

# **Cashier Labor Scheduling In Supermarkets**

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# CASHIER LABOR SCHEDULING IN SUPERMARKETS

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## INTRODUCTION

In 1962, supermarkets had a sales volume of about 38 billion dollars. To service this large volume of business requires a large work force. Since more than 20 percent of total man-hour labor requirements in supermarkets involve check-out operations,<sup>1</sup> any improvement in efficiency in use of such labor should lead to significant savings.

With today's self-service supermarkets, the check-out operators are often the only members of the store personnel to come in contact with the customers. For this reason, along with others, the check-out operation of the store should always be at its best in order to give customers a favorable impression of the store. This impression can be enhanced by proper scheduling of cashiers in order that customers can be serviced promptly or with a minimum time spent in check-out lines.

Recent studies have indicated that check-out operations are causing management at least as much concern as any other phase of supermarket operation. Because of rising labor costs, check-out operation costs have increased. Check-out lanes usually create the only customer bottleneck in the store during the rush periods of the week. It is not uncommon for supermarkets to handle 60-70 percent of their weekly sales volume on Friday and Saturday.<sup>2</sup> These rush periods place a great strain on the check-out operations which, in turn, help create customer impressions. Industry accepts the fact that store sales volume is directly affected by the rapidity with which customers are accurately processed through the check-out operations.<sup>3</sup>

In order to make efficient check-out labor scheduling possible it is necessary to determine considerable detail concerning the pattern of business. The purpose of this study was to collect data concerning volume of business by hour, by day and by week for a representative sample of supermarkets in order to determine the existence of, or lack of, a pattern of business volume. From these determinations it would then be possible to calculate needs and at what management levels such needs could be scheduled most efficiently.

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<sup>1</sup>The Check-Out in Self Service Retail Food Stores, United States Department of Agriculture, Washington, D. C., Agricultural Information Bulletin No. 31, January, 1951, page 3.

<sup>2</sup>Ibid., page 3.

<sup>3</sup>Ibid., page 3.

### Method and Scope of Study

The four supermarkets from which records were secured for this study were located in and near Columbus, Ohio. One supermarket was a member of an independent chain and three were segments of a national chain. In order to protect the identity of the cooperating stores, each supermarket was assigned a code letter A, B, C or D and such designation is used throughout the study. Data were collected from February 1962 to February 1963. Weekly periods were selected which were representative for each store for the year. Weeks which were affected by holidays were excluded as non-representative. It was felt that scheduling of cashier labor for holiday weeks would probably never lend itself to a repeating pattern.

For this study, the head cashier in each store kept the customer count by hour. Dollar volume was then calculated for the same periods from detail cash register tapes.

Volumes of sales and number of customers that a cashier can process per hour is dependent almost entirely on (1) size of the order, (2) value of individual items in the order, (3) check-out facilities, (4) use of baggers and (5) use of trading stamps, coupons, etc. In turn the number of cashiers needed at any one time is dependent on these factors. A recent study<sup>4</sup> found that a cashier could handle \$157 of sales per hour if average sales per customer were \$2 to \$3.99; \$183 of sales per hour if average sales per customer were \$4 to \$7.99; and \$194 if sales per customer were \$8 or over. These figures are for supermarkets that give stamps and use conveyor belts. Since all stores included in the present study fell in this category, proposed cashier scheduling was based on the cashier capabilities stated here.

Based on information gathered concerning each store's average hourly dollar sales and dollar sales per customer, tables were constructed to indicate the minimum number of cashiers needed to handle adequately each store's sales volume without excessive waiting in line by customers. The number of cashiers needed each hour was determined by the relationship between average sales and average sales per customer by hour based on the Cornell study cited.<sup>5</sup> This study deals with cashier needs only—no consideration being given to varied use of baggers.

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<sup>4</sup>Ott, Leland E., *Increasing Labor Efficiency at the Check-Out in Supermarket*. A. E. Res. 43, Department of Agricultural Economics, Cornell University Agricultural Experiment Station, Ithaca, N. Y., July, 1960, page 16.

<sup>5</sup>*Ibid.*, page 16.

### Check-out Labor Scheduling by Central Management

Central management is interested in knowing if it is possible to make one check-out labor schedule which will work for all stores. If this were possible, it would seem to be the best way to accomplish the scheduling. Table 1 gives the number of cashier labor hours needed per store by day of the week.

This study was not designed to discover the specific causes of variation in store volume of the four stores, though it is well known that weather, paydays, location, advertising, specials, stamps, type of customer, and others are responsible for variations. On the basis of variations among and between stores determined by this study it is apparent that central management cannot set up a "master" labor schedule for cashiers which will fit any substantial number of its supermarkets. Thus, the conclusion is that cashier labor scheduling can best be done by individual store management or each store must be scheduled according to its own sales pattern.

Since efficient scheduling of cashier labor time can best be done on an individual store basis, the store managers or those making up the schedules, need to have a schedule of needs based on the store sales pattern. This study was designed to determine if information could be provided which would aid such scheduling.

The minimum cashier labor needs for supermarkets, A, B, C and D are shown in Tables 2, 3, 4 and 5. Supermarket A had 8 check-out

**TABLE 1.—Cashier Time Needs, Four Supermarkets, Columbus, Ohio, 1962-1963.**

Store Volume	Store Code	Mon.	Tue.	Wed.	Thurs.	Fri.	Sat.	Total	Actually Used
HOURS									
\$31,793	A	29	20	15	29	63	49	205	217
22,161	B	31	13	16	18	38	41	157	193
21,897	C	21	18	17	24	32	49	161	150
18,326	D	12	15	12	17	32	44	132	150
PERCENT OF WEEK									
	A	14	10	7	14	31	24	100	
	B	20	8	10	12	24	26	100	
	C	13	11	11	15	20	30	100	
	D	9	12	9	13	24	33	100	
	Average	14	10	10	13	25	28	100	

lanes, supermarket B had 6 lanes, and supermarkets C and D had 5 each. During some hours of heavy business supermarkets A and C needed more cashiers than there were lanes available. To meet these emergencies baggers were added to increase capacity of the lanes. The Cornell study, referred to previously found that the addition of a bagger increased dollar volume handled by each cashier some 68 to 98 percent. However, this study assumed no shortage of check-out lanes. Neither did suggested cashier labor scheduling include any adjustment for adding baggers to relieve pressure on cashier time.

Managers of the four supermarkets supplied data concerning the number of hours of cashier labor used per week during the study period. Supermarket A used 217 hours, supermarket B used 193 hours, supermarket C used 150 hours and supermarket D used 150 hours. The weekly minimum cashier labor needs based on Tables 2, 3, 4 and 5 were 205 hours for supermarket A, 157 hours for supermarket B, 161 hours for supermarket C and 132 hours for supermarket D. This showed that supermarket A scheduled 12 hours more than minimum needs; supermarket B, 36 hours more; and supermarket D, 18 hours more. Supermarket C scheduled 11 hours less than the minimum needed. This latter supermarket adjusted by using other personnel to fill needs or to speed up the lanes. Some scheduling above minimum needs is necessary due to work rules. The effect of these rules is indicated in the following section.

**TABLE 2.—Number of Cashiers Needed by Hour, Supermarket A, 1962-1963.**

Hours	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.
9-10	2	1	1	1	3	2
10-11	2	1	1	2	3	3
11-12	2	1	1	2	4	4
12-1	2	1	1	2	4	4
1-2	2	2	1	2	3	4
2-3	2	2	1	2	5	4
3-4	2	2	1	2	4	4
4-5	2	2	1	2	5	4
5-6	3	2	1	3	6	4
6-7	4	2	2	4	9	5
7-8	3	2	2	3	7	4
8-9	3	2	2	4	10	7
Cashier						
Total Hours	29	20	15	29	63	49
205 Weekly Total						

**TABLE 3.—Number of Cashiers Needed by Hour, Supermarket B, 1962-1963.**

Hours	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.
9-10	1	1	1	1	2	3
10-11	1	1	1	1	3	3
11-12	1	1	1	1	2	3
12-1	2	1	1	1	3	3
1-2	2	1	1	1	3	3
2-3	3	1	1	2	3	2
3-4	3	1	1	1	2	4
4-5	3	1	2	2	4	5
5-6	4	2	2	2	4	5
6-7	4	1	2	2	4	3
7-8	3	1	1	2	4	3
8-9	4	1	2	2	4	4
Cashier Total Hours	31	13	16	18	38	41
157 Weekly Total						

**TABLE 4.—Number of Cashiers Needed by Hour, Supermarket C, 1962-1963.**

Hours	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.
9-10	1	1	1	1	2	3
10-11	2	1	1	1	2	5
11-12	2	1	1	2	3	4
12-1	2	2	1	2	2	6
1-2	1	2	1	2	2	6
2-3	1	2	2	2	3	5
3-4	2	2	2	2	3	5
4-5	2	2	2	3	4	4
5-6	2	2	2	3	3	3
6-7	2	1	2	2	3	4
7-8	2	1	1	2	2	2
8-9	2	1	1	2	3	2
Cashier Total Hours	21	18	17	24	32	49
161 Weekly Total						

**TABLE 5.—Number of Cashiers Needed by Hour, Supermarket D, 1962-1963.**

Hours	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.
9-10	1	1	1	1	1	2
10-11	1	1	1	1	2	3
11-12	1	1	1	1	2	4
12-1	1	1	1	1	2	4
1-2	1	1	1	1	2	4
2-3	1	1	1	1	2	4
3-4	1	1	1	1	3	4
4-5	1	1	1	2	4	5
5-6	1	2	1	2	3	4
6-7	1	2	1	2	4	4
7-8	1	1	1	2	3	3
8-9	1	2	1	2	4	3
Cashier Total Hours	12	15	12	17	32	44
132 Weekly Total						

**Comparison of Present Cashier Labor Schedule With a Proposed Schedule for Supermarket B**

To serve as an illustration of actual to “desirable” or “most efficient” cashier labor scheduling a comparison was made between the present schedule of cashier labor used by supermarket B and the minimum hours necessary based on information obtained in this study. The “present” schedule is that actually used by store B.

The cashier labor allocation for the proposed schedule was based on dollar volume of business and number of customers of the store during the study period. Factors considered in determining minimum requirements of cashier time were: (1) union rule that full-time cashiers could work no more than two nights per week; (2) full-time workers must be given an hour for a meal; (3) regular part-time workers working longer than five hours must be given a lunch hour; (5) high school part-time workers must work at least two hours when called in; and (6) high school part-time workers were available all day Saturday and after 4:00 p m. on week-days.

The schedule for cashier labor used by store B totaled 193 hours per week. The daily schedule ranged from a low of 20.5 hours on Monday and Tuesday to 54 hours on Saturday. Number of cashiers

used ranged from 3 on Monday and Tuesday to 9 on Friday and 8 on Saturday.

The proposed schedule for cashier labor requires 170 hours per week. This is based on information in Table 3 and work rules in force. This proposed schedule requires 13 hours above actual needs because of work rules. This schedule varied from a low of 14 hours on Tuesday to 46 hours on Saturday (detail in Table 6). Number of cashiers (full-time and part-time) necessary to meet these requirements ranged from 3 on Tuesday to 12 on Saturday with a maximum of 7 on duty at any one time.

The proposed schedule required 12.5 more hours of cashier time on Monday than their present schedule, but it required 6.5 fewer hours on Tuesday, 8 fewer on Wednesday, 5 fewer on Thursday, 8 fewer on Friday and 8 fewer on Saturday. It should be repeated that the proposed scheduling did not include addition of baggers to speed up lanes in peak periods. Whether or not baggers would be advantageous would depend on their pay scale as compared to cashiers and availability of sufficient check-out lanes.

**TABLE 6.—Number of Cashiers Used and Needed by Hour, and Proposed Schedule, Store B.**

Time of Day	Used						Minimum Needed						Minimum Scheduling Possible Within Work Rules					
	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.
9-10	1	1	1	1	1	2	1	1	1	1	2	3	1	1	1	1	2	3
10-11	1	1	1	1	3	4	1	1	1	1	3	3	1	1	1	1	3	3
11-12	1	1	2	1	3	5	1	1	1	1	2	3	2	1	1	1	3	4
12-1	2	2	2	2	3	5	2	1	1	1	3	3	2	1	1	1	3	4
1-2	2	2	2	2	4	6	2	1	1	1	3	3	2	1	1	2	3	3
2-3	2	2	2	2	4	6	3	1	1	2	3	2	3	1	1	2	3	2
3-4	2	2	2	2	4	6	3	1	1	1	2	4	3	1	2	2	3	4
4-5	2	2	2	2	3	6	3	1	2	2	4	5	3	2	2	2	4	6
5-6	1½	1½	3	3	7	4	4	2	2	2	4	5	4	2	2	2	3	5
6-7	2	2	3	3	5	4	4	1	2	2	4	3	4	1	2	2	4	4
7-8	2	2	3	3	5	3	3	1	1	2	4	3	4	1	2	2	4	4
8-9	2	2	3	3	5	3	4	1	2	2	4	4	4	1	2	2	4	4

## CONCLUSIONS AND IMPLICATIONS

1. Cashier labor needs varied too greatly among stores to permit efficient central management scheduling. Each store required a different pattern of scheduling in order to minimize waste of cashier labor time. Standard scheduling for all stores, that is, providing sufficient cashier labor at all times, would have resulted in a surplus of 27.2 percent more than by individual store scheduling.
2. Work rules among supermarkets involved in this study made it necessary to over-schedule cashier labor time by 8.5 percent over minimum needs, based on sales.
3. For the store for which a detailed analysis was made the amount of cashier labor actually used exceeded needs by 1170 hours per year. Actual loss to the store would be the difference in the value of cashier services and those services which they could perform while not performing cashier duties.
4. If the 1170 hours were a total loss, the cost per \$100 of sales would amount to 18 cents. But because such surplus cashier time has salvage value, the cost ranged between 0 and 18 cents. No information was available concerning salvage value of such surplus cashier time.
5. One store under-scheduled cashier time by about 670 hours on a yearly basis. Over-scheduling for the other three stores was approximately 12.5 percent.