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THE IMPACT OF MINIMUM WAGE ON FOOD AWAY FROM HOME EXPENDITURE USING STRUCTURAL EQUATION MODEL

Jun Ho Seok
University of Kentucky, Department of Agricultural Economics, USA

GwanSeon Kim
University of Kentucky, Department of Agricultural Economics, USA

Tyler Mark
University of Kentucky, Department of Agricultural Economics, 417 Charles E. Barnhart Bldg., Lexington, KY 40546, USA, Email: tyler.mark@uky.edu

Abstract

This paper develops the proxy variable for food away from home price to solve the omitted variable problem in FAFH expenditure. Secondly, this paper incorporates two equations for FAFH price and demand to capture the minimum wage shock on food away from home expenditure. Decomposing food away from home expenditures to demand and price, this study determines the path of minimum wage shock on food away from home expenditures. A structural equation model framework with data from Bureau of Labor Statistics for periods through 2005 to 2010 is used. We find that the minimum wage has a positive relationship with the price level of food away from home, but a price does not have a significant effect on food away from home demand. It infers that the employment in restaurant industries may not be reduced by an increase of minimum wage.

Key words*: Food away from home (FAFH), minimum wage, structural equation model (SEM)*
JEL Codes: *J3, L11, Q10, R2*

1. Introduction

While the federal minimum wage in U.S. has not changed since 2009 as $7.25, 16 states in U.S. increases the state minimum wage in 2016 (Ayers, 2016). California approves the legislature the increase plan of state minimum wage from $10 to $10.5 in 2017. California also has a plan to increase the state minimum wage $15 until 2022. Other large cities in U.S. such as Seattle, New York, San Francisco, Los Angeles also have a plan to increase the minimum wage to $15 over the next few years (Ayers, 2016).

An increasing minimum wage could be considered a supply shock that has ripple effects through the economy. Lemos (2008) argues that company respond to an increase in minimum wage by reducing employment, reducing profits, or raising prices. Even and Macpherson (2014) state that the restaurant industry has a relatively large portion of low-income workers, and an increased effect of minimum wage is large compared to other industries such as automotive, cellular, or banking.[1] For this reason, many studies focus on the restaurant industry to investigate the implications of raising/lower the minimum wage.

Aaronson (2001), Basker and Khan (2016), Fougère, et al. (2010), Lemos (2008), and MacDonald and Aaronson (2006) focus on the minimum wage effect on menu price in the restaurant industry. Aaronson (2001) use the price data of McDonald's Hamburger, Kentucky

Fried Chicken, and Pizza Hut Pizza during 1978-1995 and find the price pass through minimum wage on these menu prices. Basker and Khan (2016) use the quarterly data of city level during 1993-2014 and derive the price pass through minimum wage on fast food menu prices level. Fougère, et al. (2010) use the monthly price level data of French Statistical Institute (Insee, Paris) from July, 1994 to February, 2003 and find the positive relationship between minimum wage and restaurant price level. Lemos (2008) find the price pass through using the partial and general equilibrium model. MacDonald and Aaronson (2006) use the U.S. Bureau of Labor Statistics (BLS) data from 1996 to 1997 and find the existence of price pass through.

Card and Krueger (1993), Even and Macpherson (2014), and Lynn and Boone (2015) investigate the minimum wage effect on employment in the restaurant industry. Card and Krueger (1993) find that the increased minimum wage in New Jersey does not have a significant effect on employment of fast-food restaurant. Even and Macpherson (2014) find that increased tipped minimum wage enhance earnings of employers in full-service restaurants, however, decrease employments in full-service restaurants. Lynn and Boone (2015) argue that increased minimum wage in restaurant industry increases wages, however, does not have a significant effect on employment.

Even though a change in minimum wage directly affects prices or employment based on previous literature, it also can be hypothesized that expenditures in the restaurant sector could also be impacted by pricing changes in the industry as restaurants respond to minimum wage changes. Restaurant expenditures can be decomposed by restaurant demand and menu price. If price pass through exists, then restaurant expenditure would increase by increased minimum wage. If restaurant demand has a negative relationship with its price and price pass through exists, then restaurant expenditure would decrease by increased minimum wage.

The U.S. restaurant sector in 2016 accounted for 10% of the total employment in the U.S. and is dominated by single location operations; also, single location restaurants accounted for more than 70% of all restaurants (National Restaurant Association, 2016). More than 90% of restaurants employ fewer than 50 employees and changes to the minimum wage could have significant impacts on the future success and failures in the restaurant sector.[2] Despite some studies that have examined a variety of effects in the minimum wage, the questions of whether and to what extent minimum wage reduces or increases restaurant expenditures are not well understood. Therefore, this study investigates the impact of minimum wage on the restaurant expenditures by evaluating menu price changes due to a minimum wage change.

Ham, et al. (2004), Liu, et al. (2013a), and Liu, et al. (2013b) utilize the Tobit model to estimate food away from home (FAFH) expenditures. The theoretical expenditure functions employed in these studies contain the price variable; however, the empirical models of these studies do not take into account price information as a result of data restrictions. A critical advancement of this research is the incorporation of a price index for food away from home. Even though data for the price is available, previous studies' model specifications do not explicitly capture the effect of price change on expenditure by using both price and quantity.[3] By decomposing expenditure into the price and quantity components, we can address previous shortcomings.

This study assumes that an increasing minimum wage results in an increasing the menu price at restaurants. Basker and Khan (2016) and MacDonald and Aaronson (2006) employed the same assumption in their study. An increased menu price in the restaurant may be associated with a reduction in expenditures based on the economic theory and empirical studies such as Weatherspoon, et al. (2013). However, there is no empirical literature for the relationship between minimum wage and Food Away from Home (FAFH) based the authors' knowledge. Thus, this paper estimates the linear recursive model to identify the effect of minimum wage on restaurant expenditures using a structural equation model using a recursive relationship. The structural equation model, which utilizes the recursive model, allows for an

estimate of the minimum wage effect on restaurant expenditures through the price path. Moreover, this recursive form with structural equations allows for assumptions to maintain the low unemployment rate since restaurant expenditures are used to determine the impact of minimum wage on restaurant expenditures needed to maintain this low unemployment rate.[4]

2. Theory for Supply Shock, Price, and Demand

According to the microeconomic theory, supply shocks are defined as unanticipated changes in factor costs (Jerger and Michaelis, 2003). Among supply shocks, wage and income explain about 2/3 of aggregated activities (Jerger and Michaelis, 2003). Thus, a change of minimum wage in FAFH or the restaurant industry may explain a large part of the variation in supply shocks. FAFH or the restaurant industry has a characteristic of the competitive market since there exist many suppliers and consumers. At the competitive market, the marginal cost is equal to the market price at the equilibrium. Thus, this paper can consider the marginal cost as price (P=MC).

This study follows Bils (1987) for understanding the supply shock and price (or marginal costs). The condition, relative marginal cost=relative marginal product, is a necessary condition for a cost minimization. Following equation defines the marginal cost of average hours of work for production workers holding other conditions such as production and employment.

$$\mathrm{MC} = \left(\frac{\mathrm{dCosts}}{\mathrm{dH}}\right) \times \left(\frac{\mathrm{dH}}{\mathrm{dY}}\right) | Y^*, H^*, N^*, etc^* \tag{1}$$

where, *Y* is output, *N* is employment, *H* is average work hours, and *etc* is other factors such as interest rate and rental costs.

Bils (1987) also assume the production technology function as the following form.

$$\mathrm{Y} = H^{\alpha}\mathrm{f}(\text{everythin but H}) \tag{2}$$

This function is less restrictive than Cobb-Douglas technology function. Bils (1987) allows the productivity shock as the multiplicative form with respect to average working hours. Thus, production function of Bils (1987) implies the following equation.

$$MC = \left(\frac{1}{\alpha}\right)\left(\frac{H^*}{Y^*}\right)\left(\frac{dCosts}{dH}\right)|_* \tag{3}$$

This function implies that if the marginal wage increases, then the marginal cost will increases. In the restaurant industry, the increase of minimum wage indicates the increase of marginal costs. Considering the competitive market structure of restaurant industry, the price of the restaurant will increase under the increase of minimum wage.

Consumers buy their food products on food away from home (using restaurants) or food at home (using grocery stores). Restaurants are one of the industries that heavily depend on minimum wage workers. Therefore, the impact of minimum wage on price may be high in restaurant industry compared to food at home. In this case, the utility maximization theory explains the decrease of restaurant demand in the case of increasing trend of the minimum wage. The food away from home and food at home are a normal good, thus the increase of price at food away from home decreases of food at home demand by substitution and income effect.

3. Empirical Model and Method

The purpose of this paper is to estimate the impact of minimum wage on restaurant expenditures via changes in restaurant pricing. This manuscript utilizes a recursive structural equation framework to capture the restaurant price effect on restaurant expenditure through minimum wage changes. First, this article determines the appropriate design specification for the restaurant price determinants. This study follows the model specification of Basker and Khan (2016) which define the determinants for prices of a fast-food restaurant using Equation 4. Based on Basker and Khan (2016), the determinants of restaurant menu prices are as follows.

$$Ln(Price_{it}) = \beta_0 + \beta_1 Ln(minimum\ wage) + u_i + v_t + s_i + \varepsilon_{it} \quad (4)$$

where, *i* is household, *t* is the year, *Price* is a consumer price index, u_i is household fixed effect, v_t is year fixed effect, *minimum wage* is state minimum wage, and ε_{it} is and *i.i.d.* disturbance term. In addition, we used the state fixed effects, s_i, to control the potential omitted unobservable variable bias which are constant over time and specific to each state (Buck et al., 2016; Nemati et al, 2016). ..This study does not specify the food expenditures between fast food and full-service restaurants due to data limitations. Therefore, this study employs aggregated expenditures between all restaurants as FAFH expenditure.

The expenditure function defined by Equation 5 is utilized to determine the model specification of the restaurant expenditure.

$$Expenditure = Price \times Quantity \quad (5)$$

Take a log both sides of the equation; this paper derives the following equation:

$$Ln(Expenditure) = Ln(Price) + Ln(Quantity) \quad (6)$$

The restaurant industry displays characteristics of a competitive market with a large number of suppliers and consumers. Thus, the equilibrium quantity of restaurant food is defined as a quantity demanded of restaurant food. Following Ham, et al. (2004) for the restaurant demand determinants. The following function indicates the determinants for restaurant food demand:

$$\begin{aligned} Ln(Demand) = {} & \beta_0 + \beta_1 Ln(Price) + \beta_2 Ln(Habit\ Formation) \\ & + \beta_3 Income + \beta_4 Race + \beta_5 Marital\ Status \\ & + \beta_6 Education + \beta_7 Child\ Number \\ & + \beta_8 Presence\ of\ Infants + \beta_9 Housing\ Tenure \\ & + \beta_{10} Number\ of\ Earners + u_i + v_t + s_i + \varepsilon_{it} \end{aligned} \quad (7)$$

Figure 1 shows the path flows once equations (4), (5), (6) and (7) are combined.

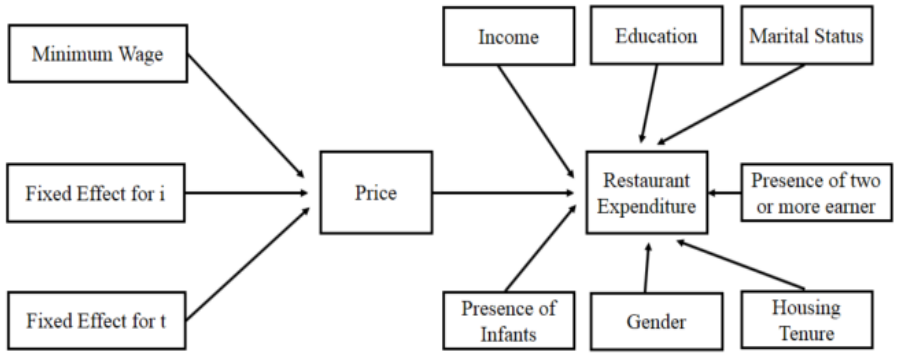

Figure 1. Structural Equation Model for Restaurant Expenditure

4. Data

This study utilizes the Consumer Expenditure (CE) Survey data provided by the U.S. Department of Labor, Bureau of Labor Statistics. Based on the Handbook of Methods provided by U.S. BLS (2015), the consumer expenditure surveys are defined as specific studies on data associated with day-to-day family expenses for goods and services. The survey mainly collects data on income, expenditures, and consumer characteristics. The CE contains two different surveys: the weekly diary survey and a quarterly interview survey. Each survey has specific data collection methods, and the data release date is one-year lagged from the date collected. The survey size typically ranges from 7,500 to 8,000 consumer units. A consumer unit is defined as either a family or individual consumer. CE interviews are conducted every three months over five consecutive quarters. The survey collects information on expenditures, including large purchases, recurring expenditures, continuing expenses, and other expenses except for nonprescription drugs, housekeeping supplies, and personal care products (Mabli and Malsberger, 2013).

Figure 2. The U.S. Federal Minimum Wage Rates through 2000 to 2015

Table 1. Descriptive Summary Statistics (N=6,873)

Variable	Type	Description	Mean	Std. Dev	Exp. Sign
Wage	Continuous	Annual minimum wage rate in log	1.860	0.182	
Price	Continuous	Average annual Consumer Price Index (CPI) in log	5.311	0.148	+/-
Demand	Continuous	Demand for Food Away from Home in current year in log	-1.731	1.132	
Habit	Continuous	Demand for Food Away from Home in previous year in log	-1.730	1.132	+
Income 1	Binary	1 if income category is less than $5,000 and 0 otherwise	0.023	0.149	+
Income 2	Binary	1 if income category is between $5,000 and $9,999 and 0 otherwise	0.025	0.157	+
Income 3	Binary	1 if income category is between $10,000 and $14,999 and 0 otherwise	0.048	0.214	+
Income 4	Binary	1 if income category is between $15,000 and $19,999 and 0 otherwise	0.042	0.201	+
Income 5	Binary	1 if income category is between $20,000 and $29,999 and 0 otherwise	0.105	0.306	+
Income 6	Binary	1 if income category is between $30,000 and $39,999 and 0 otherwise	0.110	0.313	+
Income 7	Binary	1 if income category is between $40,000 and $49,999 and 0 otherwise	0.098	0.298	+
Income 8	Binary	1 if income category is between $50,000 and $69,999 and 0 otherwise	0.171	0.377	+
Income 9	Binary	I if income category is over $70,000 and 0 otherwise	0.377	0.485	+
White	Binary	1 if household is white and 0 otherwise	0.828	0.377	+
Married	Binary	1 if household is married and 0 otherwise	0.570	0.495	+
College	Binary	1 if household's education level is some college, less than college graduate , Associate's degree, or Bachelor's degree	0.540	0.498	+
Grad	Binary	1 if household's education level is Master's degree or Professional/Doctorate degree	0.120	0.326	+
Age_6	Binary	1 if all age of children are less than 6 and 0 otherwise	0.071	0.258	-
Owned	Binary	1 if household owned house and 0 otherwise	0.678	0.467	+
Age	Continuous	Age of household	47.572	16.180	-
Child	Binary	Number of children	0.731	1.109	+
Earner	Continuous	Number of earner	1.422	0.910	+

Note: We calculate demand as total expenditure of food away from home divided by mean price

This study focuses on diary survey data, which mainly includes consumer unit characteristics and income. The U.S. Department of Labor collects and stores annual federal and state minimum wage rates. Figure 2 shows that how the annual federal minimum wage rates change over the period from 2000 to 2015. Based on figure 2, the federal minimum wage rates are constant at $5.15 from 2000-2005 and $7.15 from 2009-2015. During the period from 2006 through 2009, the federal minimum wage rate increased incrementally from $5.15 to $7.15. The overall minimum wage rate increased by 40.78% between 2005 and 2009. This study utilizes annual data due the to the fact that variations in minimum wage rate are only able to be captured on a yearly basis. In other words, there are no differences in the minimum wage rates on a weekly or monthly basis. This paper uses the state level minimum wage for the estimation since each state can set the different minimum wage if it is higher than the federal minimum wage. Usually, there is a high degree of correlation between state, and federal minimum wage changes. Thus this study only uses 6-years of annual panel data from 2005 to 2010 when the annual federal minimum wage was increasing steadily. The 6,873 household observations used in this study are the remaining observations after controlling for respondents who never spent money on food away from home during the study period. Table 1 shows the summary statistics and description of dependent and independent variables with sign expectations.

The price data in this study is utilized based on the consumer price index (CPI) of food away from home provided by BLS. Household income is represented by one of nine different categorical values. This study utilizes all nine levels to examine how total expenditure of FAFH is differently affected by income level. Even though we hypothesize that higher income level leads to increases in total FAFH expenditure, the magnitudes of income effect are substantially different at certain threshold levels. The variable for minimum wage is created by merging state minimum wage rates with the consumer panel dataset based on U.S. Federal Information Processing Standard (FIPS) code since there are variations in the minimum wage rates across states.[5] Compared with Ham, et al. (2004), this study incorporates additional demographic variables such as race, the number of kids, and habit formation.[6] Habit formation is integrated by hypothesizing that total FAFH expenditures in a current year are significantly affected by total expenditures in the previous year. The variable for a number of children is expected to have a positive sign on total FAFH expenditure because an extra child may result in increased spending. The variables of race and state are expressed as dummy due to the idea that total FAFH expenditure is differently affected by different race and state.[7]

5. Results and Discussions

Table 2 shows the main results of the structural equation model with price and demand equations. In Table 2, column 1 represents the primary results of structural equation (SEM) model. Column 2 shows results from the SEM by excluding some independent variables for robustness tests compared with Ham, et al. (2004). Columns 3 and 4 show the results from the ordinary least square (OLS) by estimating price and demand equations separately. Results between OLS and SEM, this study compares the estimated coefficients and standard errors between two models. Across all regression models, this study includes the year and state effects to control time and state heterogeneity. Based on price equation in column 1, this study finds that the price is positively and significantly affected by minimum wage rate. Quantitatively, a one percent increase in minimum wage results in 0.026 percent increase in FAFH price. In the demand equation in column 1, the minimum wage rate through price equation, however, has no significant impact on demand for FAFH. This finding indicates that the supply shock from the minimum wage change has an impact on total annual FAFH expenditure only through the price path.

Table2. The Structural Equation Model with Price and Demand (N=6,873)

Variables	Price Equation (SEM)				Price Equation (OLS)			
	(1)		(2)		(3)		(4)	
Minimum Wage	0.026***	(0.001)	0.026***	(0.001)	0.026***	(0.001)	0.026***	(0.001)
	Demand Equation (SEM)				**Demand Equation (OLS)**			
	(1)		(2)		(3)		(4)	
Price	1.665	(1.264)	1.668	(1.264)	1.665	(1.267)	1.668	(1.267)
$5,000-$9,999	0.033	(0.115)	0.040	(0.115)	0.033	(0.116)	0.040	(0.116)
$10,000-$14,999	-0.035	(0.102)	-0.027	(0.102)	-0.035	(0.102)	-0.027	(0.102)
$15,000-$19,999	-0.012	(0.105)	0.005	(0.105)	-0.012	(0.105)	0.005	(0.105)
$20,000-$29,000	0.089	(0.093)	0.103	(0.093)	0.089	(0.093)	0.103	(0.093)
$30,000-$39,999	0.251***	(0.093)	0.266***	(0.093)	0.251***	(0.093)	0.266***	(0.093)
$40,000-$49,000	0.334***	(0.095)	0.348***	(0.094)	0.334***	(0.095)	0.348***	(0.095)
$50,000-$69,999	0.448***	(0.092)	0.461***	(0.092)	0.448***	(0.092)	0.461***	(0.092)
>$70,000	0.653***	(0.092)	0.666***	(0.092)	0.653***	(0.092)	0.666***	(0.092)
Married	0.110***	(0.030)	0.129***	(0.030)	0.110***	(0.030)	0.129***	(0.030)
College Education	0.152***	(0.030)	0.146***	(0.029)	0.152***	(0.029)	0.146***	(0.029)
Graduate Education	0.189***	(0.046)	0.178***	(0.046)	0.189***	(0.046)	0.178***	(0.046)
Age	-0.006***	(0.001)	-0.007***	(0.001)	-0.006***	(0.001)	-0.007***	(0.001)
Own House	0.150***	(0.032)	0.162***	(0.032)	0.150***	(0.032)	0.162***	(0.032)
Number of Earner	0.058***	(0.018)	0.057***	(0.018)	0.058***	(0.018)	0.057***	(0.018)
Habit Formation	0.006	(0.011)			0.006	(0.011)		
White	0.128***	(0.035)			0.128***	(0.035)		
Number of Child	0.027**	(0.013)			0.027**	(0.013)		
Log Likelihood	12040.4		12030.7					
R-Squared					0.151		0.151	

Note: ***, **, * Significant 1%, 5%, and 10%, respectively. () is standard error. Regression models include year and state fixed effects.

For different income categories, this study finds that the demand for FAFH is differently affected by different income levels. If household's income level is 2, 3, 4, or 5 income categories, there is no significant income effect on FAFH demand compared to income class 1. In other words, if household's income level lies between $5,000 and $29,999, FAFH demand is not significantly affected compared to income level with less than $5,000. However, the FAFH demand is significantly associated with income categories between 6 and 9 (i.e., $30,000 and over $70,000). Also, statistical powers are increasing as the income category increases by one unit from income group 6. These findings indicate that total FAFH demand and expenditure are positively associated with the minimum annual income level more than $30,000. It also suggests that people tend to consume more in FAFH compared to food at home as the household income increases with a minimum annual earnings level more than $30,000.

For the demographic variables, this study finds that annual FAFH demand is positively associated with the married households and number of children compared to the single households and no child households respectively. This plausible positive relationship can be explained with additional spendings as number family members increases. This finding is also consistent with Stewart and Yen (2004) in that single and single parents have a negative impact on FAFH expenditure compared to married and non-single parents. Higher education level leads more annual FAFH expenditure than households who have less than high school level of education due to the fact that higher education level infers higher income level. If households own house, they are more likely spend money for FAFH compared to the households who do not own house. Even though the own house is not directly and strongly related to the higher income level, it may able to be explained by the correlation between the own house and other variables. Age, however, is negatively related to the annual FAFH. The negative relationship between age and FAFH expenditure is consistent with other previous studies such as McCracken and Brandt (1987), Yen, et al. (2012), and Liu, et al. (2013b). Finally, we hypothesized that households tend to consume more FAFH of current year than FAFH of the previous year. It is because this study hypothesizes that the habit formation exists in FAFH markets. Results show that the lagged FAFH demand does not have a significant effect on the FAFH demand of current year. This finding indicates that current FAFH demand does not depend on the previous demand.

Table 3. Comparison Standard Errors between SEM and OLS

	Price Equation	
	Between (1) and (3)	Between (2) and (4)
Minimum Wage	0.0000	0.0000
	Demand Equation	
	Between (1) and (3)	Between (2) and (4)
Price	-0.0034	-0.0031
Income 2	0.0000	-0.0003
Income 3	-0.0003	-0.0003
Income 4	-0.0003	-0.0003
Income 5	-0.0003	-0.0002
Income 6	-0.0003	-0.0002
Income 7	-0.0003	-0.0002
Income 8	-0.0003	-0.0002
Income 9	-0.0002	-0.0002
Married	-0.0002	-0.0001
College Education	-0.0001	-0.0001
Graduate Education	-0.0001	-0.0001

Age	-0.0001	0.0000
Number of Infant	-0.0001	-0.0001
Own House	0.0000	-0.0001
Number of Earner	0.0000	0.0000
Habit Formation	-0.0001	
White	-0.0001	
Number of Children	0.0000	

Note: We calculate the differences by subtracting standard errors in OLS from SEM

Based on the result of column 2 in Table 2, this study finds that the estimated coefficients and signs are robust compared to the main result in column 1. It is because all coefficients in column 1 and 2 are identical across two models with the same significance levels. Results of column 3 and 4 represent estimated coefficients from the OLS by estimating price and demand equations separately, and this study finds that estimators in our benchmark model, which is SEM model, are robust. All coefficients in column 1 and 3 have a similar value as well as the significance.

Table 3 shows the comparison standard errors between SEM and OLS. Results indicate that the standard errors in SEM are smaller than OLS, which implies that estimators of SEM are more efficient than OLS. This result may come from an advantage of SEM that coefficients are estimated based on the simultaneous relationship. However, estimators of OLS do not capture and control the simultaneous relationship among minimum wage, price, and FAFH expenditure. Therefore, residual variance in OLS is expected to be higher than SEM. Thus estimators of SEM has smaller values of standard errors compared to OLS. It implies that ignoring the possible simultaneous relationships to estimate the model may derive less efficiency estimators compared to SEM.

6. Conclusion

This paper investigates the impact of minimum wage on FAFH expenditures using the data from BLS for periods 2005 to 2009. This study supposes that the menu price of FAFH is affected by a change of minimum wage since this factor is one of key supply shocks. The utility maximization theory also indicates that an increase of menu price will reduce demand of FAFH. To capture these two aspects, this paper adapts SEM to estimate the model. This study finds that the restaurant price (i.e., menu price) is positively associated with the minimum wage rate. The supply shock from the minimum wage change through price equation, however, has no significant impact on demand for FAFH. Also, this study finds that the demand for FAFH is differently affected by different income levels. Specifically, the FAFH demand is positively associated with income categories between $30,000 and over $70,000 whereas any income categories less than $30,000 has no significant impact on the FAFH demand. Finally, this study shows that use of SEM reduces standard errors compared to OLS. This finding implies that ignorance of simultaneous relationship leads incorrect statistical inference.

This paper has several contributions and implications to existing literature for FAFH expenditure. The first contribution of this study is to develop the proxy variable for the FAFH price using the FAFH price index in BLS. Considering most previous literature does not take into account the price variable in the expenditure function due to the data limitation, making a proxy variable for the FAFH price may help to derive more accurate FAFH expenditure estimators. Second, decomposing expenditure into demand and price, this study captures not only the price effect but also demand effect on FAFH from a price change. It is because the decomposition allows for the estimation of quantity and price effect separately. Third, this

study finds that the government policy for increasing minimum wage results in mixed policy implications for the restaurant industry.

The results of this paper show that the minimum wage has a significant impact on FAFH price; however, FAFH price does not have a significant effect on FAFH demand. These results indicate that the increasing minimum wage does not have an impact on FAFH demand. In this sense, the purpose of government policy to protect low-income people is satisfied without loss of expenditures. This finding infers that restaurants may not consider reducing employees since FAFH expenditure is not substantially affected by a minimum wage, caused by the change in FAFH expenditure. It also supports the non-negative relationship between minimum wage and employment (Allegretto, et l. (2011). However, there is a probability that the supply shock based on increasing minimum wage deteriorate the chances of creating jobs from the expansion of FAFH since the sales growth of restaurant in U.S. between 2007 and 2010 is relatively lower than other periods. Future studies should investigate the net effect of minimum wage based on minimum wage itself and employment effect to measure the policy efficiency of the minimum wage.[8]

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[1] This study assumes that those industries are relatively less affected by change in minimum wage. This is due to the fact that their hour wages are not depending on minimum wage.
[2] The increase of minimum wage makes restaurants business to thrive harder (Ayers, 2016)
[3] Quantity is defined by the function of price (Q=f(P)).
[4] Restaurant sales are one of important factors for the closure of business, thus restaurant expenditures also may be highly correlated with restaurant employments.
[5] The state FIPS codes are generally defined as both numeric and two letter alphabetic codes, and each state is uniquely identified by the codes.
[6] This study uses age of children less than 6 as proxy for the presence of infant.
[7] Especially for state variable, this study creates 13 state dummies in order to control state heterogeneity
[8] Hill and Ybarra (2014) point out that less educated people have a problem with less stable employment in recent decades. Considering the education level is positively correlated with the income level, offering stable jobs and more jobs may help the low-income people's life standard.