,18	66,30	68,64	68,66	66,31	68,72	66,27	68,50
average sales NST(22,1)	14,83	14,83	14,83	14,83	14,83	14,83	14,83	14,83	14,83
average sales NST(23,1)	10,37	10,35	10,35	10,37	10,36	10,35	10,37	10,35	10,36
average sales NST(31,1)	7,30	7,30	7,30	7,30	7,30	7,30	7,30	7,30	7,30
average sales NST(32,1)	72,21	71,98	71,97	72,21	72,21	71,98	72,21	71,98	72,22
lost of sales NST(11)	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
lost of sales NST(12)	0,00	0,29	0,28	0,03	0,02	0,25	0,00	0,30	0,01
lost of sales NST(13)	0,00	0,03	0,03	0,01	0,01	0,04	0,00	0,03	0,00
lost of sales NST(21)	1,34	3,86	3,74	1,40	1,38	3,73	1,32	3,77	1,54
lost of sales NST(22)	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
lost of sales NST(23)	0,02	0,04	0,04	0,02	0,02	0,04	0,02	0,04	0,02
lost of sales NST(31)	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,02
lost of sales NST(32)	0,02	0,25	0,26	0,03	0,03	0,25	0,02	0,25	0,02
average inventory NST(11)	96,48	94,11	93,89	96,77	96,66	93,76	96,43	93,98	96,46
average inventory NST(12)	435,27	336,70	336,38	435,63	438,14	338,88	437,87	339,03	455,29
average inventory NST(13)	148,53	118,35	117,53	149,40	149,49	117,49	148,46	118,41	149,29
average inventory NST(21)	269,91	200,66	200,34	270,16	271,64	201,41	271,34	201,80	281,94
average inventory NST(22)	108,85	109,30	108,83	109,32	109,32	108,83	108,85	109,30	108,60
average inventory NST(23)	53,72	47,87	47,92	53,73	53,67	47,81	53,66	47,83	53,46
average inventory NST(31)	38,04	33,28	33,27	38,05	38,05	33,28	38,04	33,28	38,06
average inventory NST(32)	316,82	252,31	252,55	317,05	317,08	252,51	316,85	252,36	319,36
average shipment WH(11)	72,21	72,41	72,22	72,39	72,38	72,28	72,24	72,39	72,30
average shipment WH(12)	312,83	312,55	312,56	312,71	312,85	312,79	312,95	312,67	311,55
average shipment WH(13)	90,97	91,13	90,98	91,15	91,15	90,95	90,93	91,13	90,37
average shipment WH(21)	325,51	322,97	323,19	325,30	325,35	323,21	325,52	323,09	322,24
average shipment WH(22)	56,02	56,14	56,02	56,14	56,14	56,02	56,02	56,14	55,44
average shipment WH(23)	63,08	63,18	63,07	63,19	63,18	63,03	63,05	63,15	62,90
average shipment WH(31)	28,31	28,36	28,32	28,35	28,35	28,33	28,33	28,36	28,08
average shipment WH(32)	210,13	209,68	209,70	210,13	210,13	209,71	210,11	209,68	207,64
average inventory WH(11)	214,69	210,29	212,99	212,19	218,26	218,88	220,64	216,44	224,86
average inventory WH(12)	355,06	351,67	345,70	361,18	366,76	352,63	360,91	357,95	426,76
average inventory WH(13)	226,11	218,59	226,47	219,80	219,43	226,51	226,64	218,22	244,08
average inventory WH(21)	350,78	342,17	340,46	352,56	355,88	343,93	353,98	345,85	394,49
average inventory WH(22)	215,28	201,01	215,26	201,01	200,98	215,23	215,25	200,98	236,32
average inventory WH(23)	194,96	194,61	194,25	195,19	198,84	197,31	197,96	198,23	213,12
average inventory WH(31)	237,21	233,17	236,60	234,29	233,15	235,67	236,17	232,18	238,95
average inventory WH(32)	311,58	322,52	320,81	311,73	311,59	321,26	311,40	322,26	406,40

Table C.18. Daily outputs of 3 stores with transfer in no discount period

transfer , no discount									
z values of AHL store	7 DAYS	7 DAYS	7 DAYS	7 DAYS	7 DAYS	6 DAYS	6 DAYS	6 DAYS	6 DAYS
z values of ERENKOY store	8 DAYS	7 DAYS	8 DAYS	7 DAYS	7 DAYS	7 DAYS	8 DAYS	8 DAYS	7 DAYS
z values of NST store	6 DAYS	5 DAYS	5 DAYS	6 DAYS	7 DAYS	6 DAYS	5 DAYS	6 DAYS	5 DAYS
transfer EAHL(11)	1,45	1,20	1,67	1,12	1,10	1,15	1,74	1,68	1,21
transfer NAHL(11)	0,68	0,54	0,57	0,68	0,75	0,78	0,63	0,76	0,67
transfer EAHL(12)	0,76	0,55	0,80	0,54	0,61	0,51	0,71	0,75	0,58
transfer NAHL(12)	2,23	2,40	2,74	1,81	1,52	2,08	2,64	2,41	2,37
transfer EAHL(13)	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
transfer NAHL(13)	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
transfer EAHL(21)	1,25	1,51	1,22	1,58	1,50	1,48	1,18	1,21	1,38
transfer NAHL(21)	1,24	1,17	1,00	1,27	1,00	1,23	0,94	1,18	1,17
transfer EAHL(22)	0,81	0,61	0,82	0,60	0,62	0,59	0,82	0,81	0,60
transfer NAHL(22)	0,15	0,09	0,12	0,14	0,16	0,14	0,12	0,15	0,09
transfer EAHL(23)	1,60	1,63	1,65	1,60	1,58	1,42	1,58	1,54	1,51
transfer NAHL(23)	0,71	0,65	0,67	0,70	0,70	0,71	0,62	0,75	0,67
transfer EAHL(31)	1,13	1,02	1,15	0,99	0,96	1,03	1,17	1,16	1,03
transfer NAHL(31)	0,38	0,33	0,33	0,45	0,51	0,41	0,32	0,39	0,32
transfer EAHL(32)	0,22	0,19	0,19	0,20	0,20	0,20	0,19	0,21	0,18
transfer NAHL(32)	0,16	0,25	0,26	0,14	0,12	0,14	0,24	0,16	0,26
average shipment AHL(11)	20,52	21,05	20,40	20,90	20,98	20,98	20,41	20,54	20,89
average shipment AHL(12)	62,38	61,52	62,00	62,14	62,65	65,54	65,28	65,50	65,51
average shipment AHL(13)	6,26	6,25	6,24	6,29	6,30	6,29	6,24	6,26	6,25
average shipment AHL(21)	63,39	63,76	63,84	63,62	63,74	66,34	66,73	66,10	66,66
average shipment AHL(22)	7,06	7,29	7,12	7,27	7,20	7,27	7,09	7,03	7,29
average shipment AHL(23)	29,85	29,77	29,73	29,73	29,92	30,25	30,33	30,17	30,20
average shipment AHL(31)	8,68	8,86	8,70	8,74	8,72	8,17	8,16	8,11	8,25
average shipment AHL(32)	5,71	5,66	5,63	5,80	5,87	5,63	5,42	5,53	5,46
average return AHL(11)	2,29	2,19	2,38	2,15	2,16	2,38	2,29	2,42	2,34
average return AHL(12)	3,61	2,74	3,53	2,87	2,67	3,77	3,99	4,16	3,82
average return AHL(13)	0,66	0,62	0,62	0,67	0,59	0,67	0,62	0,66	0,62
average return AHL(21)	1,75	1,90	1,73	1,99	2,02	2,34	2,12	2,09	2,44
average return AHL(22)	0,54	0,43	0,55	0,46	0,46	0,45	0,54	0,53	0,42
average return AHL(23)	3,94	3,70	3,85	3,93	3,92	3,98	4,05	3,98	4,00
average return AHL(31)	2,29	2,24	2,30	2,23	2,22	1,92	1,94	1,98	1,90
average return AHL(32)	0,58	0,71	0,72	0,60	0,60	0,61	0,66	0,57	0,68
average sales AHL(11,1)	16,35	16,35	16,35	16,35	16,35	16,32	16,31	16,32	16,32
average sales AHL(12,1)	56,07	56,06	56,06	56,07	56,07	56,01	55,99	56,00	56,00
average sales AHL(13,1)	2,95	2,95	2,95	2,95	2,95	2,95	2,95	2,95	2,95
average sales AHL(21,1)	55,96	55,95	55,94	55,95	55,96	55,83	55,78	55,81	55,81
average sales AHL(22,1)	6,47	6,47	6,47	6,47	6,47	6,47	6,47	6,47	6,47
average sales AHL(23,1)	22,66	22,65	22,66	22,65	22,64	22,51	22,50	22,50	22,49
average sales AHL(31,1)	5,82	5,81	5,81	5,81	5,81	5,81	5,81	5,82	5,81
average sales AHL(32,1)	3,58	3,57	3,56	3,58	3,59	3,57	3,55	3,57	3,57
lost of sales AHL(11)	0,02	0,02	0,02	0,02	0,02	0,05	0,05	0,05	0,05
lost of sales AHL(12)	0,00	0,01	0,01	0,00	0,00	0,06	0,08	0,06	0,07
lost of sales AHL(13)	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
lost of sales AHL(21)	0,04	0,05	0,05	0,04	0,04	0,17	0,22	0,19	0,19
lost of sales AHL(22)	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
lost of sales AHL(23)	0,06	0,08	0,06	0,07	0,08	0,21	0,22	0,22	0,23
lost of sales AHL(31)	0,07	0,07	0,07	0,07	0,07	0,07	0,07	0,07	0,07
lost of sales AHL(32)	0,25	0,27	0,28	0,26	0,25	0,26	0,28	0,27	0,27
average inventory AHL(11)	112,88	112,95	112,83	112,87	113,04	96,20	96,16	96,02	96,32
average inventory AHL(12)	342,92	343,42	343,75	342,79	342,98	302,26	303,70	303,04	303,25
average inventory AHL(13)	71,91	71,95	71,94	71,90	71,93	71,90	71,94	71,91	71,95
average inventory AHL(21)	333,06	334,62	333,47	334,39	333,95	289,49	288,01	288,39	289,83
average inventory AHL(22)	89,13	89,22	89,15	89,22	89,23	89,15	89,08	89,06	89,15
average inventory AHL(23)	154,25	154,30	154,02	154,44	154,45	131,33	131,51	131,56	131,38
average inventory AHL(31)	48,62	48,60	48,59	48,59	48,60	45,60	45,64	45,63	45,60
average inventory AHL(32)	40,59	40,52	40,46	40,46	40,55	39,70	39,71	39,74	39,78
transfer AERENKOY(11)	3,24	3,38	3,16	3,30	3,39	3,21	3,35	3,38	3,16
transfer NERENKOY(11)	1,78	1,47	1,29	1,95	2,31	1,85	1,27	1,64	1,45

transfer AERENKOY(12)	4,35	4,00	4,32	4,08	4,33	6,06	6,38	6,46	6,04
transfer NERENKOY(12)	7,75	9,81	8,97	8,12	6,30	8,19	8,49	7,32	8,99
transfer AERENKOY(13)	2,40	2,36	2,37	2,39	2,48	2,39	2,37	2,40	2,36
transfer NERENKOY(13)	4,68	4,86	4,87	4,66	4,53	4,66	4,87	4,68	4,86
transfer AERENKOY(21)	7,29	7,49	7,36	7,50	7,24	9,48	9,78	9,53	9,61
transfer NERENKOY(21)	12,47	13,15	12,87	12,28	10,84	12,18	12,86	12,39	13,36

z values of AHL store	7 DAYS	7 DAYS	7 DAYS	7 DAYS	7 DAYS	6 DAYS	6 DAYS	6 DAYS	6 DAYS
z values of ERENKOY store	8 DAYS	7 DAYS	8 DAYS	7 DAYS	7 DAYS	7 DAYS	8 DAYS	8 DAYS	7 DAYS
z values of NST store	6 DAYS	5 DAYS	5 DAYS	6 DAYS	7 DAYS	6 DAYS	5 DAYS	6 DAYS	5 DAYS
transfer AERENKOY(22)	0,86	0,92	0,91	0,92	0,89	0,92	0,90	0,84	0,93
transfer NERENKOY(22)	1,44	1,34	1,14	1,63	1,96	1,63	1,15	1,44	1,33
transfer AERENKOY(23)	4,56	4,67	4,57	4,53	4,61	4,75	4,98	4,95	4,76
transfer NERENKOY(23)	1,93	1,69	1,69	2,03	2,22	1,96	1,63	1,87	1,75
transfer AERENKOY(31)	1,55	1,65	1,56	1,60	1,60	1,42	1,43	1,39	1,45
transfer NERENKOY(31)	0,84	0,73	0,65	0,92	1,07	0,94	0,67	0,86	0,75
transfer AERENKOY(32)	1,78	1,65	1,67	1,78	1,84	1,63	1,51	1,65	1,51
transfer NERENKOY(32)	6,87	9,67	9,83	6,65	5,78	6,85	10,07	6,82	9,65
average shipment ERENKOY(11)	25,48	23,59	26,22	23,16	22,68	23,29	25,93	25,56	23,86
average shipment ERENKOY(12)	36,65	34,30	35,91	35,73	37,16	33,51	34,04	34,78	32,91
average shipment ERENKOY(13)	119,90	120,15	120,14	119,93	119,85	119,93	120,14	119,90	120,15
average shipment ERENKOY(21)	118,97	120,01	118,84	120,76	122,45	118,97	116,47	117,03	117,67
average shipment ERENKOY(22)	42,03	40,42	42,32	40,09	39,93	40,07	42,34	42,05	40,41
average shipment ERENKOY(23)	25,04	25,23	25,34	25,04	24,84	24,66	24,73	24,54	24,81
average shipment ERENKOY(31)	14,43	13,67	14,64	13,43	13,33	13,59	14,78	14,56	13,83
average shipment ERENKOY(32)	113,90	113,94	112,26	115,38	116,45	115,44	112,27	114,26	114,05
average return ERENKOY(11)	3,95	2,38	3,89	2,33	2,28	2,31	3,72	3,70	2,38
average return ERENKOY(12)	1,91	1,63	2,17	1,59	1,27	1,57	2,10	1,84	1,59
average return ERENKOY(13)	4,64	4,75	4,74	4,65	4,27	4,65	4,74	4,64	4,75
average return ERENKOY(21)	3,25	4,38	3,40	4,27	4,30	4,43	3,42	3,52	4,45
average return ERENKOY(22)	5,10	3,66	5,12	3,64	3,59	3,63	5,13	5,10	3,64
average return ERENKOY(23)	2,46	2,37	2,43	2,46	2,42	2,47	2,36	2,48	2,30
average return ERENKOY(31)	4,16	3,55	4,19	3,47	3,51	3,38	4,17	4,08	3,48
average return ERENKOY(32)	5,74	8,15	7,09	6,52	6,63	6,52	7,15	5,84	7,97
average sales ERENKOY(11,1)	23,24	23,24	23,24	23,24	23,24	23,24	23,24	23,24	23,24
average sales ERENKOY(12,1)	43,61	43,61	43,61	43,61	43,61	43,61	43,61	43,61	43,61
average sales ERENKOY(13,1)	120,94	120,85	120,86	120,90	121,07	120,90	120,86	120,94	120,85
average sales ERENKOY(21,1)	131,75	131,49	131,71	131,47	131,48	131,52	131,75	131,71	131,54
average sales ERENKOY(22,1)	36,59	36,59	36,59	36,59	36,59	36,59	36,59	36,59	36,59
average sales ERENKOY(23,1)	26,11	26,09	26,11	26,09	26,10	26,10	26,11	26,11	26,10
average sales ERENKOY(31,1)	10,44	10,40	10,44	10,40	10,41	10,40	10,44	10,44	10,40
average sales ERENKOY(32,1)	114,39	114,39	114,39	114,39	114,37	114,39	114,39	114,39	114,39
lost of sales ERENKOY(11)	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
lost of sales ERENKOY(12)	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
lost of sales ERENKOY(13)	2,47	2,56	2,55	2,51	2,34	2,51	2,55	2,47	2,56
lost of sales ERENKOY(21)	0,08	0,34	0,12	0,35	0,35	0,30	0,08	0,11	0,29
lost of sales ERENKOY(22)	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
lost of sales ERENKOY(23)	0,00	0,02	0,01	0,02	0,01	0,01	0,00	0,00	0,01
lost of sales ERENKOY(31)	0,05	0,08	0,05	0,09	0,08	0,09	0,05	0,05	0,09
lost of sales ERENKOY(32)	0,00	0,00	0,00	0,00	0,02	0,01	0,00	0,00	0,00
average inventory ERENKOY(11)	182,22	160,61	182,16	160,55	160,67	160,74	182,27	182,43	160,70
average inventory ERENKOY(12)	325,92	285,38	325,35	285,50	286,22	286,50	326,75	327,37	286,41
average inventory ERENKOY(13)	345,29	345,28	345,25	345,21	346,07	345,21	345,25	345,29	345,28
average inventory ERENKOY(21)	777,82	734,40	778,60	733,47	733,27	736,00	780,74	780,22	735,90
average inventory ERENKOY(22)	281,63	248,33	281,60	248,25	248,47	248,26	281,60	281,63	248,33
average inventory ERENKOY(23)	199,78	177,87	199,87	178,00	178,06	177,76	199,81	199,93	177,79
average inventory ERENKOY(31)	83,55	73,02	83,53	73,00	73,03	72,98	83,60	83,69	72,99
average inventory ERENKOY(32)	685,19	665,09	685,94	663,36	662,74	663,35	685,95	684,99	664,96
transfer ANST(11)	0,82	0,92	0,79	0,96	0,98	1,03	0,85	0,89	0,95
transfer ANST(12)	1,94	1,68	1,94	1,77	1,80	1,68	1,92	2,00	1,67
transfer ANST(13)	1,04	1,37	1,35	1,20	1,44	1,93	1,91	1,68	2,23
transfer ENST(12)	2,43	2,18	2,52	2,10	2,21	1,95	2,42	2,33	2,06
transfer ANST(13)	0,23	0,29	0,29	0,24	0,25	0,24	0,29	0,23	0,29
transfer ENST(13)	0,96	1,36	1,36	0,99	1,06	0,99	1,36	0,96	1,36
transfer ANST(21)	0,51	0,77	0,69	0,70	0,68	1,05	0,83	0,69	1,03
transfer ENST(21)	1,89	2,71	2,28	2,54	2,59	2,52	2,19	1,86	2,68
transfer ANST(22)	0,13	0,14	0,11	0,14	0,14	0,14	0,11	0,13	0,14
transfer ENST(22)	1,80	1,77	1,80	1,75	1,89	1,76	1,81	1,80	1,77
transfer ANST(23)	1,00	1,02	0,95	0,90	0,99	1,15	1,02	1,04	1,13
transfer ENST(23)	1,38	1,43	1,46	1,44	1,54	1,33	1,29	1,25	1,36
transfer ANST(31)	0,53	0,49	0,50	0,52	0,56	0,45	0,45	0,47	0,43
transfer ENST(31)	1,10	1,08	1,09	1,10	1,14	1,15	1,14	1,16	1,12
transfer ANST(32)	0,12	0,14	0,10	0,15	0,14	0,14	0,10	0,11	0,12
transfer ENST(32)	1,49	1,66	1,31	1,89	2,08	2,01	1,32	1,54	1,79

z values of AHL store	7 DAYS	7 DAYS	7 DAYS	7 DAYS	7 DAYS	6 DAYS	6 DAYS	6 DAYS	6 DAYS
z values of ERENKOY store	8 DAYS	7 DAYS	8 DAYS	7 DAYS	7 DAYS	7 DAYS	8 DAYS	8 DAYS	7 DAYS
z values of NST store	6 DAYS	5 DAYS	5 DAYS	6 DAYS	7 DAYS	6 DAYS	5 DAYS	6 DAYS	5 DAYS
average shipment NST(11)	19,12	18,08	18,14	19,00	19,66	19,11	18,00	18,91	18,15
average shipment NST(12)	102,26	104,38	105,86	100,94	94,86	100,68	104,54	101,30	103,11
average shipment NST(13)	36,17	35,49	35,51	36,14	35,38	36,14	35,51	36,17	35,49
average shipment NST(21)	67,79	66,68	66,43	67,47	65,00	66,77	66,33	67,44	66,44
average shipment NST(22)	17,84	16,97	17,17	17,59	17,87	17,59	17,18	17,85	16,95
average shipment NST(23)	11,82	11,16	11,34	11,85	11,95	11,74	11,28	11,93	11,25
average shipment NST(31)	5,97	5,64	5,60	6,07	6,49	6,03	5,61	6,00	5,65
average shipment NST(32)	83,26	87,51	88,22	82,61	81,02	82,97	88,44	83,30	87,42
average return NST(11)	2,11	1,37	1,70	1,79	2,04	1,84	1,55	2,07	1,32
average return NST(12)	8,22	8,26	10,66	6,77	3,14	6,75	10,45	8,02	8,69
average return NST(13)	1,91	1,57	1,58	1,93	1,40	1,93	1,58	1,91	1,57
average return NST(21)	3,53	3,42	3,07	4,21	3,26	3,98	3,03	3,43	3,21
average return NST(22)	1,51	0,75	1,15	1,04	1,11	1,04	1,16	1,52	0,75
average return NST(23)	1,46	1,22	1,33	1,40	1,49	1,48	1,29	1,54	1,25
average return NST(31)	1,30	1,09	1,14	1,26	1,53	1,20	1,13	1,29	1,07
average return NST(32)	4,80	6,69	6,81	4,81	4,21	5,06	6,82	4,92	6,72
average sales NST(11,1)	17,29	17,29	17,29	17,29	17,29	17,29	17,29	17,29	17,29
average sales NST(12,1)	87,07	87,00	86,96	87,08	87,11	87,10	86,96	87,11	86,97
average sales NST(13,1)	30,53	30,51	30,51	30,53	30,53	30,53	30,51	30,53	30,51
average sales NST(21,1)	52,74	52,15	52,21	52,74	52,95	52,73	52,24	52,76	52,13
average sales NST(22,1)	16,63	16,63	16,63	16,63	16,63	16,63	16,63	16,63	16,63
average sales NST(23,1)	10,06	10,05	10,05	10,06	10,08	10,07	10,06	10,06	10,05
average sales NST(31,1)	5,11	5,10	5,10	5,11	5,11	5,11	5,10	5,10	5,10
average sales NST(32,1)	72,44	72,18	72,20	72,46	72,48	72,46	72,20	72,45	72,17
lost of sales NST(11)	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
lost of sales NST(12)	0,04	0,11	0,15	0,03	0,00	0,02	0,15	0,00	0,14
lost of sales NST(13)	0,00	0,02	0,02	0,00	0,00	0,00	0,02	0,00	0,02
lost of sales NST(21)	0,27	0,86	0,79	0,27	0,06	0,27	0,77	0,25	0,88
lost of sales NST(22)	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
lost of sales NST(23)	0,02	0,03	0,03	0,02	0,00	0,01	0,02	0,02	0,03
lost of sales NST(31)	0,05	0,06	0,06	0,05	0,05	0,05	0,06	0,05	0,06
lost of sales NST(32)	0,04	0,30	0,28	0,02	0,00	0,02	0,28	0,03	0,31
average inventory NST(11)	106,33	97,74	97,57	106,43	120,29	106,64	97,56	106,36	97,81
average inventory NST(12)	475,10	384,87	384,85	475,65	565,07	475,76	385,71	476,14	385,97
average inventory NST(13)	173,32	142,75	142,73	173,40	204,52	173,40	142,73	173,32	142,75
average inventory NST(21)	270,68	216,31	216,86	271,33	326,70	271,26	217,02	270,92	216,60
average inventory NST(22)	110,27	108,47	107,97	110,90	118,48	110,90	107,97	110,26	108,47
average inventory NST(23)	59,98	52,36	52,28	60,12	69,35	60,09	52,31	60,05	52,35
average inventory NST(31)	35,23	32,74	32,74	35,25	38,56	35,28	32,76	35,25	32,76
average inventory NST(32)	339,99	311,29	311,79	339,98	346,01	339,91	311,47	339,97	311,54
average shipment WH(11)	56,73	56,82	56,71	56,89	56,86	56,86	56,75	56,70	56,76
average shipment WH(12)	186,97	186,97	186,88	187,03	187,11	187,09	186,74	186,89	186,85
average shipment WH(13)	154,42	154,23	154,24	154,40	154,55	154,40	154,24	154,42	154,23
average shipment WH(21)	240,77	240,10	240,25	240,68	241,03	240,62	240,15	240,63	239,94
average shipment WH(22)	59,55	59,60	59,57	59,62	59,67	59,62	59,57	59,55	59,60
average shipment WH(23)	58,68	58,72	58,64	58,68	58,74	58,64	58,56	58,58	58,61
average shipment WH(31)	21,31	21,28	21,33	21,27	21,27	21,26	21,30	21,26	21,26
average shipment WH(32)	190,31	190,04	190,10	190,41	190,58	190,39	190,11	190,31	189,99
average inventory WH(11)	241,53	232,46	241,59	233,44	233,52	234,01	241,64	241,38	233,18
average inventory WH(12)	293,72	291,10	296,61	288,44	277,81	294,66	301,71	299,23	296,90
average inventory WH(13)	252,56	253,25	253,28	252,44	250,07	252,44	253,28	252,56	253,25
average inventory WH(21)	315,90	325,08	312,79	327,38	324,02	329,98	317,04	318,82	328,30
average inventory WH(22)	232,64	216,13	231,78	216,95	216,66	216,92	231,82	232,68	216,13
average inventory WH(23)	219,67	216,73	219,13	217,69	217,45	220,38	220,47	220,80	218,92
average inventory WH(31)	251,72	246,71	250,39	247,82	249,35	246,82	249,18	249,94	245,73
average inventory WH(32)	309,82	336,24	327,80	319,90	317,15	320,29	327,64	310,45	335,27

Table C.19. Daily outputs of 3 stores with transfer in 12 % discount period

transfer , 12 % discount									
z values of AHL store	6 DAYS	6 DAYS	6 DAYS	6 DAYS	5 DAYS	5 DAYS	5 DAYS	5 DAYS	5 DAYS
z values of ERENKOY store	8 DAYS	7 DAYS	8 DAYS	7 DAYS	7 DAYS	8 DAYS	8 DAYS	7 DAYS	5 DAYS
z values of NST store	5 DAYS	4 DAYS	4 DAYS	5 DAYS	5 DAYS	4 DAYS	5 DAYS	4 DAYS	5 DAYS
transfer EAHL(11)	1,71	1,13	1,73	1,05	0,93	1,46	1,42	0,83	0,90
transfer NAHL(11)	0,60	0,34	0,48	0,51	0,40	0,39	0,49	0,29	0,35
transfer EAHL(12)	0,20	0,31	0,24	0,30	0,24	0,20	0,24	0,22	1,58
transfer NAHL(12)	0,43	0,28	0,17	0,39	0,41	0,14	0,37	0,28	0,32
transfer EAHL(13)	0,78	0,69	0,79	0,67	0,68	0,73	0,76	0,78	0,93
transfer NAHL(13)	0,53	0,58	0,51	0,46	0,45	0,50	0,54	0,58	0,28
transfer EAHL(21)	0,39	0,41	0,34	0,47	0,46	0,31	0,34	0,38	2,01
transfer NAHL(21)	0,61	0,44	0,42	0,58	0,60	0,57	0,64	0,61	0,92
transfer EAHL(22)	1,05	0,73	1,05	0,73	0,73	1,04	1,04	0,73	1,24
transfer NAHL(22)	0,09	0,10	0,09	0,10	0,10	0,09	0,09	0,10	0,09
transfer EAHL(23)	1,23	1,11	1,32	1,10	1,02	1,11	1,15	1,12	1,29
transfer NAHL(23)	0,58	0,49	0,50	0,59	0,52	0,46	0,59	0,50	0,38
transfer EAHL(31)	1,09	0,95	1,07	0,92	0,90	1,00	0,99	0,89	1,03
transfer NAHL(31)	0,44	0,34	0,35	0,43	0,40	0,32	0,40	0,32	0,42
transfer EAHL(32)	0,08	0,10	0,08	0,09	0,09	0,08	0,08	0,09	0,19
transfer NAHL(32)	0,05	0,06	0,07	0,05	0,05	0,06	0,05	0,06	0,06
average shipment AHL(11)	33,39	33,77	33,43	33,93	36,62	36,00	35,79	36,52	36,96
average shipment AHL(12)	71,59	71,63	71,37	71,52	75,25	75,33	75,42	75,04	76,68
average shipment AHL(13)	20,14	19,90	19,99	20,15	20,14	20,06	20,02	19,83	21,22
average shipment AHL(21)	88,81	88,30	88,26	88,71	90,03	89,66	90,07	89,51	90,12
average shipment AHL(22)	8,51	8,84	8,51	8,83	8,82	8,51	8,51	8,83	8,47
average shipment AHL(23)	29,35	29,70	29,41	29,63	31,13	31,04	30,76	31,03	31,70
average shipment AHL(31)	8,51	8,68	8,60	8,65	8,22	8,16	8,12	8,29	7,92
average shipment AHL(32)	4,27	4,31	4,31	4,30	4,26	4,29	4,25	4,28	4,31
average return AHL(11)	1,49	1,34	1,42	1,42	2,59	2,36	2,31	2,28	2,83
average return AHL(12)	0,53	0,54	0,34	0,59	0,97	0,63	0,98	0,87	3,75
average return AHL(13)	1,16	0,96	1,03	1,12	1,06	1,01	1,11	0,96	1,89
average return AHL(21)	0,36	0,19	0,17	0,39	0,41	0,15	0,41	0,17	1,49
average return AHL(22)	0,36	0,29	0,35	0,29	0,28	0,35	0,35	0,29	0,58
average return AHL(23)	1,75	1,84	1,87	1,86	2,45	2,55	2,33	2,44	3,35
average return AHL(31)	1,37	1,28	1,37	1,30	1,15	1,19	1,19	1,15	1,09
average return AHL(32)	0,31	0,32	0,32	0,31	0,29	0,31	0,31	0,32	0,57
average sales AHL(11,1)	31,10	31,10	31,10	31,10	31,10	31,10	31,10	31,10	31,09
average sales AHL(12,1)	67,55	67,55	67,55	67,55	67,54	67,53	67,54	67,54	67,51
average sales AHL(13,1)	17,60	17,60	17,60	17,60	17,60	17,59	17,60	17,60	17,60
average sales AHL(21,1)	86,64	86,64	86,64	86,64	86,61	86,62	86,61	86,62	86,59
average sales AHL(22,1)	8,20	8,20	8,20	8,20	8,20	8,20	8,20	8,20	8,20
average sales AHL(23,1)	26,00	26,00	26,00	26,00	25,99	25,98	25,99	25,99	25,98
average sales AHL(31,1)	6,82	6,82	6,82	6,82	6,81	6,81	6,81	6,81	6,82
average sales AHL(32,1)	3,22	3,22	3,22	3,22	3,22	3,22	3,22	3,22	3,22
lost of sales AHL(11)	0,00	0,00	0,00	0,00	0,01	0,01	0,01	0,00	0,01
lost of sales AHL(12)	0,00	0,00	0,00	0,00	0,01	0,02	0,01	0,01	0,03
lost of sales AHL(13)	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
lost of sales AHL(21)	0,00	0,00	0,00	0,00	0,03	0,02	0,03	0,02	0,05
lost of sales AHL(22)	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
lost of sales AHL(23)	0,00	0,00	0,00	0,00	0,01	0,01	0,01	0,01	0,02
lost of sales AHL(31)	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
lost of sales AHL(32)	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
average inventory AHL(11)	177,02	177,39	176,97	177,37	150,99	150,94	150,69	151,17	150,41
average inventory AHL(12)	342,97	343,33	343,69	343,05	289,35	290,19	289,62	289,93	295,37
average inventory AHL(13)	102,06	102,45	102,14	102,48	85,74	85,42	85,35	85,68	84,21
average inventory AHL(21)	352,94	353,66	353,56	353,08	336,70	336,27	336,81	336,45	340,18
average inventory AHL(22)	89,31	89,43	89,31	89,42	89,40	89,28	89,28	89,40	88,77
average inventory AHL(23)	152,90	152,98	152,88	153,03	125,87	125,72	125,66	125,90	124,53
average inventory AHL(31)	46,43	46,43	46,43	46,43	43,17	43,16	43,16	43,17	43,17
average inventory AHL(32)	38,60	38,53	38,52	38,57	38,49	38,44	38,50	38,44	38,42
transfer AERENKOY(11)	2,51	2,23	2,50	2,30	3,22	3,38	3,32	3,20	3,05
transfer NERENKOY(11)	1,24	1,02	0,93	1,31	1,36	0,88	1,11	0,94	1,48

transfer AERENKOY(12)	3,27	3,27	3,09	3,30	6,07	6,26	6,32	5,91	5,31
transfer NERENKOY(12)	11,46	10,19	10,06	11,32	11,54	10,52	11,73	10,70	9,70
transfer AERENKOY(13)	2,14	2,00	2,09	2,03	2,05	2,12	2,07	2,05	2,17
transfer NERENKOY(13)	3,86	4,01	3,95	3,79	3,69	3,96	3,77	4,06	3,19
transfer AERENKOY(21)	1,93	1,54	1,43	1,89	3,16	2,89	3,12	2,77	3,61
transfer NERENKOY(21)	17,50	14,22	14,14	17,45	17,48	14,42	17,55	14,47	19,34

z values of AHL store	6 DAYS	6 DAYS	6 DAYS	6 DAYS	5 DAYS	5 DAYS	5 DAYS	5 DAYS	5 DAYS
z values of ERENKOY store	8 DAYS	7 DAYS	8 DAYS	7 DAYS	7 DAYS	8 DAYS	8 DAYS	7 DAYS	5 DAYS
z values of NST store	5 DAYS	4 DAYS	4 DAYS	5 DAYS	5 DAYS	4 DAYS	5 DAYS	4 DAYS	5 DAYS
transfer AERENKOY(22)	0,99	1,04	0,99	1,04	1,04	1,00	0,99	1,04	0,86
transfer NERENKOY(22)	0,84	0,95	0,83	0,96	0,95	0,82	0,83	0,95	0,86
transfer AERENKOY(23)	2,65	2,64	2,67	2,65	3,30	3,18	3,30	3,31	2,84
transfer NERENKOY(23)	2,13	1,71	1,72	2,11	2,15	1,65	2,07	1,67	1,93
transfer AERENKOY(31)	1,42	1,52	1,46	1,50	1,20	1,14	1,13	1,21	1,17
transfer NERENKOY(31)	0,92	0,84	0,69	1,06	1,06	0,68	0,93	0,85	1,01
transfer AERENKOY(32)	0,79	0,78	0,78	0,81	0,79	0,75	0,77	0,75	0,65
transfer NERENKOY(32)	4,94	6,99	6,60	4,85	4,87	6,67	4,83	6,95	4,32
average shipment ERENKOY(11)	25,71	24,68	26,04	24,23	23,45	25,00	25,03	23,63	23,38
average shipment ERENKOY(12)	131,54	133,87	133,08	132,74	129,65	129,46	128,31	130,60	152,92
average shipment ERENKOY(13)	42,25	42,22	42,12	42,47	42,57	41,94	42,42	42,27	46,59
average shipment ERENKOY(21)	153,72	156,84	156,83	154,09	152,79	155,07	152,44	155,43	159,20
average shipment ERENKOY(22)	38,46	35,80	38,48	35,80	35,80	38,49	38,47	35,80	40,33
average shipment ERENKOY(23)	25,85	26,23	26,31	25,82	25,12	25,68	25,11	25,57	27,30
average shipment ERENKOY(31)	17,94	17,09	18,17	16,84	17,13	18,53	18,25	17,40	17,59
average shipment ERENKOY(32)	136,06	136,32	136,70	136,22	136,28	136,56	136,26	136,54	151,86
average return ERENKOY(11)	1,90	1,19	1,86	1,20	1,59	2,01	2,29	1,44	1,56
average return ERENKOY(12)	0,99	1,03	0,73	1,42	1,42	0,85	1,05	1,17	15,34
average return ERENKOY(13)	2,39	2,20	2,19	2,32	2,28	2,13	2,39	2,28	5,71
average return ERENKOY(21)	1,11	0,60	0,60	1,23	1,25	0,61	1,11	0,66	5,82
average return ERENKOY(22)	4,06	2,26	4,06	2,26	2,25	4,07	4,06	2,25	5,60
average return ERENKOY(23)	1,30	1,42	1,29	1,36	1,55	1,40	1,36	1,51	2,48
average return ERENKOY(31)	3,68	3,03	3,76	2,96	2,99	3,87	3,78	3,10	3,47
average return ERENKOY(32)	5,60	6,86	6,76	5,53	5,57	6,75	5,63	6,92	17,85
average sales ERENKOY(11,1)	24,18	24,18	24,18	24,18	24,18	24,18	24,18	24,18	24,18
average sales ERENKOY(12,1)	143,45	143,45	143,45	143,45	143,45	143,45	143,45	143,45	142,81
average sales ERENKOY(13,1)	42,88	42,88	42,88	42,88	42,88	42,88	42,88	42,88	42,38
average sales ERENKOY(21,1)	169,59	169,50	169,61	169,48	169,50	169,61	169,60	169,52	167,30
average sales ERENKOY(22,1)	33,24	33,24	33,24	33,24	33,24	33,24	33,24	33,24	32,63
average sales ERENKOY(23,1)	26,74	26,74	26,74	26,74	26,74	26,74	26,74	26,74	26,54
average sales ERENKOY(31,1)	14,31	14,30	14,31	14,30	14,30	14,31	14,31	14,30	14,08
average sales ERENKOY(32,1)	134,24	134,25	134,25	134,25	134,25	134,25	134,24	134,25	133,15
lost of sales ERENKOY(11)	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
lost of sales ERENKOY(12)	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,64
lost of sales ERENKOY(13)	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,50
lost of sales ERENKOY(21)	0,02	0,11	0,00	0,12	0,11	0,00	0,01	0,09	2,31
lost of sales ERENKOY(22)	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,61
lost of sales ERENKOY(23)	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,20
lost of sales ERENKOY(31)	0,00	0,02	0,01	0,02	0,02	0,00	0,00	0,02	0,23
lost of sales ERENKOY(32)	0,01	0,00	0,00	0,00	0,00	0,00	0,01	0,00	1,10
average inventory ERENKOY(11)	188,79	165,81	188,89	165,74	165,45	188,93	188,88	165,52	128,29
average inventory ERENKOY(12)	891,35	859,47	892,00	858,33	860,75	894,47	893,93	861,23	579,63
average inventory ERENKOY(13)	328,12	289,97	327,91	289,53	289,56	328,34	328,43	289,88	192,54
average inventory ERENKOY(21)	756,19	749,75	756,50	749,37	751,12	758,43	757,89	751,67	627,14
average inventory ERENKOY(22)	258,84	228,40	258,85	228,40	228,41	258,85	258,85	228,41	152,46
average inventory ERENKOY(23)	207,08	183,56	207,19	183,52	182,99	206,77	206,61	182,91	126,77
average inventory ERENKOY(31)	115,01	100,16	114,98	100,16	100,13	114,98	114,98	100,22	70,50
average inventory ERENKOY(32)	680,68	679,11	680,28	679,38	679,60	680,35	680,68	678,86	570,13
transfer ANST(11)	0,49	0,51	0,51	0,59	0,94	0,92	0,90	0,96	1,06
transfer ENST(11)	1,69	1,43	1,73	1,40	1,30	1,66	1,61	1,30	1,34
transfer ANST(12)	0,42	0,42	0,36	0,33	0,81	0,72	0,67	0,73	1,26
transfer ENST(12)	1,19	2,16	1,40	1,81	1,87	1,39	1,22	2,00	7,77
transfer ANST(13)	0,46	0,53	0,48	0,46	0,47	0,46	0,45	0,48	0,63
transfer ENST(13)	2,21	2,40	2,31	2,33	2,41	2,31	2,27	2,39	3,07
transfer ANST(21)	0,30	0,25	0,22	0,27	0,30	0,31	0,30	0,36	0,77
transfer ENST(21)	1,19	1,26	0,98	1,40	1,33	0,97	1,19	1,22	6,18
transfer ANST(22)	0,07	0,10	0,07	0,10	0,10	0,07	0,07	0,10	0,13
transfer ENST(22)	1,98	1,64	1,99	1,63	1,64	1,99	1,98	1,64	2,85
transfer ANST(23)	0,66	0,71	0,59	0,72	0,86	0,78	0,80	0,80	1,09
transfer ENST(23)	1,35	1,21	1,34	1,28	1,20	1,24	1,23	1,13	1,77
transfer ANST(31)	0,41	0,36	0,36	0,38	0,34	0,32	0,35	0,31	0,28
transfer ENST(31)	1,24	1,19	1,21	1,25	1,23	1,19	1,26	1,19	1,28
transfer ANST(32)	0,05	0,12	0,12	0,06	0,06	0,12	0,05	0,11	0,10
transfer ENST(32)	0,89	1,71	1,78	1,03	1,04	1,71	0,93	1,76	4,60

z values of AHL store	6 DAYS	6 DAYS	6 DAYS	6 DAYS	5 DAYS	5 DAYS	5 DAYS	5 DAYS	5 DAYS
z values of ERENKOY store	8 DAYS	7 DAYS	8 DAYS	7 DAYS	7 DAYS	8 DAYS	8 DAYS	7 DAYS	5 DAYS
z values of NST store	5 DAYS	4 DAYS	4 DAYS	5 DAYS	5 DAYS	4 DAYS	5 DAYS	4 DAYS	5 DAYS
average shipment NST(11)	17,76	17,11	16,94	17,89	17,70	16,58	17,34	16,86	17,61
average shipment NST(12)	113,16	109,51	110,04	112,40	112,10	110,17	113,19	109,97	106,59
average shipment NST(13)	34,93	34,31	34,57	34,23	34,17	34,59	34,70	34,42	33,24
average shipment NST(21)	86,26	79,51	79,80	85,99	86,29	80,34	86,51	80,07	84,57
average shipment NST(22)	14,36	14,58	14,34	14,58	14,57	14,33	14,35	14,57	13,62
average shipment NST(23)	11,86	11,38	11,37	11,93	11,82	11,21	11,80	11,31	10,75
average shipment NST(31)	8,28	8,03	7,93	8,37	8,41	8,00	8,32	8,08	8,36
average shipment NST(32)	80,29	81,26	80,76	80,03	79,95	80,87	80,20	81,15	78,47
average return NST(11)	0,95	0,51	0,62	0,90	1,01	0,70	1,08	0,69	1,00
average return NST(12)	1,45	0,52	0,37	1,39	1,45	0,51	1,61	0,68	3,76
average return NST(13)	2,18	1,60	1,86	1,70	1,82	1,86	2,06	1,59	2,37
average return NST(21)	0,91	0,42	0,35	0,99	1,13	0,41	1,03	0,49	2,67
average return NST(22)	0,59	0,35	0,59	0,35	0,35	0,59	0,59	0,35	0,78
average return NST(23)	0,76	0,70	0,69	0,81	0,80	0,72	0,76	0,67	0,90
average return NST(31)	1,32	1,14	1,22	1,25	1,26	1,25	1,35	1,16	1,26
average return NST(32)	3,41	3,50	3,46	3,36	3,28	3,41	3,44	3,47	5,95
average sales NST(11,1)	17,13	17,13	17,13	17,13	17,13	17,13	17,13	17,13	17,13
average sales NST(12,1)	100,98	100,58	100,67	100,96	100,92	100,60	100,97	100,57	100,99
average sales NST(13,1)	30,94	30,91	30,91	30,94	30,94	30,89	30,94	30,92	30,94
average sales NST(21,1)	68,33	65,53	65,67	68,21	68,27	65,78	68,33	65,66	68,17
average sales NST(22,1)	14,83	14,83	14,83	14,83	14,83	14,83	14,83	14,83	14,83
average sales NST(23,1)	10,37	10,35	10,36	10,36	10,35	10,36	10,37	10,35	10,36
average sales NST(31,1)	7,30	7,30	7,29	7,30	7,30	7,30	7,31	7,30	7,30
average sales NST(32,1)	72,19	72,04	72,06	72,18	72,19	72,07	72,21	72,05	72,21
lost of sales NST(11)	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
lost of sales NST(12)	0,05	0,45	0,36	0,07	0,11	0,43	0,06	0,46	0,04
lost of sales NST(13)	0,01	0,03	0,03	0,00	0,01	0,05	0,00	0,02	0,00
lost of sales NST(21)	1,71	4,51	4,37	1,83	1,77	4,26	1,71	4,38	1,87
lost of sales NST(22)	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
lost of sales NST(23)	0,01	0,03	0,02	0,02	0,03	0,02	0,01	0,03	0,03
lost of sales NST(31)	0,02	0,02	0,03	0,02	0,02	0,03	0,02	0,02	0,02
lost of sales NST(32)	0,04	0,19	0,17	0,05	0,05	0,17	0,03	0,19	0,02
average inventory NST(11)	96,02	93,66	93,48	96,32	96,12	93,32	95,91	93,47	95,92
average inventory NST(12)	432,35	331,35	331,85	432,53	433,34	332,98	434,10	332,63	447,02
average inventory NST(13)	147,39	117,01	116,21	148,42	148,27	116,28	147,37	116,95	147,48
average inventory NST(21)	264,73	196,44	196,33	265,07	265,71	196,87	265,51	196,85	274,86
average inventory NST(22)	108,73	109,04	108,71	109,06	109,06	108,71	108,73	109,05	108,41
average inventory NST(23)	53,38	47,62	47,70	53,38	53,23	47,63	53,33	47,52	53,08
average inventory NST(31)	38,03	33,28	33,25	38,05	38,05	33,25	38,04	33,28	38,04
average inventory NST(32)	319,15	254,19	254,34	319,21	319,24	254,32	319,20	254,18	321,42
average shipment WH(11)	72,26	72,40	72,32	72,37	72,41	72,28	72,30	72,46	72,39
average shipment WH(12)	312,67	312,31	312,42	312,59	312,64	312,61	312,89	312,54	312,13
average shipment WH(13)	90,98	91,20	91,02	91,21	91,19	90,96	90,98	91,21	90,63
average shipment WH(21)	325,02	322,25	322,51	324,87	325,01	322,67	325,10	322,45	322,79
average shipment WH(22)	56,05	56,20	56,05	56,20	56,20	56,04	56,05	56,20	55,48
average shipment WH(23)	63,06	63,28	63,05	63,28	63,22	63,06	63,03	63,24	63,02
average shipment WH(31)	28,34	28,35	28,36	28,35	28,33	28,34	28,33	28,34	28,05
average shipment WH(32)	210,17	209,67	209,70	210,12	210,15	209,72	210,20	209,69	208,91
average inventory WH(11)	222,86	215,74	221,29	216,73	224,65	226,23	228,00	223,19	231,95
average inventory WH(12)	360,33	358,10	352,29	366,17	370,60	356,95	364,42	362,93	422,44
average inventory WH(13)	231,15	222,36	231,63	222,29	223,03	231,37	230,57	223,29	249,40
average inventory WH(21)	357,12	344,50	342,61	358,67	361,48	346,59	359,31	348,54	400,58
average inventory WH(22)	222,99	206,12	223,00	206,16	206,09	222,96	222,95	206,08	249,53
average inventory WH(23)	200,69	199,34	200,18	199,57	204,45	203,86	204,18	204,34	218,66
average inventory WH(31)	244,90	239,27	244,17	239,81	239,00	242,66	243,45	238,24	246,26
average inventory WH(32)	311,72	326,25	325,40	312,34	311,80	325,56	311,62	326,53	377,06