Is Wal-Mart a Monopsony? Evidence from Local Labor Markets

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Contributed Paper prepared for presentation at the International Association of Agricultural Economists Conference, Beijing, China, August 16-22, 2009

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Abstract

This paper measures the degree of monopsony power exerted by Wal-Mart over retail workers using a dominant-firm model and data in the 48 contiguous U.S. states for counties where the company operates, presenting for the first time a measure of the company's anti-competitive behavior. Empirical results show that Wal-Mart's monopsony power over workers varies significantly across the country, being higher in non-metro and rural counties, particularly in the south. For instance, Wal-Mart's buying power index in labor markets in rural southern and central states is estimated to be 5% or higher while the impact on northeastern states' retail wages is negligible.

JEL: J42, L13, L81

1. Introduction

Wal-Mart, the largest retailer in the world, employs nearly 1.4 million people in the United States (Wal-Mart Stores Inc., United States operational data sheet, May 2007), making it the largest private employer. The growth of Wal-Mart in the last two decades, fueled by the company's low prices,[1] has significantly altered the retailing and employment landscape throughout the country. Moreover, the company has faced nationwide criticism for its wages and labor conditions, prompting numerous labor-practice lawsuits and local and state attempts to target and regulate its labor practices.[2]

Critics contend that the company undercuts wages, although the empirical evidence to support this claim is scant and mixed. While Ketchum and Hughes (1997) find no evidence of a Wal-Mart impact on wage growth and employment across Maine counties, Neumark, Zhang and Ciccarella (2008) find that Wal-Mart lowers per capita earnings by approximately 2.7% per store opening. Dube, Lester, and Eidlin (2007) find a negative impact on retail earnings estimated to be between 0.5 and 0.9%, primarily associated with increased rents for the company. Basker (2005a), on the other hand, finds that Wal-Mart has a small positive effect on county-level retail employment, even as it reduces wholesale employment, but wages impacts are not addressed.

Figure 1 illustrates the correlation between Wal-Mart retail labor shares and average retail labor earnings in counties where the company operated in 2006.[3] It is interesting to note that higher Wal-Mart labor shares are associated with lower workers' earnings, suggesting a wage-decreasing effect. As Table 1 indicates, retail worker earnings are lower in states where Wal-Mart's presence is higher, (particularly in the southern and midwestern United States). However, this is not evidence of exploitation, as these figures do not correct for local market

conditions or productivity differentials and do not consider the presence of monopsony power markdown. Wal-Mart's lower wages may be due to the company's buying power, a higher productivity of non-labor inputs, and/or its strategic location in lower-wage markets. The available literature has focused on controlling for the latter without relying on a structural model that explicitly accounts for the sources of the company's lower wages, leaving interpretation hostage to empirical results. The benchmark for comparison has so far been wages in counties where Wal-Mart does not operate, which does not necessarily reflect the competitive benchmark once a Wal-Mart has located there.

Given the public concern over the impact of the company on retail workers and the existence of competing explanations for its alleged wage-decreasing effects, there is a need for formal structural analysis that quantifies the effect and rigorously tests the hypothesis of monopsony power over workers based on *local* rather than nationwide conditions.

This paper estimates a dominant firm model to measure Wal-Mart's monopsony power in local labor markets, using a cross section of data for all the counties in the contiguous U.S. where the company operated in 2006. Empirical results show that although Wal-Mart's monopsony power is on average limited (the average markdown is approximately 2%), the company does exert a significant amount of oligopsony power over workers in non-metro and rural counties located in south central states where the percent markdowns on retail worker earnings often exceed 5%, while the markdown in the northeast are negligible. While we find evidence to support the criticisms in some states, the findings do not support the notion that this is a nationwide problem.

2. The Model

The model that follows relies on the assumptions of no worker mobility across markets and homogenous labor, instrumental to the empirical implementation of the model due to the lack of industry-specific data on workers' retribution and mobility at the local level. For simplicity, it is also assumed that labor is the only variable input used to sell a bundle of goods at competitive prices and that minimum wages are not binding. Consider a simple dominant firm model, as depicted in Figure 2. The monopsonist, *i.e.*, Wal-Mart, sets wages at the level where its marginal revenue product of labor ($MRPL_{WM}$) equals marginal labor cost (*mlc*) above the company's residual supply of labor (x_{WM}^{s}, obtained by subtracting the fringe demand for labor from the total supply of labor). This results in both a wage rate w^{*} and an employment level x_{WM}^{*} that are below the perfectly competitive ones (w^{pc} and x_{WM}^{pc}, respectively).[4]

Let $X_T^s\left(w, Z_T^s\right)$ and $x_{FR}^d\left(w, Z_{FR}^d\right)$ denote the total supply of and the fringe demand functions for labor, where Z_T^s and Z_{FR}^d are respectively vectors of shifters. Given the assumption of homogeneous labor the residual supply of labor for Wal-Mart can be obtained by:

$$x_{WM}^s = X_T^s\left(w, Z_T^s\right) - x_{FR}^d\left(w, Z_{FR}^d\right) = x_{WM}^s\left(w, Z_T^s, Z_{FR}^d\right) \ . \qquad (1)$$

The first-order condition for profit maximization w.r.t. wages yields:

$$w^{*} = MRPL_{WM}\frac{\eta_{WM}^s}{1+\eta_{WM}^s}, \qquad (2)$$

where η_{WM}^s is the wage elasticity of the residual labor supply to Wal-Mart $\left(\eta_{WM}^s = \partial \ln x_{WM}^s / \partial \ln w\right)$. From (2), one can derive the classical measure of monopsony power in labor markets, what Pigou (1924, p. 754) defined as the "rate of exploitation" and

Blair and Harrison (1993) refer to as the Buying Power Index (*BPI*), given by the inverse of the elasticity of the residual supply of labor:

$$BPI = \frac{MRPL_{WM} - w^*}{w^*} = \frac{1}{\eta^s_{WM}}. \quad (3)$$

Since labor is assumed homogeneous, the supply of labor to Wal-Mart cannot be directly observed, an alternative expression of the BPI is obtained combining (1) and (3):

$$BPI = \frac{S_{WM}}{\eta^s_T - \eta^d_{FR}(1 - S_{WM})}, \quad (4)$$

where $S_{WM} = x_{WM} / X_T$ is Wal-Mart's labor market share, $\eta^d_{FR} = \partial \ln x^d_{FR} / \partial \ln w$ is the elasticity of the fringe demand for labor, and $\eta^s_T = \partial \ln X^s_T / \partial \ln w$ is the elasticity of the total supply of labor.[5] In order to estimate *BPI*, one needs values for both η^d_{FR} and η^s_T. To this end, assume the total supply of retail labor takes a log-linear form, given by:

$$\ln X_T = \alpha_0 + \eta^s_T \ln w + \sum_l \alpha_l Z^s_{Tl} + e^s_T, \quad (5)$$

where the Z_Ts are labor supply shifters, the αs are parameters to be estimated, and e^s_T is an error term.

The fringe revenue function is assumed to be:

$$R_{FR} = \frac{Z_{FR} x^{1+\varepsilon_{FR}}_{FR} k^{\gamma}_{FR}}{1 + \varepsilon_{FR}}, \quad (6)$$

where R_{FR} represents revenues accruing to fringe retailers, $1+\varepsilon_{FR}$ the revenue elasticity with respect to labor, and γ the revenue elasticity with respect to capital. For (6) to be well-behaved, $1+\varepsilon_{FR} > 0$ or $\varepsilon_{FR} > -1$, $\gamma > 0$ and $1+\varepsilon_{FR}+\gamma > 0$. Under the assumption of a competitive fringe, the wages offered will be equal to the marginal revenue product of labor:

$$w = MRPL_{FR} = Z_{FR} x_{FR}^{\varepsilon_{FR}} k_{FR}^{\gamma}. \qquad (7)$$

Taking natural logs on both sides of the equations, rearranging and adding a random error term, an empirical expression for the fringe retailers' demand for labor is:

$$\ln x_{FR} = \eta_{FR}^{d} \ln w - \eta_{FR}^{d} \left(\gamma \ln k_{FR} + \beta_0 + \sum_k \beta_k Z_{FRk}^{d} \right) + e_{FR}^{d} , \qquad (8)$$

where ln is the natural log operator; the β_ks are parameters to be estimated; the Z_{FR}^{d}s are labor demand shifters; and e_{FR}^{d} is an error term. For consistency with equation (6), the elasticity of fringe demand, η_{FR}^{d} is expected to be less than < -1 (*i.e.*, fringe retailers' demand for labor is wage-elastic).[6]

To complete the empirical model, one needs to address the issue that output, usually introduced as a labor demand shifter, is potentially endogenous, as addressed in Quandt and Rosen (1989) and Gorter, Hassink, Nijkamp and Pels (1997). To deal with this problem, output is modeled explicitly with an additional equation following Quandt and Rosen's (1989) approach. Using (6) and normalizing output prices to 1, an instrument for the log of output is expressed as[7]

$$\ln y_{FR} = \ln R_{FR}\big|_{p_{FR}=1} = \delta_0 + \frac{1+\eta_{FR}^{d}}{\eta_{FR}^{d}} \ln x_{FR} + \gamma \ln k_{FR} + \sum_l \delta_l Z_{FRl}^{y} + e_{FR}^{y}, \qquad (9)$$

where $\delta_0 = -\ln\left(1+\eta_{FR}^{d}\right)\big/\eta_{FR}^{d}$ and $\sum_l \delta_l Z_{FRl}^{y} = \ln Z_{FR}$; the Z_{FR}^{y}s are output shifters; the δs parameters to be estimated; and e_{FR}^{y} is an error term.

Summarizing, the model to be estimated consists of three simultaneous equations: total supply of retail labor (equation 5), demand for labor by fringe retailers (equation 8), and

an output instrument (equation 9). From the estimated parameters, Wal-Mart's monopsony power over workers can then be obtained using equation (4).

3. Data and Estimation

Using the political boundaries of counties as the geographical definition of labor markets, the data used to estimate equations (5), (8) and (9) consisted of 1,641 contiguous U.S. counties in which Wal-Mart operated in 2006. Seventy counties were excluded due to missing data. For the purposes of analysis, this sample (which will be referred to as the "full sample") was sub-divided using the Economic Research Service/USDA Rural-Urban Continuum Codes into metro (N=761), non-metro (N=640) and rural (N=240) counties.[8]

Wal-Mart employment at the county level came from aggregating individual store employment data from Dun & Bradstreet's Million Dollar Database (D&B).[9] Total county retail employment (NAICS 44) and earnings came from the County Business Patterns (CBP) database of the U.S. Bureau of Census, excluding Motor Vehicles and Parts Dealers (NAICS 441) as in Basker (2005a). Then Wal-Mart's shares of retail employment and average retail earnings (used in lieu of wages) were computed.

For equation (5), the dependent variable is total county retail employment discussed above. The supply shifters are: total size of the labor force, unemployment rate[10] (following the disequilibrium model of Hall, Henry and Pemberton, 1992); earnings for other low-skilled jobs (measured by the per capita earnings for the NAICS 722 industry: Food Services and Drinking Places); and composition of the labor force. The last includes the percentages of the population that are female, white non-Hispanic, and belonging to the three age groups 15-24, 25-64 and over 65 years of age. County labor force data including total labor force

and unemployment rate are retrieved from the U.S. Bureau of Census County Population Survey (CPS), while county-level population characteristics are retrieved from the Population Estimates Program. Per capita earnings for the NAICS 722 industry are obtained from the CBP. Due to disclosure issues, 191 counties in the sample presented missing values for this variable: since this lack of reporting may indicate less employment opportunity for low-skilled individuals, missing values were replaced by zeros and an indicator variable included as an additional shifter to capture a county's relative lack of low-skill job alternatives to retailing.

For equation (8), the dependent variable is total retail employment minus Wal-Mart's. A first set of fringe demand shifters are: capital investment (measured by the number of fringe stores per square mile), the state-level percentage of unionized workers (from the CPS) and fringe output. A different set of shifters is added to capture the adjustments of the fringe demand for labor as a consequence of the presence of Wal-Mart. As Khanna and Tice (2000) showed, Wal-Mart's presence may trigger strategic and technological changes in competing firms. In adopting cost reducing technologies, competing retailers may reduce the number of workers they need and demand different skill sets in the workers they hire, which may result in job polarization (Goos and Manning 2007), leading to a relative higher demand in skilled jobs than in least-skilled jobs and falling demand for routine jobs. Wal-Mart's technological push is captured by the number of years Wal-Mart operated in a county (from Thomas Holmes's Wal-Mart store openings database). The percentage of the population above 25 years of age having at least some years of college or a bachelor degree (from the Census of the Population Census 2000) is used as a proxy for workers' skill set; the interaction of these

two variables is introduced to capture any job polarization effect as a result of Wal-Mart's presence.

Equation (9) is estimated to instrumentalize fringe output. The dependent variable is sales data for retail establishments (excluding NAICS 441) from the 2002 Economic Census. The 2002 sales values are projected to 2006 values using the growth of retail Gross State Product (GSP) from 2002 to 2006. Counties' contribution to the retail GSP are calculated using a procedure similar to Bauer and Lee's (2006) method to estimate the GSP from national data[12] (the data for the computation are obtained from the U.S. Bureau of Economic Analysis). Fringe retailers' sales are obtained subtracting Wal-Mart's sales from D&B to the projected 2006 values. To identify equation (9), a measure of retail labor's partial productivity obtained dividing county-level retail gross product by the number of retail workers is used as shifter.

Since the markdown is determined by the monopsonist's market share, the natural log of earnings is regressed on a set of exogenous variables correlated with Wal-Mart's presence across different geographic areas: county population density, distance from Benton County[11] (measured in hundreds of miles and obtained applying the Haversine formula to county coordinates obtained from the Census Gazetteer of Counties 2000), the squared value of this distance and Census division[13]dummies. The predicted log of earnings is used in place of the actual ones in the system.[14]

All variables used as shifters are expressed in natural log values unless otherwise specified. Also, in order to control for unobservables, the shifters of all equations include fixed regional effects (*i.e.*, dummies for eight out of the nine Census divisions).

Once all the variables were operational, equations (5), (8) and (9) were estimated simultaneously via heteroschedastic robust non-linear three-stage least squares. Four versions of the model were estimated: the full sample, metro counties, non-metro counties and rural counties. The results are presented below.

4. Empirical Results and Discussion

Econometrics Results

The parameter estimates and the associated statistics using the full sample are presented in Table 2. Nearly all the parameters are statistically significant at the 1% level and have the expected signs. Furthermore, the Wald test for joint significance of the model is significant at the 0.1% level.

The elasticity of retail labor supply with respect to wages is approximately 0.74, indicating a moderate responsiveness of workers to wages. In terms of shifters, the results are consistent with the expected composition of the population willing to work in the retailing industry: female individuals and those in age groups including high school/college students (15-24) and retirees (over 65) are more likely to actively seek jobs in retailing, being more willing to accept part-time jobs and the flexibility required by retailing jobs; being non-Hispanic white seems a deterrent to supplying labor to retail establishments. Restaurant workers' earnings are positively related to the supply of labor in retailing, suggesting a moderate complementarity between the two types of low-skill jobs;[15] also it appears that the retail supply of labor increases when fewer opportunities for unskilled workers are available.

The wage elasticity of the fringe demand for labor is estimated at approximately -8.17, indicating that under monopsonistic wages, fringe retailers will tend to hire

significantly more retail workers, an effect that countervails in part any employment losses from Wal-Mart's anti-competitive behavior.

In terms of shifters fringe retail sales significantly expand the fringe demand for labor, and so do the degrees of capital utilization and unionization, the latter being a likely result of labor surplus generated by negotiation through unions. Results also show that fringe retailers that have been exposed longer to Wal-Mart tend to hire fewer workers. This suggests that the presence of Wal-Mart pushes its competitors toward labor-saving technologies. Also, the estimated coefficients for the education variables suggest that fringe retailers' demand for labor is lower for skilled workers than for unskilled ones. The positive interaction of education and number of years of Wal-Mart's presence indicates that low-skill workers are penalized more than high-skill ones as labor-saving technology is put into place, which could be a consequence of the job polarization discussed by Goos and Manning (2007).

The estimated parameters for the fringe output equation are significant and satisfy the restrictions of the theoretical model. Both the estimated output elasticity of labor (0.8776) and capital (0.0519) are significant at the 1% level. As expected, the partial productivity of labor increases output.

To gain further insight into Wal-Mart's behavior in local labor markets, the model is estimated separately for three sub-samples, metro, non-metro and rural areas as defined in the preceding section. The parameter estimates and associated statistics are presented in Tables 3 to 5. The retailing supply of labor becomes more elastic as the analysis moves from metro to non-metro to rural areas (the estimated values are 0.8844, 1.1894 and 2.8978 respectively). These results indicate that workers in rural communities are much more responsive to

changes in retail wages than urban workers, meaning that they are more willing to supply labor to the retail industry as wages increase, but are also more easily discouraged by wage decreases, making Wal-Mart's wage decisions more crucial for rural areas.

The other insight from the three sets of split-sample estimates is that the age composition of the labor force matters more in metro and non-metro areas than in rural areas. The retail labor supply is strongly driven by the older (over 65) and younger (15-24) populations in metro and non-metro areas, while in rural areas there appears to be less incentive for younger individuals while individuals in other age groups are equally likely to supply labor to retailers. This difference along with the fact that retail workers are less sensitive to wage changes in metro and non-metro than in rural areas indicates that retail jobs are more appealing to the total workforce in those areas where there may be few employment alternatives.

The estimated fringe retailers' demand for labor is more wage elastic in metro counties (the estimated value is -6.4036) than in non-metro (-4.0743) and rural ones (-4.7949). This implies that labor is a more important input for fringe retailers operating in rural areas than for those operating in urban ones, which is also supported by the smaller estimated parameters for capital in the fringe output equations. Interestingly, in the results for both the non-metro and rural samples, the estimated parameters for the number of years of Wal-Mart's presence and for education are positive, while their interaction produces a negative coefficient. This may indicate that lack of job opportunities in non-metro and rural areas enables fringe retailers to hire highly educated individuals and that, as fringe retailers respond to Wal-Mart's presence by changing labor utilization technology, they will be more interested in hiring lower-wage low-skilled individuals to keep labor costs down.

In sum, what the split-sample regressions indicate is that the total supply of retail labor is more sensitive to wages in non-metro and rural counties than in metro ones while for the fringe demand the wage-sensitivity is more marked in metro areas. These findings have direct implications for Wal-Mart's residual labor supply elasticity and therefore for the company's monopsony power. Given the magnitude of the estimated coefficients for the three subsamples, one would expect the estimated *BPI* to be smaller for metro areas than for non-metro areas, regardless of Wal-Mart's retail labor shares. Also, for a given value of Wal-Mart's labor share, the company is expected to show less monopsony power over workers in rural areas than in metro or non-metro areas, results driven by the difference of the wage elasticity of the supply of retail labor.

Monopsony power estimates

The buying power indexes are estimated as in equation (4), using the econometric estimates of the total labor supply elasticity and the fringe demand elasticity with respect to wages as well as Wal-Mart labor market shares. As shown at the bottom of Tables 2-5, these estimates were highly significant.

For the full sample, the average residual supply elasticity facing Wal-Mart was estimated at 50.47, leading to a *BPI* of 1.98%, indicating that *nationally* Wal-Mart pays wages that are nearly 2% below the marginal revenue product of labor. Considering that the *BPI* provides an upper bound to the percentage of wage decrease (the BPI would represent the effective percentage decrease in earnings only if the monopsonist's demand for the input was infinitely elastic) this average result appears to be consistent with both Neumark *et al.*'s (2008) and Dube *et al.*'s (2007) findings.

Considering that the Department of Justice does not have well-developed monopsony guidelines, applying a 5% rule (considered by the antitrust authorities in the evaluation of market power in merger analysis as a "small but significant" level of market power) as a threshold of imperfect competition, a 2% markdown on wages nationally does not appear to be a compelling case for action against Wal-Mart by antitrust authorities or anti-Wal-Mart organizations.

However, for metro counties, Wal-Mart's average residual supply of retail labor is estimated at 62.83, resulting in a *BPI* of approximately 1.59%, while for non-metro and rural samples Wal-Mart average residual supply elasticities are estimated to be approximately 25.12 and 29.42 (respectively), leading to *BPI*s of approximately 3.98% and 3.40%, closer to the 5% threshold. Thus, overall, the issue of monopsony power is less relevant in urban America where Wal-Mart often faces criticism for its labor practices. In fact, Wal-Mart estimated *BPI*s exceed the 5% threshold in only 7.49% of counties classified as metro, while this threshold is surpassed in 30.47% and 21.67% of non-metro and rural counties, respectively.

Further insight is obtained when monopsony power is calculated by states, as shown in Table 6. Given that the magnitude of *BPI* increases with the monopsonist's market shares (Blair and Harrison, 1993), Wal-Mart is expected to have significantly greater market power in counties where it is the predominant employer in retailing. In fact, two consistent results are that Wal-Mart shows larger market power in 1) non-metro and rural counties than in metro ones, and 2) that in non-metro and rural areas of some southern and central states, the average *BPI*s exceed 5%.

It should be noted that, given the estimated elasticities obtained from the rural sample, Wal-Mart was expected to have less monopsony power in rural areas than in others. However, the results show the company having significant market power in these areas and this, thanks to its large retail labor shares, is also a result of other retailers' lack of interest or incentives to locate their stores in rural America.

Thus, non-metro and rural counties in south-central states, as well as in other selected states where the company's presence is strong, are where Wal-Mart monopsony power is the highest, exceeding 7% in rural Idaho; 6% in rural Louisiana, Utah and non-metro Kentucky; 5% in six states' non-metro areas (Arkansas, Indiana, Kansas, Louisiana, Virginia and West Virginia) and in two states' rural areas (Florida and Kansas). On the other hand, Wal-Mart's monopsony power over workers is minimal in the Northeast, with Vermont showing the lowest *BPI* among all states.

Given the considerable number of southern states where the average Wal-Mart *BPI* was larger than (or close to) the 5% threshold, the model was re-estimated using a subsample for southern states. Given the small number of rural counties in this subsample (N=108) the model was estimated for the full southern states sample, and for two subsamples of southern metro and southern non-metro plus rural counties (referred to as "non-metro" for simplicity). The estimated elasticities and Wal-Mart state-level average *BPI*s are reported in Table 7.[16]

Restricting the sample to southern states produces estimates that differ from those obtained from the full sample. The estimated elasticities for the full sample of southern states show smaller magnitudes than those obtained from the full nationwide sample, resulting in an average Wal-Mart *BPI* of 3.08%, which is 50% larger than the national one (approximately 2%). Despite the estimated elasticities resulting in considerably larger state-level *BPI*s than

those obtained from the nationwide sample, none exceeds the 5% threshold. The estimates for the southern metro subsample are extremely close to those obtained from the nationwide data, and so are the estimated state-level *BPI*s. In light of these results, as the values of state-level *BPI*s obtained from the full sample of southern states exceeds those obtained with nationwide data, one would expect that, by restricting the analysis to southern non-metro areas, Wal-Mart would show much larger market power than is shown by the nationwide sample's estimates.

In fact, principally driven by an inelastic supply of retail labor (0.7211), Wal-Mart's non-metro counties state-level *BPI*s exceed the 5% threshold in all four states of the West South Central division (Arkansas, Louisiana, Oklahoma and Texas; with a maximum 8% in Louisiana); the same is observed in Kentucky (6.7%) and Tennessee (5.24%). Of the South Atlantic states, only the Carolinas and Delaware (Wal-Mart's presence is very limited in the latter) do not show Wal-Mart having substantial market power in their rural areas.

Discussion

The results presented above show Wal-Mart being able to exert considerable market power over its workers in limited areas, particularly in non-metro and rural areas in southern and central states. However, when examining individual states, it emerges that those areas where the company's anticompetitive behavior toward workers may raise concern, *i.e,* rural counties in south central and north central states, do not necessarily coincide with areas where Wal-Mart's labor practices are strongly questioned. Of the ten states where Wal-Mart has faced workers' class actions,[17] only three present a *BPI* exceeding the 5% threshold in rural (or non-metro) areas (Georgia, Kentucky and Tennessee). Also, the estimated *BPIs* do

not support the necessity for policy intervention in areas such as in urban Illinois (Chicago's "living wage" ordinance).

Despite finding Wal-Mart exerting monopsony power over its workers, the results presented in this paper do not support policy intervention to mitigate this anti-competitive behavior for three reasons. First, given the small magnitude of the wage-elasticity for the total supply of retailing labor and the large wage-elasticity of fringe retailers' demand for labor, the losses in workers' surplus are likely to be internalized in large part by firms operating in the market with relatively small deadweight losses. Second, the measures presented here are valid for a post-entry scenario and do not consider the overall impact of Wal-Mart's entry on retail labor; there is no *a priori* reason to believe that in counties without Wal-Mart, the perfectly competitive equilibrium wages paid by other retailers would be higher than the monopsony wages set by the company. Third, considering Wal-Mart's depressive impact on retail prices (Basker 2005b; Basker and Noel forthcoming; Hausman and Liebtag 2007) and incumbent retailers' oligopoly power (Cleary and Lopez 2007), there are doubts as to whether deadweight losses from the company's anti-competitive behavior toward workers would overpower consumers' welfare gains.

5. Concluding Remarks

The vivid debate over the impact of Wal-Mart on retail workers' conditions has triggered an increasing number of studies, which have failed to reach conclusive and unanimous findings on the issue. This article estimates and tests for the degree of monopsony

power exerted by the company on *local* retail labor markets, using a dominant firm model and county level data.

Empirical results indicate that Wal-Mart does exert a statistically significant degree of monopsony power over workers but that this varies significantly across the nation. Overall, the average buying power index (*BPI*) with respect to labor is approximately 2%, in line with some previous findings. However, in selected non-metro and rural areas of the south and the midwest, the degree of Wal-Mart's monopsony power reaches values large enough to raise concerns. When restricting the focus to southern states, the estimated *BPI*s reach values as high as 8% in rural Louisiana and West Virginia.

Although this article provides evidence of monopsonistic behavior by the company vis-à-vis its workers in some areas, it fails to show evidence to warrant deeming this a nationwide problem, particularly in areas where Wal-Mart has faced has faced labor class action suits. This leaves open the question of why Wal-Mart workers' issues are on local and state policy agendas throughout the nation, especially in areas where there is no evidence of monopsony power. The high visibility of Wal-Mart makes it an easy target for policymakers and opinion leaders, who may see attacking the company's practices as a way to both increase public consensus and relieve political pressure from interested parties (such as retail workers' unions and traditional retailers).

Footnotes

1. For evidence of Wal-Mart's beneficial impact on consumers through low prices, see Basker (2005b); Basker and Noel (forthcoming); Cleary and Lopez (2007) and Hausman and Liebtag (2007).

2. Wal-Mart has faced not only myriad labor lawsuits but also policymakers' threats in Illinois and Maryland. A Chicago City Council ordinance, subsequently vetoed by the mayor, would have required stores of more than 90,000 square feet and companies grossing more than $1 billion annually to pay an hourly minimum wage of $10 and benefits worth at least $3. The Maryland State Assembly passed the Maryland Fair Share Health Act which would have imposed tax burdens on companies paying low healthcare benefits; the ordinance, which by design was to affect only Wal-Mart, was found to violate federal trade laws (Wagner 2006). Being notoriously a "union-free" company, Wal-Mart also faces stiff criticism from public officials and labor unions. In February 2004, Democratic Congressman George Miller presented a report to the House of Representatives highlighting the low-wage and union-free policies of the company and the many labor malpractices that Wal-Mart store managers allegedly engaged in (Miller 2004).

3. The relevant market is Retailing Industry (NAICS 44) excluding the Motor Vehicle and the Parts Dealers (NAICS 441) sub-industry. The data used to obtain the measures reported in Figure 1 and Table 1 are described in the Data and Estimation section.

4. In this framework, the location of Wal-Mart is given. The resulting equilibrium wages and employment if Wal-Mart were not present would be indicated by $x_{FR}^{d} = X_{T}^{s}$, which would result in a lower wage than the monopsony wage set by the company.

5. Under the assumption of heterogeneous labor, one could use the approach developed by Baker and Bresnahan (1988). Even if this scenario would be more likely to represent a world in which Wal-Mart hires non-unionized workers and other firms are left to bargain wages with unions, the unavailability of information on wages offered by both groups inhibits this approach.

6. Note that $\eta_{FR}^{d} = 1/\varepsilon_{FR}$; therefore, in order to satisfy $1+\varepsilon_{FR} > 0$, the condition $\eta_{FR}^{d} < -1$needs to hold.

7. This assumes that the bundles of goods sold are the same across counties. Although this is a strong assumption, the unavailability of county-level retail quantity and/or price indexes forces the use of a value measure in place of a quantity measure of output.

8. The ERS/USDA Rural-Urban Continuum Codes is a nine-part codification that distinguishes metropolitan counties by the population of their metro area, and nonmetropolitan counties by degree of urbanization and adjacency to metro areas. The counties indicated as metro in this analysis are those identified as metropolitan by the Rural-Urban Continuum code, while those identified as rural are those having urban population of 19,999 or less, not adjacent to a metro area (code 7) and those identified as " completely rural" (codes 8 and 9); the remaining ones are identified as non-metro.

9. D&B provides information on each store's type of business, location and estimates of its number of employees and values of sales, obtained from various sources, such as government registers, legal filing offices, or directly from the companies via telephone surveys. Historical data cannot be retrieved since the database is updated regularly.

10. The unemployment rate in the aggregate labor market is considered here as an exogenous variable in the specific retailing industry.

11. Neumark *et al.* (2008) and Dube *et al*. (2007) use distance and time from Bentonville, Arkansas, to predict the timing of Wal-Mart entry. The distance from Benton County, Arkansas, being a good predictor of Wal-Mart's presence in a county comes from the fact that Wal-Mart bases its growth strategy on expanding in areas closer to preexisting distribution centers, following the "hub and scope" logistic system, as explained in Sam Walton's autobiography (Walton and Huey 1992). Basker (2006) argues that the distance from Bentonville may not be a good exogenous predictor of Wal-Mart expansion. However, this paper treats Wal-Mart's location as given. Therefore, the distance from Benton County serves to capture exogenous variation in the distribution of the number of stores across the continental U.S.

12. Bauer and Lee's (2006) method to assigns each state contribution to the GNP in terms of the state's population personal income. Applying the same principles to counties one has $GCP_i = GSP*PI_i / PI$, where *GCPi* is the county-specific measure of retail value added; *GSP* is the Gross State Product for the year 2006 from retail trade, PI_i and *PI* are respectively county and state-level Personal Income.

13. The U.S. Bureau of Census divides the U.S. into four regions (and nine divisions): South (W. South Central, E. South Central, S. Atlantic), Northeast (New England, Middle Atlantic), West (Mountain, Pacific), and Midwest (E. North Central, S. North Central).

14. The results of the OLS used to generate the instrument for the log of earnings are omitted for brevity. The regression shows an R-squared of 0.4008, an *F*-test for the joint significance of the parameters rejects the null hypothesis of non-significance at the 0.1% level and three of the eleven instruments variables are not significant at the 10% level.

15. Dube *et al*. (2007) found that restaurant workers' per-capita earnings are positively related with retail workers' earnings, but not in a statistically significant way.

16. A discussion of the estimation results for the southern states subsample is omitted for brevity. The full sets of results are available upon request to the corresponding author.

17. The states where Wal-Mart's workers have filed class action lawsuits against the company are: California, Georgia, Kentucky, Michigan, Missouri, New Jersey, New Mexico, Oregon, Pennsylvania, and Tennessee.

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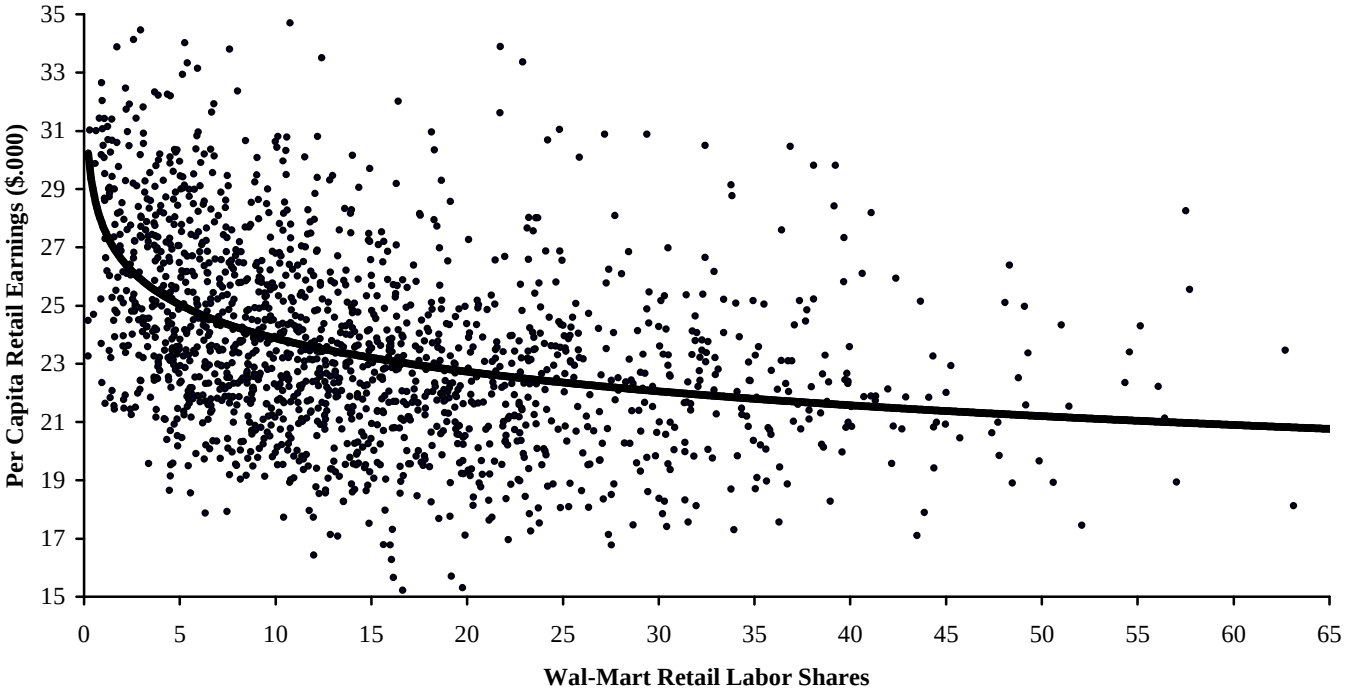
Figure 1. County-Level Wal-Mart Retail Labor Shares and Per Capita Earnings



Source: Computed from Dun & Bradstreet's Million Dollar Database and U.S. Bureau of Census, County Business Patterns.
Note: The data include only those counties in which Wal-Mart operated in 2006. Data details are in the Data and Estimations section.

Figure 2. Equilibrium with a Dominant Firm in Labor Markets

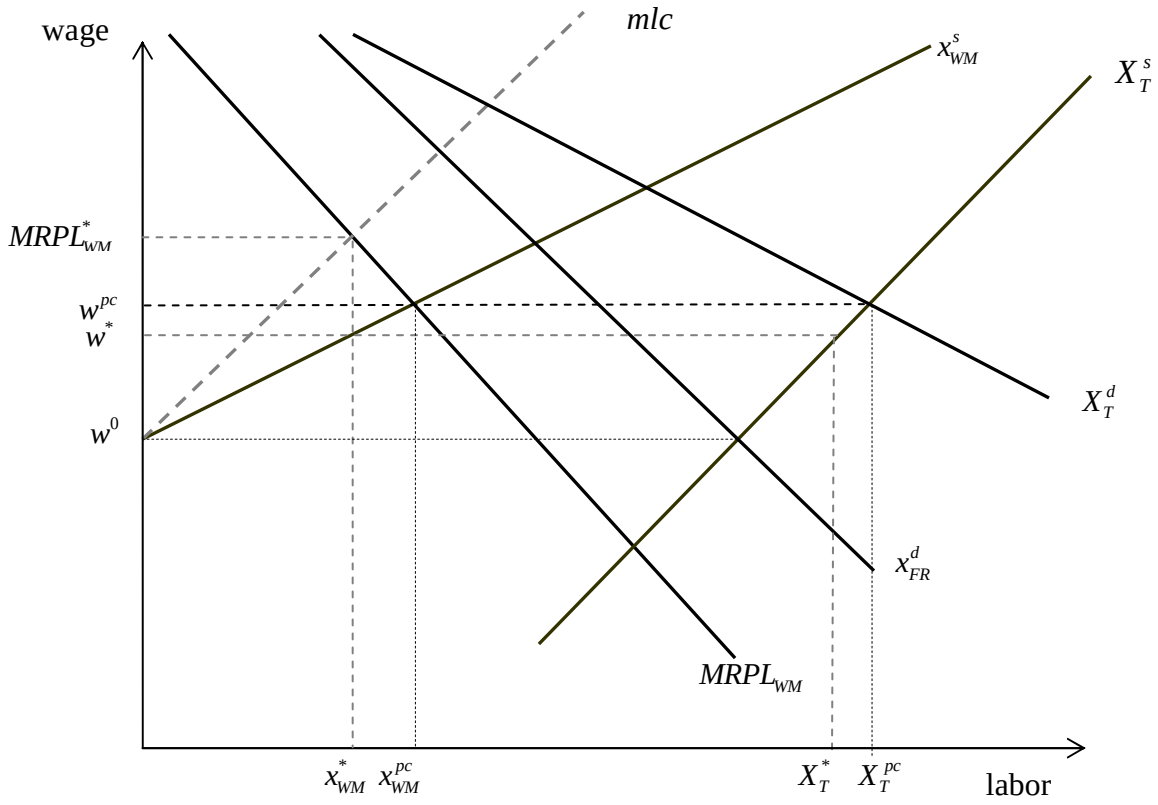


Table 1. Wal-Mart's Presence and Per Capita Earnings (PCE), 2006

Areas	Number of WMs	PCE ($1000)	Number of Counties
South			
West South Central			
Arkansas	86	20.96	55
Louisiana	84	22.39	40
Oklahoma	97	21.73	53
Texas	345	24.16	133
East South Central			
Alabama	91	22.36	48
Kentucky	83	21.68	60
Mississippi	66	21.37	50
Tennessee	103	22.78	60
South Atlantic			
Delaware	8	27.64	3
Florida	185	25.56	30
Georgia	116	24.38	75
Maryland	41	26.64	20
N. Carolina	112	24.37	73
S. Carolina	63	22.39	35
Virginia	81	23.81	30
West Virginia	32	21.25	23
Northeast			
New England			
Connecticut	32	29.83	7
Maine	22	24.97	12
Massachusetts	44	27.60	11
New Hampshire	26	28.15	10
Rhode Island	8	29.96	4
Vermont	4	26.29	4
Middle Atlantic			
New Jersey	41	28.58	17
New York	83	24.90	43
Pennsylvania	116	23.27	42

Areas	Number of WMs	PCE ($1,000)	Number of Counties
West			
Mountain			
Arizona	66	25.07	12
Colorado	57	27.03	17
Idaho	17	26.06	12
New Mexico	30	24.02	18
Montana	11	25.88	9
Nevada	29	30.32	8
Utah	33	23.34	12
Wyoming	9	26.85	9
Pacific			
California	159	29.23	41
Oregon	29	26.40	10
Washington	40	28.21	24
Midwest			
East North Central			
Indiana	92	22.38	67
Illinois	130	23.44	66
Michigan	77	22.98	49
Ohio	124	22.70	71
Wisconsin	77	23.91	33
West North Central			
Iowa	55	22.38	42
Kansas	56	22.31	36
Minnesota	52	23.22	35
Missouri	117	22.01	68
Nebraska	26	22.57	18
N. Dakota	8	24.17	8
S. Dakota	11	23.15	9

Note: The state averages include only those counties where Wal-Mart operated in 2006, reported in the "Number of Counties" column. Per capita earnings are for retail workers per year.

Source: Elaboration from U.S. Bureau of Census–County Business Patterns; Wal-Mart Annual Report (2007) and Dun & Bradstreet's Million Dollar Database.

Table 2. Results for the Full Sample (N=1,641)

Variable	Coefficient	St. Error	Significance
Constant	-12.5760	2.0727	***
Retail wages	0.7431	0.2169	***
Labor force	0.6514	0.0891	***
Unemployment	-0.0197	0.0054	***
Restaurant Wages	0.3706	0.0506	***
% Female	0.5598	0.1481	***
% White	-0.1433	0.0404	***
% 15-24	0.2432	0.0370	***
% 25-64	-0.6121	0.1063	***
% Over 65	0.3134	0.0333	***
Rest. Disclosure Dummy	3.2171	0.4625	***
Regional Dummies	Yes	Yes	
Fringe Demand			
Constant	10.5880	0.1136	***
Retailing wages	-8.1711	0.3716	***
Capital	0.0519	0.0023	***
Output	0.1338	0.0068	***
Unionization	0.0025	0.0005	***
Wal-Mart years	-0.0184	0.0054	***
Education	-0.0085	0.0026	***
Education*Wal-Mart years	0.0004	0.0001	***
Regional Dummies	Yes	Yes	
Fringe Output			
Constant	-1.2678	0.1115	***
Fringe labor	0.8776	0.0042	***
Capital	0.0519	0.0023	***
Productivity index	0.1752	0.0219	***
Regional Dummies	Yes	Yes	
Related Measures			
η^{s}_{WM}	50.4690	2.5502	***
BPI	1.9814	0.10012	***
Wald-stat for overall significance:	2,066,894		
Critical 0.1% $\chi^2_{(45)}$	89.0695		

*Note: *, **, and *** represent 10, 5 and 1% significance levels*

Table 3. Results for Metro Counties (N=761)

Variable	Coefficient	St. Error	Significance
Total Supply			
Constant	-13.4680	2.9773	***
Retail wages	0.8844	0.3062	***
Labor force	1.2904	0.1496	***
Unemployment	-0.0135	0.0086	*
Restaurant Wages	0.2604	0.0844	***
% Female	0.4309	0.2814	*
% White	-0.0924	0.0571	***
% 15-24	0.1925	0.0769	**
% 25-64	-1.0471	0.2160	***
% Over 65	0.2651	0.0479	***
Rest. Disclosure Dummy	2.1880	0.7809	***
Regional Dummies	Yes	Yes	
Fringe Demand			
Constant	10.2550	0.0370	***
Retailing wages	-6.4036	0.2970	***
Capital	0.0431	0.0008	***
Output	0.1792	0.0096	***
Unionization	0.0006	0.0002	***
Wal-Mart years	-0.0008	0.0018	
Education	-0.0004	0.0008	
Education*Wal-Mart years	0.0000	0.0000	
Regional Dummies	Yes	Yes	
Fringe Output			
Constant	-0.6703	0.1040	***
Fringe labor	0.8438	0.0042	***
Capital	0.0431	0.0008	***
Productivity index	0.0761	0.0117	***
Regional Dummies	Yes	Yes	
Related Measures			
η^{s}_{WM}	62.8370	4.1754	***
BPI	1.5914	0.10575	***
Wald-stat for overall significance: 1,718,294			
Critical 0.1% $\chi^2_{(45)}$	89.0695		

*Note: *, **, and *** represent 10, 5 and 1% significance levels*

Table 4. Results for Non-metro Counties (N=640)

Variable	Coefficient	St. Error	Significance
Total Supply			
Constant	-18.1050	3.8934	***
Retail wages	1.1894	0.4104	***
Labor force	0.5533	0.1131	***
Unemployment	-0.0140	0.0073	**
Restaurant Wages	0.4402	0.0703	***
% Female	0.5391	0.1754	***
% White	-0.1813	0.0508	***
% 15-24	0.2020	0.0448	***
% 25-64	-0.2368	0.1148	**
% Over 65	0.1487	0.0547	***
Rest. Disclosure Dummy	3.9094	0.6440	***
Regional Dummies	Yes	Yes	
Fringe Demand			
Constant	9.9837	0.0817	***
Retailing wages	-4.0743	0.2579	***
Capital	0.0251	0.0018	***
Output	0.3108	0.0241	***
Unionization	0.0001	0.0004	
Wal-Mart years	0.0050	0.0034	
Education	0.0039	0.0019	***
Education*Wal-Mart years	-0.0002	0.0001	***
Regional Dummies	Yes	Yes	
Fringe Output			
Constant	0.1402	0.1515	
Fringe labor	0.7546	0.0042	***
Capital	0.0251	0.0018	***
Productivity index	0.0135	0.0132	
Regional Dummies	Yes	Yes	
Related Measures			
η^{s}_{WM}	25.1190	2.5556	***
BPI	3.981	0.40502	***
Wald-stat for overall significance: 383,778			
Critical 0.1% $\chi^2_{(45)}$	89.0695		

*Note: *, **, and *** represent 10, 5 and 1% significance levels*

Table 5. Results for Rural Counties (N=240)

Variable	Coefficient	St. Error	Significance
Total Supply			
Constant	-35.0440	4.3790	***
Retail wages	2.8978	0.4676	***
Labor force	0.9845	0.1524	***
Unemployment	-0.0160	0.0125	
Restaurant Wages	0.4508	0.0955	***
% Female	0.7274	0.2625	***
% White	-0.1913	0.0854	***
% 15-24	-0.1838	0.0882	**
% 25-64	-0.2627	0.1980	
% Over 65	-0.1210	0.0891	
Rest. Disclosure Dummy	3.9089	0.8648	***
Regional Dummies	Yes	Yes	
Fringe Demand			
Constant	9.7920	0.0922	***
Retailing wages	-4.7949	0.5117	***
Capital	0.0150	0.0035	***
Output	0.2658	0.0341	***
Unionization	0.0026	0.0008	***
Wal-Mart years	0.0087	0.0038	**
Education	0.0059	0.0021	***
Education*Wal-Mart years	-0.0003	0.0001	***
Regional Dummies	Yes	Yes	
Fringe Output			
Constant	-0.1213	0.2204	
Fringe labor	0.7914	0.0042	***
Capital	0.0150	0.0035	***
Productivity index	0.0366	0.0303	
Regional Dummies	Yes	Yes	
Related Measures			
η^{s}_{WM}	29.4210	2.6970	***
BPI	3.3989	0.31157	***
Wald-stat for overall significance: 417,936			
Critical 0.1% $\chi^2_{(45)}$	89.0695		

*Note: *, **, and *** represent 10, 5 and 1% significance levels*

Table 6. Estimated Buying Power Indexes: All State Averages†

Areas	Full	Metro	Non-Metro	Rural
South				
West South Central				
Arkansas	3.10	2.93	5.28	3.80
Louisiana	2.86	2.45	5.16	6.57
Oklahoma	3.28	3.77	4.88	4.33
Texas	2.41	2.18	4.81	3.42
East South Central				
Alabama	2.13	1.96	3.69	4.30
Kentucky	3.14	2.09	6.46	4.00
Mississippi	2.61	2.65	3.71	3.63
Tennessee	2.51	2.25	4.99	3.09
South Atlantic				
Delaware	0.72	0.88	1.20	-
Florida	1.43	1.11	4.15	5.30
Georgia	2.14	2.03	4.20	3.44
Maryland	0.91	0.83	2.76	-
N. Carolina	1.68	1.75	2.71	3.75
S. Carolina	1.63	1.79	3.00	-
Virginia	2.05	1.82	5.83	2.16
West Virginia	2.59	1.86	5.75	3.13
Northeast				
New England				
Connecticut	0.54	0.62	1.08	-
Maine	0.92	0.97	1.64	1.13
Massachusetts	0.45	0.56	-	-
New Hampshire	0.95	0.93	1.62	1.27
Rhode Island	0.54	0.66	-	-
Vermont	0.35	0.25	0.68	-
Middle Atlantic				
New Jersey	0.34	0.42	-	-
New York	1.15	0.95	2.92	-
Pennsylvania	1.03	0.72	2.53	1.80
West				
Mountain				
Arizona	1.34	1.01	3.14	-
Colorado	1.55	0.96	4.56	2.15
Idaho	2.10	1.09	4.76	7.39
New Mexico	1.92	1.10	4.28	2.01
Montana	1.31	1.49	1.51	4.34
Nevada	1.82	0.58	4.34	3.47
Utah	1.70	1.08	4.86	6.17
Wyoming	2.01	1.23	5.17	1.94
Pacific				
California	0.88	0.63	3.59	3.26
Oregon	1.09	0.77	2.34	3.06
Washington	1.25	0.86	3.46	-
Midwest				
East North Central				
Indiana	2.30	2.11	5.39	2.10
Illinois	2.31	1.99	4.36	3.49
Michigan	1.24	0.77	2.68	2.68
Ohio	1.43	0.96	3.16	3.81
Wisconsin	1.19	1.10	2.57	1.21
West North Central				
Iowa	2.17	2.03	3.90	2.68
Kansas	3.25	2.34	5.06	5.40
Minnesota	1.30	0.71	2.39	2.47
Missouri	2.80	2.96	4.25	3.70
Nebraska	2.72	2.48	3.85	4.35
N. Dakota	1.39	0.79	1.06	2.43
S. Dakota	1.47	0.40	4.10	1.76

† For Massachusetts, New Jersey and Rhode Island, the sample did not include counties having Wal-Mart classified as "non-metro". For Arizona, Delaware, Maryland, New Jersey, New York, Rhode Island, South Carolina, Vermont and Washington, the sample did not include counties having Wal-Mart classified as "rural".

Table 7. Estimated Elasticities and Buying Power Indexes: Southern States Sample

	Full (N=785)	Metro (N=352)	Non-Metro + Rural (N=433)
η_T^S	1.2868	1.4981	0.7211
η_{FR}^d	-5.2793	-5.7171	-3.4879
η_{WM}^S	32.4100	49.6040	16.5720
Average BPI	3.0855	2.0160	6.0342
West South Central			
Arkansas	4.09	2.91	5.50
Louisiana	3.77	2.44	8.00
Oklahoma	4.31	3.72	5.73
Texas	3.20	2.17	6.25
East South Central			
Alabama	2.84	1.95	3.78
Kentucky	4.13	2.09	6.70
Mississippi	3.45	2.63	3.80
Tennessee	3.32	2.24	5.14
South Atlantic			
Delaware	0.97	0.88	1.51
Florida	1.91	1.12	5.55
Georgia	2.85	2.03	5.65
Maryland	1.23	0.83	3.48
N. Carolina	2.24	1.75	3.94
S. Carolina	2.18	1.79	3.78
Virginia	2.73	1.82	6.44
West Virginia	3.92	1.97	7.99

Note: The estimated parameters in the top part of the table are statistically significant at the 5% level or more.