AN ECONOMIC ANALYSIS OF MAJOR APPLIANCE PURCHASES JUSTIFIED BY RELEASED-TIME EMPLOYMENT

by

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TABLE OF CONTENTS

INTRODUCTION

Women are one of the United States' greatest resources. Women's skills and abilities are being used more fully and more creatively than every before, not only in the home and in the community but on the job.

The growing contribution made by women to the economic life of the country has developed largely as a result of many social, cultural and economic changes over the last 25 years. Scientific and technological advances have simplified home chores, and have freed women for work outside the home. The growth of new industries, expanded activities in others, and an increase in commerce and trade have opened new doors for women in business, the professions and the production of goods and services.

The national economy has become dependent upon the work of women. In 1970, 87 million workers are needed, 13.5 million more workers than in 1960. Forty-four per cent of the new positions are for women, which is an increase of 25 per cent more women workers (Wood, 1962).

The current willingness and ability of women to enter the labor force has been increased by greater longevity of women, rise in the educational level of women, control over family planning, and a need for greater income in the home.

The median family income in 1966 in the husband-wife families where the wife worked was $9,246. Where the wife did not work, the median family income was $7,128 (Women's Bureau, 1968a). It is often the wife's earnings that raise the family income above the poverty levels. Only 5 per cent of all husband-wife families fell into this income group when the wife was in the paid labor force; 15 per cent, when she was not.

"The higher the annual family income (up to $15,000), the greater likelihood the wife is in the labor force. The labor force participation of

wives in March, 1967, was lowest (13%) in families with 1966 incomes of less than $2000 and highest (53%) in families with incomes of $12,000 to $14,000" (Working Wives--USDL, Nov. 1968).

Clerical workers comprised the nation's largest major occupational group of employed women in 1968 with 33.7 per cent. Of the employed women. 21.9 per cent were service workers, 14.6 per cent were professional and technical workers and 4.4 per cent were managers, officials and proprietors. Of the 4 million professional and technical workers 1.7 million were teachers (except college) and 1 million were medical and other health workers. Of the 6 million service workers, 1.7 million were private household workers (Women's Bureau, 1968b).

The median wage or salary of year-round full-time women workers in 1966 was $3,973. Of the women with wage or salary income in 1966, 61 per cent received less than $3,000. "Among women working year-round full-time in 1966, the highest median wage or salary income was received by professional and technical workers ($5,826), followed by non-farm managers, officials, and proprietors ($4,919), craftsmen and foremen ($4,345), and clerical workers ($4,316). The lowest paid were private household workers ($1,297)" (Women's Bureau, 1968b). In December of 1969 the Kansas State Employment Service conducted a survey of salaries paid in Manhattan, Kansas. A clerical worker makes $3318 per year which is lower than the national average. The private household worker averages $3120 per year and the public school instructor averages $6984 per year, which is lower than the national average of $8621 per year for teachers.

Working wives and particularly working mothers have many expenses related to their work that reduce the income available to them from their earnings. The principal costs involved are for clothing, personal care,

food, transportation, child care, household help arrangements, taxes and professional expenses. Studies reveal these work-related expenses absorb between one-fourth and one-half of a wife's earnings. Her expenses will vary according to the number of children and their ages. A study by Caudle (1964) on clerical workers showed that one-third of their earnings was utilized for regular household expenses and to buy extra things for the family, another one-third was used for savings, bills and furnishings, with 24 per cent of take home pay going for job-related expenditures. Schlater and Fenar (1962) conducted a study on young employed wives with an annual average income of $3,477. They found an average of 45 per cent of their earnings went for job-necessitated expenses, which left 55 per cent to use for the family budget. From a study conducted by Holmes, (1965) in Ohio, employed mothers showed three-fifths of the mother's income went for job-related expenses if the children were under 6 years of age.

There are benefits from working outside the home, in addition to the increase in family income. There would include employee pension plans, health insurance, paid sick leave and vacations, profit sharing plans and discount privileges as well as social scurity benefits and retirement income. There are intangible benefits, which are equally or more important to the working wife. Many working wives feel they become more effective members of their own families and contribute more to their community and to society by combining paid employment with homemaking.

OBJECTIVE

The objective of this study was to develop a criterion for determining if a married woman can justify, economically, a major appliance purchase on the basis of the wages received from released-time employment.

REVIEW OF LITERATURE

A homemaker spends a great deal of time performing household activities for her family. Manning (1968) found a homemaker spends an average of 54.1 hours per week in performing household activities. None of these homemakers was employed more than 15 hours per week. In this study rural homemakers spent 55.4 hours per week; non-rural, 54.7 hours per week; and urban homemakers, 52.9 hours per week in household activities. Wiegand (1954) showed the farm homemaker spends 7.6 hours per day and the city homemaker spends 7.4 hours per day in homemaking activities, whereas the employed city women spend 4.1 hours per day.

Food management includes meal preparation and dishwashing, with this activity requiring most of the homemakers time. Data from Manning (1968) showed that 17.7 hours per week or 36 per cent of all the homemakers time was involved in various household activities. Of the 17.7 hours per week, 9.2 hours were used in meal preparation and 7.2 hours were used for dishwashing. The remaining time was used in making sack lunches and food preservation.

Wiegand (1954) reported the farm homemaker spends 3.0 hours per day in food preparation. The city homemaker spends 1.6 hours per day and the employed homemaker spends 1.2 hours per day in food management activities. According to data by Cowles (1956) the farm homemaker spent 2.8 hours per day on food preparation. Manning (1968) found rural homemakers spend 10.8 hours per week in food preparation compared to 9.5 hours per week for urban homemakers.

METHOD OF APPROACH

A homemaker spends a large part of her day in household tasks for her family. Studies have been conducted to tell how much time and what tasks the homemaker performs in the home. By ownership of certain major appliances the amount of time a homemaker spends in household tasks can be reduced. The time available to the homemaker allows her to work outside the home or to increase her working hours in gainful employment and still have as much time to spend with her family.

The following formula was established to determine the minimum hourly wage a married working woman needs in order to jusitfy a major appliance purchase as a time-saving device. This formula will be referred to as Formula I.

FORMULA I

$$\text{Minimum wage per hour, } M = \frac{P + E + O + C}{T}$$

M = sum of charges against given hourly wage required by employment and appliance purchase.
P = pay roll deductions per year.
E = job-holding expenses per year.
O = operational cost of appliance per year.
C - ownership cost of appliance per year.
T = time relieved in one year by owning the appliance, hours.

For application of this formula three occupations were selected. They are the private household worker whose wage is $1.50 per hour, the clerical worker whose wage is $1.60 per hour and the public school instructor whose wage is $4.74 per hour. The salaries and job-related expenditures are representative of Manhattan, Kansas.

In choosing the major appliances for the home there are sociological and psychological factors involved in why people buy. These factors will not be covered as they are available in the literature.

RESULTS

Factors on Cost of Owning and Operating Appliances

There a number of major appliances on the market today. Some of these major appliances are time and labor saving devices, which provide the homemaker with more time to spend with her family or to work.

There are two appliances that will be used as examples in this report. They are the electronic oven and the dishwasher. These two examples will provide the framework for calculations for any additional appliances.

Dishwashers. The first patent on dishwashers was in 1850. Today they are automatic, well designed and highly efficient. Ehrenkranz (1966) defines a dishwasher as a "major appliance used to wash cooking utensils and a complete service of glasses, dishes, and silver for six or more persons at one time."

Van Zante (1964) states the dishwasher cuts in half the time spent in clearing, washing, and drying the dishes. Weaver (1956) conducted a study of hand versus mechanical dishwashing. The dishwashing process included clearing the table, putting the left-overs away, washing and wiping dishes, but did not include putting the dishes away or cleaning up the kitchen. When the dishes were washed by hand it took 33.6 to 108 minutes per day or an average of 73.2 minutes per day. With the dishwasher it took the homemakers from 19.7 to 53.3 minutes per day or an average of 35.6 minutes per day. This was a reduction in time of 37.6 minutes per day or a savings of 51.3 per cent. Weaver (1956) proposed with the savings in time from owning a dishwasher the homemaker could have employment outside the home, it would replace the domestic help, and that it would make the dishwashing tasks more enjoyable for the homemakers who dislike dishwashing because it is

tedious monotonous and repetitive.

Ownership costs. The costs of ownership and operation of a dishwasher are summarized in table 1. Consumers Report (1968) gives the range of average prices for portable dishwashers as from $165.40 to $300.00. This corresponds to a mean price of $232.70, which was the figure used in this study.

The trade-in value of a dishwasher is negligable if it is an under-the-counter model. However, a portable model has a trade-in value anywhere from $20 to $50, depending upon condition and age. For this study a mean of $35 was used, assuming it would be a portable model.

In a sample of approximately 17,500 households (Family Ec. Rev., June 1961) the average life expectancy for refrigerators, ranges, washing machines and dryers was estimated. Dishwashers were not included in this study, but dealers have found the life expectancy for the dishwasher to be 8 to 10 years. For this study a figure of 10 years was selected.

Another ownership cost considered was the amount of money lost due to taking or keeping the money used to purchase the appliance out of savings. The interest rate depends upon the amount of money in savings, and the type and place of saving. In most situations the consumer can obtain 4 to 5 per cent interest on his money. The alternative to taking the money out of savings would be to buy the appliance on credit. For this study the interest lost due to taking the money out of savings was figured at 4 per cent compounded annually. When the sum is $500 or over a time certificate of deposit may be used which draws 5 per cent interest. At 4 per cent compounded annually on $232.70, the amount of interest lost in 10 years, was $111.73, according to Hart (1928), Table on Compound Amount of $1.

Operational expenses. For the operation costs of the dishwasher the

Table 1

Dishwasher Operation and Ownership Costs

Ownership Costs:

	$ 232.70	Cash price of appliance
plus	$ 111.73	Loss of interest at 4% on money taken out of savings
less	$ 35.00	Trade-in value of the appliance
equals	$ 309.43	Actual cost of the appliance
divide	10 years	Life expectancy of the appliance
equals	$ 30.94	Cost per year of owning the appliance

Operation Costs:

Clerical worker and private household worker at 254 days

	$ 11.63	Repairs at 5 per cent per year on initial investment
plus	$ 15.85	Electricity
plus	$ 10.16	Detergent or other supplies at $.02 per load
equals	$ 37.64	Cost of operating the appliance for 254 days per year

Public School instructor at 184 days

	$ 11.63	Repairs at 5 per cent per year on initial investment
plus	$ 11.84	Electricity
plus	$ 7.36	Detergent or other supplies at $.02 per load
equals	$ 30.83	Cost of operating the appliance for 184 days per year

figures are based on only the number of days a woman works. They were for the private household worker and clerical workers 254 days (6 days are excluded for holidays) and for the professional worker, who was a public school instructor 184 days.

One cannot anticipate the repair costs for a given appliance, but general information does apply. The more complicated and intricate the appliance the more that can go wrong and the more it will cost for repairs and servicing. Margolius (1963) states for every dollar spent on the appliance, $.20 is spent to service it. With the recent price rise in repair parts and services this could be higher. A figure of 5 per cent annually on initial investment was used in this study, based on the study in Family Economics Review (1964) for washing machines and dryers. It totals $11.63 for the year.

The cost of operating an appliance over several years depends on a number of factors. Consumers Report (1968 and 1965) found the cost of electricity to operate a dishwasher, based on a rate of 3 cents per kilowatt hour, to be 1 cent to 4 cents per load. However, most machines would cost about 1 1/2 cents to 2 cents per dishwashing load. According to Kansas Power and Light Company of Manhattan, Kansas the cost per kilowatt hour of electricity was 2 cents to 2.5 cents. For this study the average cost of electricity for the United States (2.4 cents per kilowatt hour) (U. S. Congress, 1966) was selected as it falls in the above range. The dishwasher operates on two different wattages, one during the washing and rinsing cycle, and the second during the drying cycle. These wattages may be obtained from the specification sheets for the model. Each of the cycles operate for 30 minutes. Weaver (1954) stated the average family operates the dishwasher twice daily. The cost of each watt-hour requirement may be figured separately, but in this case they were combined. A high wattage model of 1300 watts was selected.

The following formula was used to figure the cost of electricity. This formula will be referred to as Formula II.

FORMULA II

$$\text{Cost of electrical energy per year, } C = \frac{W}{1000 \text{ watts/Kw}} \times T \times R \times U$$

W = watts of appliance.
T = operation time, hour per day.
R = cost per KWh.
U - number of days used per year.

Clerical worker and private household worker, operating twice daily.

$$C = \frac{1300 \text{ watts}}{1000 \text{ watts/Kw}} \times \frac{2 \text{ hrs.}}{\text{day}} \times \$.024/\text{Kwh} \times 254 \frac{\text{days}}{\text{year}} = \$15.85 \text{ per year}$$

Public school instructor, operating twice daily:

$$C = \frac{1300 \text{ watts}}{1000 \text{ watts/Kw}} \times \frac{2 \text{ hrs.}}{\text{day}} \times \$.024/\text{Kwh} \times 184 \frac{\text{days}}{\text{year}} = \$11.84 \text{ per year}$$

The water requirement for dishwashing ranges from 9 1/2 to 16 gallons of water per load. Since this is a highly variable cost and can be negligible amount, water was not considered as a cost. The detergent requirements will be dependent upon the dishwasher; usually an ounce of detergent per operation will be adequate, which amounts to 2 cents per load as stated in Consumer's Report (1968). In some areas of the United States additional supplies may be needed due to the hardness of the water. For this study the 2 cents per load was used.

Electronic oven. The conventional oven is designed to perform baking, broiling, and roasting of foods. A microwave (electronic) oven's performance differs in many ways from a conventional oven. The main difference is it prepares the product more quickly.

There have been no time studies done on the amount of meal preparation time that would be saved by owning an electronic oven. The family's meal patterns and the efficiency in usage of the microwave oven are determining factors in how much time will be saved by owning it.

The Amana Company, maker of the Radarange, claims their oven will cook more than 80 per cent of the foods normally prepared. Some products are more conveniently done with other appliances (Radarange Cookbook, 1968).

Harrison and Lind (1968) compared microwave versus conventional cooking of lamb chops. The total cooking time was 3.5 minutes and 39.9 minutes, respectively. The electronic cookery was 10 times faster. Apagar (1959) reported the electronic method of cooking pork was 5 times faster than cooking by the conventional method. Kyler (1964) found that electronic cookery of meat was 4 times as fast as by the conventional roasting method.

General Electric claims that breads and pastries can be baked in one-half the normal time, and that it takes one-eighth to one-half the normal time to roast meats and cook vegetables. (Versatronic Range Cookbook, 1968). Amana claims the thawing times for frozen foods are 2 to 3 minutes per pound with the Radarange (Radarange Cookbook, 1968).

Hotpoint claims electronic cooking was 5 to 10 times faster than the conventional method of cooking and that it reduces the meal preparation time to 50 to 80 per cent. In cooking electronically the cooking time increases with the quantity cooked. (Hotpoint circular no date.) With many of the foods being cooked in their original wrappings or paper there are fewer pots and pans to wash and gives the homemaker more time.

To ascertain the amount of time spent in cooking with an electronic oven versus the conventional range the author used a study by Kolmer and Gartner (1961). This study made comparisons based on average menus for a family of

four for one week. The foods were prepared on a conventional range and the preparation time and cooking time of each item included were given for the menus. To determine the time it would take to prepare the same menus by the electronic oven the preparation times from the study were used and the cooking times were obtained from the electronic oven recipe books (Radarange Cookbook, 1968) (Versatronic Range Cookbook, 1968). These computations are contained in Appendix A. To determine the time required to cook a specific meal, the most time consuming food item appearing for that meal was used as the total time for the appliance operation. For example, on Sunday's menu a beef pot-roast required 180 minutes on a conventional range and 60 minutes on the electronic range. All other items for that meal could be done within that time period and thus were not included in total appliance operation time. The summary of the week's menu appears in table 2.

The clerical worker and private household worker would spend during their working days, 1005 hours and 50 minutes in preparation and cooking time by the conventional method (3.96 hours times 254 working days). They would spend 548 hours and 38 minutes with the electronic oven in preparation and cooking time (2.16 hours times 254 working days). The public school instructor who worked 184 days would spend during those days, 728 hours and 38 minutes in preparation and cooking time by the conventional method, and 397 hours and 26 minutes in preparation and cooking time with the electronic oven. The workers spent 3.96 hours per day with the conventional method of preparation and cooking the meals. They spent 2.16 hours per day when using the elctronic oven. This was a savings of 1.80 hours per day.

Ownership costs. The costs of ownership and operation of an electronic oven are summarized in table 3. Presently the cost of the microwave oven ranges anywhere from $500 to $1,200. For this study the Amana counter top model

Table 2. Time study of conventional versus electronic oven meal preparation.

	Preparation for cooking	Conventional cooking[1]	Electronic cooking[1]
		(Minutes and seconds of time)	
Sunday	32:42	228:90	105:42
Monday	53:24	189:19	121:24
Tuesday	51:60	154:95	86:60
Wednesday	174:96	277:52	228:96
Thursday	51:29	228:57	109:29
Friday	37:72	435:20	157:72
Saturday	51:31	150:91	96:31
	452:54	1665:24	905:54
Total time per week, hours		27:75	15:09
Total time per day, hours		3:96	2:16

[1]Includes preparation time.

at $500 was selected to be used.

The heart of the microwave oven is the power generator tube or magnetron. Crapuchettes (1969) states, "extensive tests on the Litton Industries tube in ovens manufactured by Tappan, Litton Industries and several others indicate the average life of the power generator tube in the oven is about 10 years in domestic service." The Amana Company found through laboratory testing the life expectancy of the magnatron tube to be from 8 to 12 years. General Electric claims on their Versatronic range the power unit performed satisfactorily over a period of 20 years. This is probably based on a simulated testing environment. For this study 10 years was chosen to be a realistic figure.

Table 3

Electronic Oven Operation and Ownership Costs

Ownership costs:

	$ 500.00	Cash price of appliance
plus	$ 314.40	Loss of interest at 5% on money taken out of savings
less	$ 100.00	Trade-in value of the appliance
equals	$ 714.00	Actual cost of the appliance
divide	10 years	Life expectancy of the appliance
equals	$ 71.44	Cost per year of owning the appliance

Operation costs:

Clerical worker and private household worker at 254 days

	$ 25.00	Repairs at 5 per cent per year on initial investment
plus	$ 10.52	Electricity
equals	$ 35.52	Cost of operating the appliance for 254 days per year

Public school instructor at 184 days

	$ 25.00	Repairs at 5 per cent per year on initial investment
plus	$ 7.62	Electricity
equals	$ 32.62	Cost of operating the appliance for 184 days per year

Since microwave ovens are a new product, trade-in values have not been established. A Tappan salesman indicated to the author that their $700 model would have a trade-in value of $200. This, of course, would depend upon the age and condition of the oven. The figure of $100 was chosen for the trade-in value of the appliance for this study.

The interest lost due to taking the money out of savings was figured compounded annually on a time certificate of deposit at 5 per cent. At 5 per cent compounded annually on the $500 the amount of interest in the 10 years, which is the life expectancy of the appliance, comes to $314.40 as obtained from Hart (1928), Tables on Compound Amount of $1.

Operational costs. Microwave ovens have not been in existence long enough to estimate the magnitude of repair costs. Crapuchettes (1969) states, "It may require more frequent service than the conventional oven." If the oven is cared for properly, the repairs should be just minor through the life of the magnetron tube. Repair cost will be figured on 5 per cent per year of the original cost of the range. The computed operation time of the conventional and electronic appliance is shown in table 4. The oven was operated daily 1.0785 hours by each worker.

The amount of electricity required for electronic cooking varies according to the brand. The Versatronic oven by General Electric has two settings "low" and "high". The low power operates with 150 watts and the high power operates with 700 watts. The Radarange microwave oven by Amana operates on 115 volts and a rating of 1600 watts. The Tappan countertop electronic range has a minimum power output of 575 watts. The 1600 watts was chosen for this study to compute the electrical cost. Formula II as given on page 10 was used for calculating the cost of electricity for the electronic range.

Table 4. Operation times for each oven for one weeks menus.

	Conventional oven	Electronic oven
	(all tabulated times in min. and sec.)	
Sunday	196:43	73:00
Monday	135:95	68:00
Tuesday	103:35	35:00
Wednesday	102:56	54:00
Thursday	177:28	58:00
Friday	397:48	120:00
Saturday	99:60	45:00
	1212:70	453:00
Total time per week, hours	20:21	7:55
Total time per day, hours	2:89	1.0785

Clerical worker and private household worker

$$C = \frac{1600 \text{ watts}}{1000 \text{ watts/Kw}} \times \frac{1.0785 \text{ hr.}}{\text{DAY}} \times \$.024/\text{Kwh} \times 254 \frac{\text{days}}{\text{year}} = \$10.52 \text{ per year}$$

Public school instructor

$$C = \frac{1600 \text{ watts}}{1000 \text{ watts/Kw}} \times \frac{1.0785 \text{ hr.}}{\text{DAY}} \times \$.024/\text{Kwh} \times 184 \frac{\text{days}}{\text{year}} = \$7.62 \text{ per year}$$

Job-Related Expenditures

The three occupations used for this report are the private household worker, the clerical worker and the professional worker as a public school instructor. The expenses were taken from the Manhattan, Kansas area except for a few figures from the Holmes (1965) study done on job-related expenditures of the gainfully employed wife in Ohio. This is one of three government studies conducted by Holmes.

There are two general catagories of expenses connected with working women's employment. One is the pay roll deduction which includes income tax, social security and retirement. These expenses are taken out of the check before the employee has possession of it. Job-holding expenses, the second type, are those incurred due to the occupation. They are transportation, meals and snacks, gifts or employee parties, clothing, dues, professional publication, professional or business meeting, medical expenses, educational expenses, and child care.

Pay-roll deductions. Federal income tax depends on the tax bracket the family is in. It was assumed the wife and husband would file jointly as in the Holmes (1965) study. A family of four was selected, with one child over six and the other child under six. In order to determine a tax bracket when a family is filing jointly, an occupation for the husband was assigned for each occupational group. Average salaries for these were obtained from the Kansas State Employment Service in Manhattan, Kansas. The private household worker's husband was a farm laborer earning $3,600 a year. The clerical worker's husband was a carpenter earning $5,994.40 per year and the public school instructor's husband was a public school instructor with a master's degree earning $8,236 per year. The current 1969 Federal income tax form

was used to figure the tax. See Appendix B. The following items were deducted in each case: $600 for each family member and a 10 per cent standard deduction, a 10 per cent surcharge was added. Refer to Appendix C for these calculations. To obtain the additional tax incurred to the family by the wife's working, the husband's salary was obtained, the dependency deduction and 10 per cent standard deduction taken, giving the taxable income. The tax and the surcharge are taken from page T-1 of federal form 1040. Next the 10 per cent deduction was subtracted from the wife's income to obtain her taxable income. By adding the husband's and wife's taxable income a combined taxable income was obtained. The tax and surcharge are calculated as above. The final step in obtaining the tax due to her additional income is to subtract the husband's tax payable from the combined tax payable.

State Income Tax. Some cities and states have income tax. For Kansas, the state income tax form was obtained and the same procedures were followed as for the Federal income tax except there was no surcharge. Refer to Appendix C to obtain these calculations.

As of 1968, an employee paid social security on his wages up to $7,800. The social security rate is fixed at 4.8 per cent for everyone.

The professional person in this study paid $200 in retirement when classified as a full-time employee. In the study by Holmes (1965), those people paying retirement averaged $216.

Job-holding expenses. The transportation for this report was figured at 10 miles total per day at 9 cents per mile or $.90 per day. For working 254 days the private household worker and the clerical worker spent $228.60. For the public school instructor it was $165.60 for the 184 working days. In the study by Holmes (1965) transportation costs ranged from a few cents to several hundred dollars and averaged for all women $104 per year.

The working woman who works only a few hours a day will generally not have a meal expense. For many private household workers the meals are provided, as assumed in this study. The public school instructor pays $.40 for each meal or $73.60 per year. The clerical worker has more freedom in choosing where she wants to eat and thus can spend anywhere from a few cents to any amount depending on where and what she eats. For this study the clerical worker spent $.80 per day for lunch or $203.20 per year. In the study by Holmes (1965) all women spent an average of $84 per year on meals at work and only one-half of those reporting ate out. The others went home for lunch or brought their own.

Socializing with fellow workers and buying or contributing toward gifts and flowers to mark special occasions were items of expense for about three-fourths of the women in the Holmes (1965) study. Operative and professional workers were most likely to have this expense and service workers, which included private household workers, least likely. This expense amounted to $9 on parties and $9 on gifts for the year. For the public school instructor in Manhattan gifts were not exchanged or given. The clerical worker's job allowed more gift exchanges and parties and $18 was taken from the Holmes (1965) study to cover these costs. The private household worker is exempt from this expense.

The public school instructor had dues of $43 per year for National Education Association ($15), Kansas State Teachers' Association ($21), Manhattan Unified Teachers' Association ($5), and building fund ($2).

In some occupations there would be Union dues. Thirty-seven per cent of the wives in the Holmes (1965) study had union dues averaging $29 per year.

The public school instructor, according to the Kansas law, every 8 years must obtain 8 hours of college credit. For the 1969-1970 school year at

Kansas State University this would cost the individual $164 for one semester which includes tuition and registration expenses (Kansas State General Catalog, 1969-1970). For this study $20 per year was charged off to the public school instructor, which was the average amount per year if all 8 hours were taken at one time.

The public school instructor would be the only one having professional affiliation and this expense depends upon the membership costs for the organization. The Home Economics profession was used here and the membership dues are $20.00 per year.

For the public school instructor the professional meetings were paid if one represented the school, otherwise there would be transportation and meal costs. No expenses were charged off. In the Holmes (1965) study only the professional group had this expense which amounted to $10 per person.

The additional amoutn spent for job-related clothing in the Holmes study (1965) was used for this report. Fifty-six per cent of the service workers in the Holmes (1965) study had expenses for special work clothing, amounting to $43 per year. The household worker when working 30 minutes, and 2 hours extra per day had an estimated one-fourth of the $43 or $10.75 charged off as the amount for clothing. The Holmes study (1965) reported $128 for the 2 remaining groups. Again, when the worker worked short periods only one-fourth of this amount or $32 was charged as an expense.

The expenses for the children 0-5 years of age will be different from those of the children of ages 6 to 17 years. The working monther of school-age children may or may not need paid help for baby sitting. This depends on her hours of work and the age and self-reliance of her children. In the study by Holmes (1965) 75 per cent of the mothers with children under 6 years of age paid services of a baby sitter. For the children 6 to 17 years of age

20 per cent of the mothers reported baby sitter expenses. They spent $454 and $194, respectively, per year for baby sitting. In Manhattan, nursery schools charge $2.50 to $3.00 a day for each child with a few charging $60 per month. However, where baby sitting is needed for only an hour a day the cost will be higher at $.50 per hour. For this study there was a child under six and a child over six and in the public school. For the child over six it is realistic that the mother would not work a short period until after the child leaves for school. The expense for the 30 minutes and 2 hours of babysitting is figured at $.50 per hour. For the time of working 3 hours and going to work for 5 hours the cost was figured on the child having a lunch at the nersury school, which is an extra $5.00 per month. The expense for babysitting of 3 hours or 5 hours was considered a half day in each case.

Appendix D shows the pay-roll deduction and job-holding expenses for each worker. The 30 minute increase, is the amount of time freed to the homemaker by the ownership of a dishwasher and the 2 hours represents the average amount of time saved by owning the electronic oven.

Application of the Formula

The following was the formula for figuring the wages per hour the homemaker needs to make in order to justify the appliance purchase.

$$\text{Minimum wage per hour, } M = \frac{P + C + O + E}{T}$$

M = sum of charges against given hourly wage required by employment and appliance purchase.
P = pay-roll deductions per year.
C = ownership cost of appliance per year.
O = operational cost of appliance per year.
E = additional job-holding expenses per year.
T = time relieved in one year by owning the appliance, hours.

Dishwasher. As was stated earlier the dishwasher saves a homemaker from 19.7 minutes to 53.5 minutes a day, averaging 35.6 minutes. The time of 30 minutes was selected for an example to represent the amount of time saved by owning the dishwasher which is 127 hours when working 254 days per year and 92 hours when working 184 days. To illustrate the objective, 3 cases were selected: (1) the homemaker was not previously working, (2) she was previously working 4 1/2 hours, and (3) she was previously working 7 1/2 hours. Table 5 gives the wages per hour required to justify the purchase of the dishwasher and table 6 the remaining expandable income. It is important to understand the amount of money needed per hour to justify the purchase of the appliance was based only on the extra time she was able to work because of owning the appliance.

Electronic oven. The electronic oven was found to save the homemakers 1.80 hours per day. For these sample calculations a figure of 2 hours was selected which is 508 hours when the homemaker is employed 254 days per year and 368 hours when working 184 days. Table 7 shows the wages per hour that are needed to justify the purchase of the electronic oven and table 8 the remaining expandable income.

Table 5. Minimum wage per hour to justify purchase of the dishwasher.*

Was working	Time will work	Necessary wages per hour in dollars		
		PHW[1]	CW[2]	PSI[3]
0	30 min.	3.71	4.13	5.99
4 1/2 hrs.	5 hrs.	.91	2.57	2.90
7 1/2 hrs.	8 hrs.	.92	.97	2.28

*See Appendix E for calculations

[1]Private household worker

[2]Clerical worker

[3]Public school instructor

Table 6. Expandable income from gainful employment after purchase of dishwasher.

Was working	Time will work	Remaining wage/hr. in dollars		
		PHW[1]	CW[2]	PSI[3]
0	30 min.	-2.21	-2.53	-1.25
4 1/2 hrs.	5 hrs.	.59	- .97	1.84
7 1/2 hrs.	8 hrs.	.58	.63	2.46

[1]Private household worker

[2]Clerical worker

[3]Public school instructor

Table 7. Minimum wage per hour to justify purchase of the electronic oven.*

Was working	Time will work	Necessary wages needed in dollars		
		PHW[1]	CW[2]	PSI[3]
0	2 hours	1.48	1.65	2.81
3 hours	5 hours	.68	1.16	1.98
6 hours	8 hours	.58	.64	1.89

*See Appendix D for calculations

[1]Private household worker

[2]Clerical worker

[3]Public school instructor

Table 8. Expandable income from gainful employment after purchase of electronic oven.

Was working	Time will work	Remaining wages/hr. in dollars		
		PHW[1]	CW[2]	PSI[3]
0	2 hrs.	.02	-.05	1.93
3 hrs.	5 hrs.	.82	.44	2.76
6 hrs.	8 hrs.	.92	.96	2.85

[1]Private household worker

[2]Clerical worker

[3]Public school instructor

DISCUSSION

The homemaker for this study was spending 3.96 hours per day in meal preparation which is for preparing and cooking the product while using the conventional range. With the electronic range the homemaker was spending 2.16 hours per day in meal preparation. The makers of electronic ovens state some products cook 5 to 10 times faster with the electronic oven. This of course depends upon the items being prepared and their sizes. The findings in this study reveal a homemaker's time saved was about one-half (45%) by owning the electronic oven or 1.80 hours per day. When working 254 days the conventional oven took 1005 hours and 50 minutes whereas the same menus prepared by the electronic oven took 548 hours and 38 minutes. The times when working 184 days are 728 hours and 38 minutes and 397 hours and 26 hours, respectively.

Studies as stated in the introduction reveal work-related expenses may absorb between one-fourth to one-half of a wife's earning. This study revealed the public school instructor has more work related expenses than either the clerical worker or private household worker. Transportation, meals and snacks and child care are the largest job-holding expenses. These expenses may be reduced by riding in a car pool, living closer to work and by carrying a box lunch. Unless there are older children that can stay by themselves at off school hours the child care expenses cannot be reduced. Of the pay-roll deductions the largest expense is for federal income tax. For the workers working 4 1/2 to 5 hours a day 26.7 per cent of the clerical workers income went for pay-roll deductions. The private household worker spent 24.5 per cent of her income for pay-roll deductions and 30.1 per cent of the public school instructor's income went for pay-roll deductions. For 7 1/2 to 8 hours the percents, respectively were, 26.7, 25.5 and 33.9. The trend was seen as the more hours in the day the homemakers were already

working the less was the amount per hour that was needed to purchase the appliance. This happened because all job-holding expenses were charged off to the homemaker when she was intitally starting to work. It was assumed the homemakers already working when wanting to purchase the appliances have been able to pay for their job-holding expenses. The exception is the meal cost charged off to the homemaker who goes to work for 5 hours rather than the 3 or 4 1/2 hours.

The workers were not able to justify a purchase of the dishwasher when going to work for just 30 minutes per day. However, except for the clerical workers, by working 5 hours rather than 4 1/2 hours the homemakers were able to justify the purchase with money left over to be used in any way desired. The purchase and operation of the appliance plus occupational expenses would require that the private household worker spend $.91 per hour out of her $1.50 per hour wage. The public school instructor would spend $2.90 out of her $4.74 per hour wage when increasing the work time from 4 1/2 to 5 hour per day. The required hourly wage for 7 1/2 to 8 hours were $.92 and $2.98, respectively. The clerical worker would spend $.97. See table 5 for these figures. Since the dishwasher saves each homemaker 19.7 to 53.5 minutes per day a homemaker could also figure the formula with working an extra 1 hour a day. In all cases the amount of money needed per hour to purchase the dishwasher would decline.

In all cases except for the clerical worker working initially for two hours the homemakers were able to purchase the electronic oven. For this two-hour period the purchase and operation of the appliance plus occupational expenses would require $1.48 per hour out of the private household worker's wage of $1.50 per hour, $1.65 per hour for the clerical worker's wage of $1.60 per hour, and $2.81 per hour from the public school instructor's wage of $4.74 per hour.

When the work time is increased from 3 hours to 5 hours the private household worker would require $.68 the clerical worker $1.16 and the public school instructor $1.98 to purchase the appliance. For working 8 hours per day rather than 6 hours the private household worker would spend $.58 for the electronic oven purchase, the clerical worker $.64 and the public school instructor $.189.

Although the clerical worker and public school instructor make more per hour than the private household worker the private household worker has less of her income per dollar going for the purchase of the appliance. This was because the private household worker has less pay-roll deductions and fewer job-holding expenses. For the workers working 3 to 5 hours a day 26.7 per cent of the clerical worker's income went for pay-roll deductions. The private household worker spent 23.2 per cent of her income for pay-roll deductions and 28.9 per cent of the public school instructor's income went for pay-roll deductions. For 6 to 8 hours the per cents, respectively, were 26.7, 24.7 and 33.8.

SUMMARY

The objective of this study was to develop a criterion for determining if a married woman can justify, economically, a major appliance purchase on the basis of the wages received from released-time employment. Two appliances, a dishwasher and an electronic oven, and three occupations were selected to develop the objective. The following formula was established:

$$\text{Minimum wage per hour, } M = \frac{P + E + O + C}{T}$$

M = sum of charges against given hourly wage required by employment and appliance purchase.
P = pay roll deductions per year.
E = job - holding expenses per year.
O = operational cost of appliance per year.
C = ownership cost of appliance per year.
T = time relieved in one year by owning the appliance, hours.

To demonstrate the application of the formula two appliances were selected. The dishwasher was selected and assumed to save 30 minutes per day. The electronic oven was selected, and assumed to save 2 hours per day.

Three major occupational groups were selected to represent the working mothers; the private household worker who earns $1.50 per hour, the clerical worker who earns $1.60 per hour and the public school instructor who earns $4.74 per hour. All salaries and expenses were based from Manhattan, Kansas. Two major groups of expenses were incurred by the working mother. The payroll deductions were federal and state income tax, social security and retirement. The job-holding expenses were due to the job, such as transportation, meals, clothing, child care, gifts and parties, education, publications, professional meetings and dues. For the computation, each was assigned a husband in a profession and all families were of 4 members with a child over six and a child under six. The private household worker's husband was a

carpenter earning $5994.40 per year and the public school instructor's husband was a teacher earning $8236 per year. In all cases the husband and wife filed their income tax jointly.

It was necesary to figure the time saved by owning the electronic oven. A study by Gartner and Kolmer (1961) was selected for use of the menus for a family of 4 for a week. The amount of time to prepare and cook each meal was established from this study to develop how long it would take to prepare and cook the meals with a conventional range. These same menus were used with the electronic cookbooks (Radarange, 1968 and Versatronic, 1968) to develop the cooking times for the menus. The preparation times were the same as for the conventional range. It was found the homemaker using the conventional range averages 3.96 hours per day and the homemaker using the electronic oven average 2.16 hours per day in preparing and cooking the meals. This is a savings in time of 1.80 hours per day.

To illustrate the objective certain cases were selected. The homemaker was not working and wants to purchase a dishwasher which allows her 30 minutes per day of free time to go to work. What would be her expenses for going to work? The 5 hours represented the expenses incurred if she was already working 4 1/2 hours per day. The same was true for going to work for 8 hours whereas initially she was working 7 1/2 hours. This figure depends upon how much time the appliance saves her each day and how much time she wants to work. The electronic oven saves the homemaker almost 2 hours a day which was the figure chosen as the amount of time the homemaker can have to work outside the home. The examples were going to work initially for 2 hours and the homemaker has been working 3 hours and she goes to work for 5 hours. The last case was the homemaker already working 6 hours and she goes to work for 8 hours. It must be understood the amount of money that is needed per hour

to purchase the appliance was only for the extra time she is able to work because of owning the appliance.

It was found the more hours the homemaker works per day the lower were the wages per hour needed to purchase the appliance. In all cases except for the clerical worker working initially for 2 hours, the homemakers were able to purchase the electronic oven. The homemakers were not able to purchase the dishwasher when initially working for 30 minutes per day. Except for the clerical worker who was working 4 1/2 hours and goes to work for 5 hours the homemakers were able to purchase the dishwasher in the work times of 5 hours and 8 hours when initially working 4 1/2 hours and 7 1/2 hours, respectively.

When working the 8 hours rather than the 7 1/2 hours per day the purchase and operation of the dishwasher plus occupational expenses required for the private household worker $.92, the clerical worker $.97 and the public school instructor $2.28. When working 8 hours rather than the 6 hours the amount of money required to make the electronic oven purchase was for the private household worker $.58, the clerical worker $.64 and the public school instructor $1.89.

RECOMMENDATIONS

The development of the electronic oven has brought about a change in the amount of time spent in meal preparation and a change in the method of preparation of some foods. The researcher recommends that a time study be conducted comparing like menus with the conventional range and the electronic oven.

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APPENDICES

APPENDIX A

Meal Preparation Times,
Conventional Versus Electronic Cooking

Sunday	Time in minutes and seconds		
	Preparation for cooking	Conventional	Electronic
Breakfast:			
orange juice conc.	2:33	-	-
oatmeal, quick	2:13	5:48	6:00
eggs, fried	:45	5:00	1:30
toast and butter			
chocolate milk	1:58	-	-
Lunch:			
beef pot roast	2:16	180:00	60:00
french fried potatoes	:43	20:00	13:00
asparagus, frozen	3:35	10:00	8:00
bread and butter			
warm apple pie, homemade	19:20	60:00	24:00
tea bags	:55	11:00	4:00
Dinner:			
oyster soup, frozen oyster	:49	10:22	6:00
biscuits, homemade*	8:48	11:00	7:00
peaches, canned	:32	-	-
milk	-	-	-
total	32:42	196:48	73:00
with preparation		228:90	105:42

*biscuits replace original menu of hot rolls
_____ time used in the total

Meal Preparation Times,
Conventional Versus Electronic Cooking

Monday	Time in minutes and seconds		
	Preparation for cooking	Conventional	Electronic
Breakfast:			
grapefruit, fresh	4:38	-	-
oatmeal, quick	2:13	5:48	6:00
milk	-	-	-
Lunch:			
macaroni and cheese, homemade	12:15	23:47	15:00
chocolate chip cookies	14:20	13:00	13:00
milk	-	-	-
Dinner:			
boneless rolled ham	2:44	84:00	22:00
peas, frozen	2:27	10:00	8:00
baked potatoes	2:00	60:00	12:00
coconut cream pie, homemade	22:32	10:00	12:00
tea bags	:55	11:00	4:00
total	53:24	135:95	68:00
with preparation		189:19	121:24

_____ time used in the total

Meal Preparation Times,
Conventional Versus Electronic Cooking

Tuesday	Time in minutes and seconds		
	Preparation for cooking	Conventional	Electronic
Breakfast:			
orange juice, conc.	2:33	-	-
eggs, baked	2:00	10:00	3:00
toast & butter	-	-	-
chocolate milk	1:58	-	-
Lunch:			
spanish rice, homemade	13:17	5:35	12:00
frosted yellow cake, homemade	23:52	28:00	10:00
milk	-	-	-
Dinner:			
breaded veal steak	7:44	60:00	10:00
asparagus spears, frozen	3:35	10:00	8:00
corn on cob, fresh	5:47	9:00	9:00
lemonade, conc.	2:30	-	-
pineapple chunks	:32	-	-
total	51:60	103:35	35:00
with preparation		154:95	86:60

_____ time used in the total

Meal Preparation Times,
Conventional Versus Electronic Cooking

Wednesday	Time in minutes and seconds Preparation for cooking	Conventional	Electronic
Breakfast:			
grapefruit, fresh	4:38	-	-
oatmeal, quick	2:13	5:48	6:00
milk	-	-	-
Lunch:			
vegetable soup, homemade*	11:40	35:00	20:00
salmon steak	6:47	9:23	10:00
green beans, frozen	2:53	8:16	8:00
french fried potatoes, frozen	:43	20:00	13:00
strawberries, frozen	1:20	-	-
tea bags	:55	11:00	4:00
Dinner:			
chicken pie, part. prep.**	138:49	31:08	19:00
corn niblets, frozen	2:30	5:03	5:00
brownies, homemade	20:41	31:00	9:00
milk	-	-	-
total	174.96	102:56	54:00
with preparation		277:52	228.96

*the vegetable soup cooking time was changed from original menu
**a stewing chicken was used and changed the time from original menu
_____ time used in the total

Meal Preparation Times,
Conventional Versus Electronic Cooking

Thursday	Time in minutes and seconds: Preparation for cooking	Conventional	Electronic
Breakfast:			
orange juice conc.	2:33	-	-
eggs, poached	2:00	5:00	2:00
toast & butter	-	-	-
milk	-	-	-
Lunch:			
speghetti & meat balls	24:32	35:28	18:00
lemonade, conc.	2:30	-	-
pineapple chunks	:32	-	-
Dinner:			
pork loin roast (with bone)	1:45	109:00	28:00
corn niblets, canned	1:57	5:00	4:00
asparagus spears, frozen	3:35	10:00	8:00
bread & butter	-	-	-
frosted chocolate cake	23:52	28:00	10:00
tea bags	:55	11:00	4:00
total	51:29	177:28	58:00
with preparation		228:57	109:29

_____ time used in the total

Meal Preparation Times,
Conventional Versus Electronic Cooking

Friday	Time in minutes and seconds		
	Preparation for cooking	Conventional	Electronic
Breakfast:			
grapefruit, fresh	4:38	-	-
oatmeal, quick	2:13	5:48	6:00
milk	-	-	-
Lunch:			
beef stew	13:52	152:00	30:00
green beans, frozen	2:53	8:16	8:00
whipped potatoes	7:35	17:09	-
apple pie & ice cream	19:20	60:00	24:00
chocolate milk	1:58	-	-
Dinner:			
corned beef (uncooked)	:57	180:00	60:00
peas, frozen	2:27	10:30	8:00
corn niblets, frozen	2:30	5:03	8:00
bread & butter	-	-	-
peaches, canned	:32	-	-
milk	-	-	-
total	37:72	397:48	120:00
with preparation		435:20	157:72

_____ time used in the total

Meal Preparation Times,
Conventional Versus Electronic Cooking

Saturday	Time in minutes and seconds		
	Preparation for cooking	Conventional	Electronic
Breakfast:			
orange juice, conc.	2:33	-	-
oatmeal, quick	2:13	5:48	6:00
pork sausage, link	1:47	8:13	4:30
toast & butter	-	-	-
milk	-	-	-
Lunch:			
macroni & cheese, homemade	12:05	23:47	15:00
pineapple chunks	:32	-	-
chocolate milk	1:58	-	-
Dinner:			
fried chicken, fresh	12:14	40:00	14:00
asparagus, frozen	3:35	10:00	8:00
french fried potatoes, frzn.	:43	20:00	13:00
lemonade, conc.	2:30	-	-
frosted chocolate cake	23:52	28:00	10:00
milk	-	-	-
total	51:31	99:60	45:00
with preparation		150:91	96:31

_____ time used in the total

APPENDIX B

Tax Schedules

1969 Federal Tax Rate Schedules

Schedule II—Married Taxpayers Filing Joint Returns and Certain Widows and Widowers (See B–2)

If the amount on line 5, Schedule T is: — Enter on line 6, Schedule T:

Not over $1,000....14% of the amount on line 5.

Over—	But not over—		of excess over—
$1,000	$2,000	$140+15%	$1,000
$2,000	$3,000	$290+16%	$2,000
$3,000	$4,000	$450+17%	$3,000
$4,000	$8,000	$620+19%	$4,000
$8,000	$12,000	$1,380+22%	$8,000
$12,000	$16,000	$2,260+25%	$12,000
$16,000	$20,000	$3,260+28%	$16,000
$20,000	$24,000	$4,380+32%	$20,000
$24,000	$28,000	$5,660+36%	$24,000
$28,000	$32,000	$7,100+39%	$28,000
$32,000	$36,000	$8,660+42%	$32,000
$36,000	$40,000	$10,340+45%	$36,000
$40,000	$44,000	$12,140+48%	$40,000
$44,000	$52,000	$14,060+50%	$44,000
$52,000	$64,000	$18,060+53%	$52,000
$64,000	$76,000	$24,420+55%	$64,000
$76,000	$88,000	$31,020+58%	$76,000
$88,000	$100,000	$37,980+60%	$88,000
$100,000	$120,000	$45,180+62%	$100,000
$120,000	$140,000	$57,580+64%	$120,000
$140,000	$160,000	$70,380+66%	$140,000
$160,000	$180,000	$83,580+68%	$160,000
$180,000	$200,000	$97,180+69%	$180,000
$200,000	.....	$110,980+70%	$200,000

1969 Federal Tax Surcharge Tables

TABLE 2—Married Taxpayers Filing Joint Returns and Certain Widows and Widowers

If your tax[1] is at least:	But less than	Your tax surcharge[2] is:	If your tax[1] is at least:	But less than	Your tax surcharge[2] is:
0	$293	0	$488	$493	$40
$293	298	$1	493	498	41
298	303	2	498	503	42
303	308	3	503	508	43
308	313	4	508	513	44
313	318	5	513	518	45
318	323	6	518	523	46
323	328	7	523	528	47
328	333	8	528	533	48
333	338	9	533	538	49
338	343	10	538	543	50
343	348	11	543	548	51
348	353	12	548	553	52
353	358	13	553	558	53
358	363	14	558	563	54
363	368	15	563	568	55
368	373	16	568	573	56
373	378	17	573	578	57
378	383	18	578	585	58
383	388	19	585	595	59
388	393	20	595	605	60
393	398	21	605	615	61
398	403	22	615	625	62
403	408	23	625	635	63
408	413	24	635	645	64
413	418	25	645	655	65
418	423	26	655	665	66
423	428	27	665	675	67
428	433	28	675	685	68
433	438	29	685	695	69
438	443	30	695	705	70
443	448	31	705	715	71
448	453	32	715	725	72
453	458	33	725	735	73
458	463	34			
463	468	35			
468	473	36			
473	478	37			
478	483	38			
483	488	39			

If $735 or more multiply your tax[1] by .10

1969 Kansas State Tax Rate Schedules

SCHEDULE II—MARRIED FILING A JOINT RETURN

If amount on line 16 is: — Enter on line 17, page 1:

Not over $4,000 ..... 2% of amount on line 16

Over	But Not Over		
$ 4,000	$ 6,000	$ 80.00	plus 3½% of excess over $ 4,000
$ 6,000	$10,000	$150.00	plus 4 % of excess over $ 6,000
$10,000	$14,000	$310.00	plus 5 % of excess over $10,000
$14,000	.....	$510.00	plus 6½% of excess over $14,000

APPENDIX C

Federal and State Income Tax

Example of How The Tax Due to The Wife's Income Was Figured.

Wife employed 5 hours and was working 4 1/2 hours

$ 1905.00	wife's salary
- 190.00	10% standard deduction
$ 1714.50	wife's taxable income
$ 840.00	husband's taxable income
+1714.50	wife's taxable income
$ 2554.50	combined taxable income

Federal tax (tax bracket $290 - 16% over $2000)

$ 378.72	tax
+ 18.00	tax surcharge
$ 396.72	combined tax payable

State tax (tax bracket 2%)

$ 51.90	combined tax payable

$ 396.72	combined tax payable at 5 hours of work
- 363.29	combined tax payable at 4 1/2 hours of work
$ 33.54	Federal tax due to wife's income
$ 51.90	combined tax payable at 5 hours of work
- 47.66	combined tax payable at 4 1/2 hours of work
$ 4.24	State tax due to wife's income

Federal and State Income Tax For The Private Household Worker

For the Wife	30 min.	2 hrs.	3 hrs.	4 1/2	5 hrs.	6 hrs.	7 1/2	8 hrs.
Wife's salary	190.50	762.00	1143.00	1714.50	1905.00	2286.00	2857.50	3048.00
Wife's 10% deduction	19.05	76.20	114.30	171.45	190.50	228.60	285.75	304.80
Wife's taxable income	171.45	685.89	1028.70	1543.05	1714.50	2057.40	2571.75	2743.20
Combined taxable income	1011.45	1525.80	1868.70	2383.05	2554.50	2897.40	3411.75	3583.20
Federal combined tax	141.72[a]	117.60[a]	270.31[a]	363.29[c]	396.72[c]	462.58[c]	566.00[d]	601.14[d]
Tax surcharge	---	---	---	12.00	18.00	29.00	46.00	52.00
Federal tax due to wife	224.12	101.27	---	---	33.43	---	---	35.14
Combined state tax	20.23[b]	16.80[b]	37.37[b]	47.66[b]	51.90[b]	57.95[a]	68.24[b]	71.66[b]
State tax due to wife	3.43	13.72	---	---	4.24	---	---	3.42

[a] bracket 140 + 15% over 1000

[b] 2%

[c] 290 + 16% over 2000

[d] 450 + 17% over 3000

For the Husband	
Husband's salary as a farm laborer	3600.00
Family deductions	2400.00
10% standard deduction	360.00
Federal taxable income	840.00
Husband's Federal tax payable (bracket 14%)	117.60
Husband's State tax payable (bracket 2%)	16.80

Federal and State Income Tax For The Clerical Worker

For the Wife.	30 min.	2 hrs.	3 hrs.	4 1/2	5 hrs	6 hrs.	7 1/2	8 hrs.
Wife's salary	203.20	812.80	1219.20	1828.80	2032.00	2438.40	3048.00	3251.20
Wife's 10% deduction	20.32	81.28	121.92	182.88	203.20	243.84	304.80	325.12
Wife's taxable income	182.88	731.52	1097.28	1645.92	1828.80	2194.56	2743.20	2926.08
Combined taxable income	3177.84	3726.48	4092.24	4640.88	4823.76	5189.52	5738.16	6641.04
Federal combined tax	518.23[a]	630.50[a]	701.53[c]	815.94[c]	854.16[c]	930.61[c]	1195.75[c]	1083.50[c]
Tax surcharge	38.00	57.00	64.00	74.17	77.65	84.60	95.92	98.50
Federal tax due to wife	37.04	149.31	---	---	38.22	---	---	38.23
Combined state tax	63.56[b]	74.53[b]	83.23[d]	102.43[d]	108.83[d]	121.63[d]	140.84[d]	147.24[d]
State tax due to wife	3.66	14.63	---	---	6.40	---	---	6.40

[a] tax bracket 450 + 17% over 3000

[b] tax bracket of 2%

[c] tax bracket 620 + 19% over 4000

[d] tax bracket 80 + 3 1/2% over 4000

For the Husband	
Husband's salary as a carpenter	5994.40
Family deductions	2400.00
10% standard deduction	599.44
Federal taxable income	2994.96
Husband's federal tax payable (bracket 290 + 16% over 2000)	481.19
Husband's tax surcharge	32.00
Husband's state tax payable (bracket 2%)	59.90

Federal and State Income Tax For The Public School Instructor

For the Wife	30 min.	2 hrs.	3 hrs.	4 1/2	5 hrs.	6 hrs.	7 1/2	8 hrs.
Wife's salary	436.08	1744.32	2616.48	3924.72	4360.80	5232.96	6547.92	6984.00
Wife's 10% deduction	43.60	174.43	261.64	392.47	436.08	523.29	654.79	698.40
Wife's taxable income	392.48	1569.89	2358.84	3532.25	3924.72	4709.67	5893.13	6285.60
Combined taxable income	5404.88	6582.29	7367.24	8544.65	8937.12	9722.07	10905.53	11298.00
Federal combined tax	975.62[a]	1221.70[a]	1385.75[a]	1649.80[c]	1744.77[c]	1934.72[c]	2221.14[c]	2316.11[c]
Tax surcharge	88.69	111.06	125.97	149.98	158.61	175.86	201.92	210.55
Federal tax due to wife	82.03	328.11	---	---	94.97	---	---	94.97
Combined state tax	129.17[b]	170.38[b]	204.69[d]	251.79[d]	267.48[d]	298.88[d]	355.28[e]	374.90[e]
State tax due to wife	13.74	54.95	---	---	15.69	---	---	19.62

[a] tax bracket 620 + 19% over 4000

[b] tax bracket 80 _ 13 1/2% over 4000

[c] tax bracket 1380 + 22% over 8000

[d] tax bracket 150 + 4% over 6000

[e] tax bracket 310 + 5% over 10,000

For the Husband	
Husband's salary as a teacher with a Master's Degree	8236.00
Family deductions	2400.00
10% standard deduction	823.60
Federal taxable income	5012.40
Husband's federal tax payable (bracket 620 + 19% over 4000)	893.59
Husband's tax surcharge	81.23
Husband's state tax payable (bracket 80 + 3 1/2 % over 4000)	115.43

APPENDIX D

Private Household Worker's Pay Roll Deductions and Job-Holding Expenses

	Working time increased from:					
	0-30 min.	0-2 hrs.	3-5 hrs.	4 1/2-5	6-8 hrs.	7 1/2-8
	Salary increased by:					
	190.50	762.00	762.00	190.50	762.00	190.50
PAY ROLL DEDUCTIONS						
federal tax	24.12	101.27	126.41	33.43	138.56	35.14
state tax	3.43	13.72	14.53	4.24	13.71	3.42
social security	9.14	36.58	36.58	9.14	36.58	9.14
retirement	---	---	---	---	---	---
TOTAL PER YEAR	36.69	151.57	177.52	46.81	188.85	48.70
JOB-HOLDING EXPENSES						
meals and snacks	---	---	---	---	---	---
transportation	228.60	228.60	---	---	---	---
gifts and parties	---	---	---	---	---	---
education	---	---	---	---	---	---
dues	---	---	---	---	---	---
publications	---	---	---	---	---	---
professional meetings	---	---	---	---	---	---
clothing	10.75	10.75	---	---	---	---
child 0-5 years	127.00	254.00	60.00	---	---	---
child over 6	---	---	---	---	---	---
TOTAL PER YEAR	366.35	493.35	60.00	---	---	---

Wife's salary per hour $1.60 for 254 working days.
The husband a farm laborer with a salary of $3600.00.

Clerical Worker's Pay Roll Deductions and Job-Holding Expenses

	Working time increased from:					
	0-30 min.	0-2 hrs.	3-5 hrs.	4 1/2-5	6-8 hrs.	7 1/2-8
	Salary increased by:					
	203.20	812.80	812.80	203.20	812.80	203.20
PAY ROLL DEDUCTIONS						
federal tax	37.04	149.31	152.63	38.22	152.89	38.23
state tax	3.66	14.63	25.60	6.40	25.61	6.40
social security	9.75	39.01	39.01	9.75	39.01	9.75
retirement	---	---	---	---	---	---
TOTAL PER YEAR	50.45	202.95	217.24	54.37	217.51	54.38
JOB-HOLDING EXPENSES						
meals and snacks	---	---	203.20	203.20	---	---
transportation	228.60	228.60	---	---	---	---
gifts and parties	18.00	18.00	---	---	---	---
education	---	---	---	---	---	---
dues	---	---	---	---	---	---
publications	---	---	---	---	---	---
professional meetings	---	---	---	---	---	---
clothing	32.00	32.00	---	---	---	---
child 0-5 years	127.00	254.00	60.00	---	---	---
child over 6	---	---	---	---	---	---
TOTAL PER YEAR	405.60	532.60	263.20	203.20	---	---

Wife's salary per hour $1.60 for 254 working days.
The husband a carpenter with a salary of $5999.40.

Public School Instructor's Pay Roll Deductions and Job-Holding Expenses

	Working time increased by:					
	0-30 min.	0-2 hrs.	3-5 hrs.	4 1/2-5	6-8 hrs.	7 1/2-8
	Salary increased by:					
	436.08	1744.32	1744.32	436.08	1744.32	436.08
PAY ROLL DEDUCTIONS						
federal tax	82.03	328.11	359.02	94.97	381.39	94.97
state tax	13.74	54.95	62.79	15.69	76.02	19.62
social security	20.92	83.73	83.73	20.92	83.73	20.92
retirement	---	---	---	---	50.00	12.50
TOTAL PER YEAR	116.69	466.79	505.54	131.58	591.14	148.01
JOB-HOLDING EXPENSES						
meals and snacks	---	---	73.60	73.60	---	---
transportation	165.60	165.60	---	---	---	---
gifts and parties	---	---	---	---	---	---
education	20.00	20.00	---	---	---	---
dues	43.00	43.00	---	---	---	---
publications	20.00	20.00	---	---	---	---
professional meetings	---	---	---	---	---	---
clothing	32.00	32.00	---	---	---	---
child 0-5 years	92.00	184.00	45.00	---	---	---
child over 6	---	---	---	---	---	---
TOTAL PER YEAR	372.60	464.60	118.60	73.60	---	---

Wife's salary per oour $4.74 for 184 working days.
The husband a teacher with a salary of $8236.00.

APPENDIX E

Wages Necessary Per Hour for Purchase of Appliance

Formula:

$$\text{Minimum Wage per Hour, } M = \frac{P + E + O + C}{T}$$

M = sum of charges against given hourly wage required by employment and appliance purchase.
P = pay roll deductions per year.
E = job-holding expenses per year.
O = operational cost of appliance per year.
C = ownership cost of appliance per year.

Private Household Worker

Was working	Time will work	P	C	O	E	T	Wages per hour
Dishwasher							
0	30 min.	36.69	30.94	37.64	366.35	127 hrs.	3.71
4 1/2	5 hrs.	46.81	30.94	37.64	---	127 hrs.	.91
7 1/2	8 hrs.	48.70	30.94	37.64	---	127 hrs.	.92
Electronic Oven							
0	2 hrs.	151.57	71.44	35.52	493.35	508 hrs.	1.48
3	5 hrs.	188.85	71.44	35.52	60.00	508 hrs.	.68
6	8 hrs	177.52	71.44	35.52	---	508 hrs.	.58

Clerical Worker

Was working	Time will work	P	C	O	E	T	Wages per hour
Dishwasher							
0	30 min.	50.45	30.94	37.64	405.60	127 hrs.	4.13
4 1/2	5 hrs.	54.37	30.94	37.64	203.20	127 hrs.	2.57
7 1/2	8 hrs.	54.38	30.94	37.64	---	127 h4s	.97
Electronic Oven							
0	2 hrs.	202.95	71.44	35.52	532.60	508 hrs.	1.65
3	5 hrs.	217.24	71.44	35.52	263.20	508 hrs.	1.16
6	8 hrs.	217.51	71.44	35.52	---	508 hrs.	.64

Public School Instructor

Was working	Time will work	P	C	O	E	T	Wages per hour
Dishwasher							
0	30 min.	116.69	30.94	30.83	372.60	92 hrs.	5.99
4 1/2	5 hrs.	131.58	30.94	30.83	73.60	92 hrs.	2.90
7 1/2	8 hrs.	148.01	30.94	30.83	---	92 hrs.	2.28
Electronic Oven							
0	2 hrs.	466.79	71.44	32.62	464.40	368 hrs.	2.81
3	5 hrs.	505.54	71.44	32.62	118.60	368 hrs.	1.98
6	8 hrs.	591.14	71.44	32.62	---	368 hrs.	1.89

AN ECONOMIC ANALYSIS OF MAJOR APPLIANCE PURCHASES JUSTIFIED BY RELEASED-TIME EMPLOYMENT

by

IRENE GWEN DORMAIER GRANT

B. S., Washington State University, 1966

AN ABSTRACT OF A MASTER'S REPORT

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The percentage of women in the labor force has increased during the past decade. An even larger increase in the future is expected because of greater longevity of women, rise in the educational level of women, control over family planning, and a need for greater income in the home. It is also highly probably that the advantage of owning many time and labor saving devices in the area of household appliances might encourage women to consider entering the working force.

The objective of this study was to develop a criterion for determining if a married woman can justify, economically, a major appliance purchase on the basis of the wages received from released-time employment. Two appliances, a dishwasher and an electronic oven, and three occupations were selected to develop the objective.

The dishwasher was assumed to save 30 minutes per day and the electronic oven to save 2 hours per day. The private household worker (wage $1.50 per hour), the clerical worker (wage $1.60 per hour) and the public school instructor (wage $4.74 per hour) were examples used to illustrate the occupations for the homemakers. The job-holding and pay roll deductions of each homemaker were developed as representative of Manhattan, Kansas.

The homemaker was assumed to originally be working 0, 4 1/2 and 7 1/2 hours per day before buying the dishwasher. The homemaker was assumed to originally be working 0, 3 and 6 hours per day before buying the electronic oven.

The following formula was developed for application of the objective:

$$\text{Minimum wage per hour, } M = \frac{P + E + O + C}{T}$$

M = sum of charges against given hourly wage required by employers and appliance purchase.
P = payroll deductions per year.
E = job-holding expenses per year.
O = operational cost of appliance per year.
C = ownership cost of appliance per year.
T = time relieved in one year by owning the appliance, hours.

The homemakers when originally not working could not justify the purchase of the dishwasher. Except for the clerical worker previously working 4 1/2 hours, the dishwasher purchase could be justified. In all cases except the clerical worker originally not working, the homemakers were able to justify the purchase of the electronic oven. However, all of the private household workers salary was required for the case when she was not originally working.