
Guangqing Chi and Jamie Boydstun

Department of Sociology and Social Science Research Center
Mississippi State University

University Transportation Center Conference for the Southeastern Region, April 4–5, 2013, Orlando, FL.
Responses to gasoline price increases

Gasoline price

- Trip frequency and distance
- Commute modes
- Vehicle fuel efficiency
- Driving behaviors
- Residential relocation

Traffic safety

(1)

(2)
Objective

Examine and explain the possible association of gasoline prices with residential relocation within the framework of location theory.

Research Questions:
1) Are gasoline prices and residential relocation associated?
2) If so, what are the effects of gasoline prices on residential relocation?
3) Do the effects occur directly or indirectly through disposable income?
Prior research

1. Energy effects on urban form and land use
   - The most energy-efficient urban form: centralized, high-density development, or mixed land use pattern (e.g., Holden & Norland 2005; Kenworthy & Newman 1990; Sly 1982).

2. Journey to work and residential relocation
   - Households with greater distance between workplaces and residences tend to move closer to workplaces when other factors are controlled (e.g., Clark & Burt 1980; Levinson & El-Geneidy 2009; Tillema et al. 2010).
Hypotheses

Gasoline Prices

Disposable Income

Residential Relocation

- -

+ +

- -
Data

American Housing Survey

1) Aggregated to monthly level from January 1996 – December 2008
2) \( N = 156 \) months

Dependent Variables

1) All *movers*
2) % movers who moved from previous residence to be *closer to work/school*
3) % movers who moved to current residence because of *convenient to job*
Trends of gasoline prices and residential relocation measures
Research design

Variables

1) 3 dependent variables
2) 7 gasoline price variables
   - Current gasoline price
   - Δ gasoline prices at 1-year lag, 2-year lag, and 3-year lag
   - MA gasoline prices at 1-year lag, 2-year lag, and 3-year lag
3) Control variables
   - Unemployment rate, median housing price, and seasonality

Models: Negative binomial regression

1) Individual effects: 7x2x3 = 42 models
2) Accumulative effects of Δ gasoline prices: 4x2x3 = 24 models
3) Accumulative effects of MA gasoline prices: 4x2x3 = 24 models
Main findings – *closer to work/school*

1. Individual effects are positive (14) and significant (13).

2. When considered together,
   - current gas prices have positive and strong effects,
   - $\Delta$ gas prices and MA gas prices are not significant.
Main findings – *convenient to job*

1. Individual effects are positive (14) and significant (10).

2. When considered together,
   - current gas prices have positive but only mild effects,
   - $\Delta$ gas prices and MA gas prices are not significant.
Main findings – *total movers*

1. Individual effects are negative (14) and significant (10).

2. When considered together,
   - current gas prices have negative but only mild effects,
   - $\Delta$ gas prices and MA gas prices are not significant.
Direct vs. indirect effects
– closer to work/school

Gasoline Prices

% Personal Savings

2.270***

% Closer to Work/School

-0.411

-0.095
Direct vs. indirect effects

- convenient to job

Gasoline Prices

% Personal Savings

-0.411

% Convenient to Job

1.261**

-0.320
Direct vs. indirect effects — total movers

Gasoline Prices

-0.411

% Personal Savings

0.063

% Movers

-0.469*
Conclusions

1. Higher gasoline prices are associated with fewer households relocating;

2. Higher gasoline prices lead to higher proportions of movers who move closer to work/school or to be convenient to job;

3. The direct effects are stronger than the indirect effects through disposable income.
Future research

Examine the relationship between gasoline prices and residential relocation

1. Renters/owners differences
2. Metropolitan/nonmetropolitan differences
3. Age, gender, race, and family differences
Implications

1. Higher gasoline prices might slow the long-term decentralization process and low-density sprawl development, or even reverse to a centralization process and high-density development;

2. “Bedroom communities” may experience out-migration or shift to improve public transportation;

3. Suburban areas with a mixed land use pattern and greater job opportunities may be affected less by higher gasoline prices.
Reasons for moving from previous residence

- Established a new household: 13.8%
- Needed a larger apt or house: 11.9%
- New job or job transfer: 10.8%
- Closer to work or school: 9.4%
- Other family/personal related issue: 8.9%
- Wanted a better home: 8.7%
- Other issue: 7.4%
- Married/divorced/widowed/separated: 6.8%
- Changed from renter to owner or vice versa: 6.7%
- Other housing related issues: 5.7%
- Wanted lower rent or maintenance: 5.1%
- Other financial/employment related issue: 4.0%
- Disaster loss: 1.0%
- Forced by government: 0.6%
Reasons for choosing present residence

- Convenient to their job: 21.1%
- Other reason: 19.5%
- House more important than neighborhood factors: 15.9%
- Convenient to friends/relatives: 15.2%
- Look/design of neighborhood: 14.6%
- Good schools: 7.4%
- Convenient to leisure activities: 2.8%
- Convenient to public transportation: 2.2%
- Other public service: 2.1%

Other public service includes convenience to public transportation and other public service factors.
Measures of gasoline prices: changes (Δ) & moving averages (MA)
Monthly retail gasoline prices in the U.S. (in 2009 dollars)

- Iranian Revolution & Iran/Iraq War
- Gulf War
- Iraq War, Asian Growth, & Weaker Dollar
- Yom Kippur War & Oil Embargo
- 9/11
- Recession