An analysis of Southern energy expenditures and prices, 1984–2006

In the South, where heavy usage of electricity and gasoline causes consumers to spend a larger share of their budget on energy-related goods and services than does any other region of the United States, energy prices have increased sharply in recent years; on the whole, however, energy expenses actually made up a smaller share of Southern budgets in 2006 than they did in 1984

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Whether the fuel is as basic as wood or as advanced as nuclear power, all businesses require energy to produce their goods and services. Similarly, all consumers require energy to meet their minimal living and transportation needs. That shared experience between businesses and consumers, coupled with the fact that energy prices are easily visible to both groups, makes energy costs a frequent topic of conversation. Movements in energy prices affect our economy, and depending on the elasticity of demand, rapid or unexpected changes in these prices might result in equally rapid shifts in business or consumer spending.

This article addresses the consumer side of the equation, with an emphasis on the South region,[1] through an analysis of changes in household expenditures and retail prices for the years 1984 through 2006. Although energy *prices* climbed more than 60 percent between 2002 and 2006, the research presented here finds that Southern households were still devoting smaller shares of their total expenditures to energy costs than they were in 1984. Although, on an annual basis, energy price movements were much more volatile than nonenergy price movements, household energy *expenditures* rose at a slower rate than nonenergy expenditures over the long term. This resulted in declining shares of Southern budgets devoted to energy costs through most of the period. The most important factor in the slower rise in energy expenditures was the relatively stable—or even declining—price of gasoline through most of the period studied. However, gasoline was not the only major influence on total energy expenditures in the South: while household electricity consumption rose sharply in the last two-plus decades, below-average rates of increase in electricity *prices,* particularly during the first 20 years of the study, helped to restrain the rate of increase in household electricity expenditures.

Methodology

Using published data from the Bureau of Labor Statistics (BLS) Consumer Expenditure Survey[2] (CE) and Consumer Price Index[3] (CPI), the sections that follow address both energy and nonenergy average household expenditures and retail price changes between 1984 and 2006. The year 1984 was selected as the starting point for this research to ensure historical continuity, because CE data prior to that year were not strictly comparable to data from that year on due to methodological changes.

For this analysis, published CE data for the separate categories of electricity, natural gas, fuel oil and other fuels, and gasoline and motor oil were combined to estimate *total*

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energy expenditures for households. Then the dollar costs for total energy expenditures, as well as for each of the subcategories, were expressed as a percent of total household expenditures to obtain energy expenditure shares or ratios—the percentage of total household expenditures dedicated to energy costs. Nonenergy expenditure totals were calculated by simply subtracting the energy aggregate from total expenditures. (See table 1.) In addition, average annual expenditures for each category were converted to indexes based on 1984 expenditures equaling 100. Similarly, Consumer Price Indexes for All Urban Consumers (CPI-U) for the South region were rebased to 1984 = 100 from the published base of 1982–84 = 100, to ease comparisons between the CE and CPI data. (See table 2.) Although the primary emphasis is on the South Census region and how it tracks with, or differs from, the U.S. average, broad comparisons with other regions[4] also are presented.

Total energy expenditures, 1984–2006

Energy prices have risen sharply in recent years, and their share of the typical household budget also has increased. Between 2002 and 2006, the South regional CPI for energy goods and services climbed 62.8 percent while household energy expenditures increased by a slightly smaller amount, 60.2 percent. As a result of the sharp jump in energy prices, Southern households were allocating 9.7 percent of total expenditures to energy consumption in 2006, up from a 7.2-percent share in 2002. However, these recent movements followed 15 years (1984–99) of nearly uninterrupted declines in the energy share. As a result, despite the dramatic price rise from 2002 to 2006, the percentage of Southern household expenditures devoted to energy costs in 2006 (9.7 percent) was still below the 1984 share of 10.1 percent. (See table 1.)

Energy expenditures as a percent of total household expenditures show similar historical movements among the regions. As illustrated in chart 1, the most notable difference is in the levels of the energy ratios. For nearly the entire 22-year period, energy costs as a percent of total expenditures were below the national average in the West and the Northeast. In contrast, energy costs were above the U.S. norm in the South and Midwest. The South overtook the Midwest in energy expenditure share in 1987 and has remained the highest among the regions since that time. Possessing the highest energy ratio means that movements in energy prices will affect the South more than any other region. In contrast, the West's energy share is well below the national average, indicating less susceptibility to ups and downs in energy prices.

Saying that the *share* of expenditures dedicated to en-

Table 1. Average annual household percent expenditure shares, total and selected categories, U.S. and South region, Consumer Expenditure Survey, 1984–2006

Year	Total expenditures		Total energy		Fuel oil and other fuels		Electricity		Natural gas		Gasoline and motor oil		Nonenergy	
	U.S.	South	U.S.	South	U.S.	South	U.S.	South	U.S.	South	U.S.	South	U.S.	South
1984	100.0	100.0	9.7	10.1	0.6	0.5	2.9	3.6	1.4	0.8	4.8	5.3	90.3	89.9
1985	100.0	100.0	8.9	9.1	.5	.4	2.8	3.5	1.2	.6	4.4	4.7	91.1	90.9
1986	100.0	100.0	8.1	8.8	.4	.3	2.8	3.6	1.0	.6	3.8	4.3	91.9	91.2
1987	100.0	100.0	7.8	8.6	.4	.3	2.8	3.6	1.0	.6	3.6	4.0	92.2	91.4
1988	100.0	100.0	7.6	8.5	.4	.2	2.7	3.5	.9	.6	3.6	4.2	92.4	91.5
1989	100.0	100.0	7.4	8.3	.4	.2	2.7	3.5	.9	.6	3.5	4.1	92.6	91.7
1990	100.0	100.0	7.6	8.5	.4	.2	2.7	3.5	.9	.6	3.7	4.3	92.4	91.5
1991	100.0	100.0	7.3	7.9	.3	.2	2.7	3.5	.8	.5	3.4	3.7	92.7	92.1
1992	100.0	100.0	7.0	7.9	.3	.2	2.6	3.4	.8	.6	3.3	3.7	93.0	92.1
1993	100.0	100.0	7.1	7.8	.3	.2	2.7	3.6	.9	.6	3.2	3.5	92.9	92.2
1994	100.0	100.0	7.0	7.8	.3	.2	2.7	3.6	.9	.6	3.1	3.4	93.0	92.2
1995	100.0	100.0	6.9	7.6	.3	.2	2.7	3.5	.8	.5	3.1	3.4	93.1	92.4
1996	100.0	100.0	7.1	7.7	.3	.2	2.7	3.4	.9	.6	3.2	3.5	92.9	92.3
1997	100.0	100.0	6.9	7.6	.3	.2	2.6	3.4	.9	.6	3.2	3.5	93.1	92.4
1998	100.0	100.0	6.5	7.3	.2	.1	2.6	3.5	.8	.5	2.9	3.1	93.5	92.7
1999	100.0	100.0	6.2	7.1	.2	.1	2.4	3.3	.7	.5	2.9	3.2	93.8	92.9
2000	100.0	100.0	6.8	7.7	.3	.2	2.4	3.3	.8	.5	3.4	3.7	93.2	92.3
2001	100.0	100.0	7.1	7.8	.3	.2	2.6	3.5	1.0	.7	3.2	3.4	92.9	92.2
2002	100.0	100.0	6.5	7.2	.2	.1	2.4	3.2	.8	.5	3.0	3.3	93.5	92.8
2003	100.0	100.0	7.0	7.6	.3	.2	2.5	3.3	1.0	.6	3.3	3.5	93.0	92.4
2004	100.0	100.0	7.4	8.2	.3	.2	2.5	3.3	1.0	.7	3.7	4.1	92.6	91.8
2005	100.0	100.0	8.2	9.0	.3	.2	2.5	3.3	1.0	.7	4.3	4.9	91.8	91.0
2006	100.0	100.0	8.6	9.7	.3	.1	2.6	3.6	1.1	.7	4.6	5.3	91.4	90.3

Table 2. Indexes of average annual household expenditures, and Consumer Price Indexes for All Urban Consumers, South region, 1984–2006, selected categories

[1984=100]

Year	Total expenditures	All items	Total energy		Fuel oil and other fuels		Electricity		Natural gas		Gasoline and motor oil		Nonenergy	
	CE	CPI	CE	CPI	CE	CPI	CE	CPI	CE	CPI	CE	CPI[1]	CE	CPI[2]
1984	100.0	100.0	100.0	100.0	100.0	–	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1985	107.4	103.2	96.9	100.5	80.4	–	104.5	102.4	82.7	97.6	95.3	100.5	108.6	103.6
1986	104.4	104.9	91.0	87.5	69.6	–	105.0	102.9	83.3	94.1	84.4	78.3	106.0	107.2
1987	107.9	108.3	91.1	88.6	62.7	–	108.3	101.5	89.5	92.4	82.1	82.2	109.8	111.0
1988	114.3	112.1	96.4	89.5	55.9	–	111.8	103.3	94.4	93.9	89.8	82.4	116.3	115.3
1989	121.5	117.1	99.9	94.0	56.9	–	116.0	105.2	94.4	96.5	93.4	90.0	124.0	120.2
1990	125.2	123.2	105.5	101.9	54.9	–	121.5	107.3	92.6	98.6	101.0	103.1	127.4	126.3
1991	130.0	128.0	101.1	102.3	53.9	–	124.0	110.3	93.8	98.6	90.7	101.6	133.2	131.7
1992	128.5	131.5	99.8	102.1	50.0	–	122.0	112.5	96.3	99.0	89.5	99.6	131.8	135.5
1993	135.5	135.6	104.9	103.1	56.9	–	133.1	114.5	106.2	107.1	89.7	98.4	138.9	140.0
1994	139.3	139.4	107.0	103.0	54.9	–	138.1	114.4	103.7	107.8	90.7	98.2	143.0	144.1
1995	140.3	143.5	105.2	103.7	46.1	–	136.1	115.0	98.1	102.1	90.3	100.4	144.3	148.8
1996	152.3	148.0	115.3	109.1	61.8	–	142.7	119.0	115.4	109.0	101.3	106.4	156.4	153.2
1997	149.3	151.2	111.8	110.1	53.9	–	139.9	119.9	114.2	115.7	97.5	106.3	153.5	156.5
1998	152.7	153.1	109.6	99.7	47.1	–	146.2	111.1	105.6	112.2	90.7	91.4	157.5	160.0
1999	154.3	156.1	107.7	103.1	41.2	–	139.0	111.0	96.9	113.0	93.7	99.0	159.5	162.9
2000	160.8	161.1	122.8	120.2	55.9	–	146.8	113.7	117.3	133.1	113.1	129.5	165.1	166.4
2001	168.1	164.8	129.5	123.0	56.9	–	160.9	122.3	167.9	160.2	109.1	122.1	172.4	170.3
2002	172.7	167.0	123.0	115.6	46.1	–	153.8	116.3	125.3	135.1	108.5	116.4	178.3	173.5
2003	174.3	170.8	131.5	128.1	59.8	–	160.0	122.2	150.0	169.5	115.8	132.5	179.1	176.3
2004	181.5	175.1	146.8	142.9	67.6	–	164.7	127.2	157.4	179.0	140.1	159.0	185.4	179.5
2005	196.9	181.4	175.5	168.3	73.5	–	179.2	137.5	181.5	215.5	181.3	198.4	199.3	183.4
2006	206.1	187.6	197.2	188.1	54.9	–	203.1	156.3	192.6	214.9	206.5	222.7	207.2	188.0

[1] CPI is for South region, gasoline, all types; does not include motor oil.

[2] CPI is for South region, all items less energy.

NOTE: Dash indicates data not available.

ergy costs is lower than it was 22 years ago is not the same as saying that energy *prices* have fallen during the last two decades. Indeed, energy prices, as measured by the Consumer Price Index, have fallen in some years and risen in others, even rising at double-digit annual rates on many occasions. Also, total household energy expenditures are nearly 100 percent above their 1984 level. Still, energy costs in 2006 account for a smaller share of total Southern budgets than they did in 1984. The lower current energy share may reflect the differing magnitudes of opposing annual price movements, faster rates of increase in nonenergy prices, shifts in consumer demand, or a combination of all these factors.

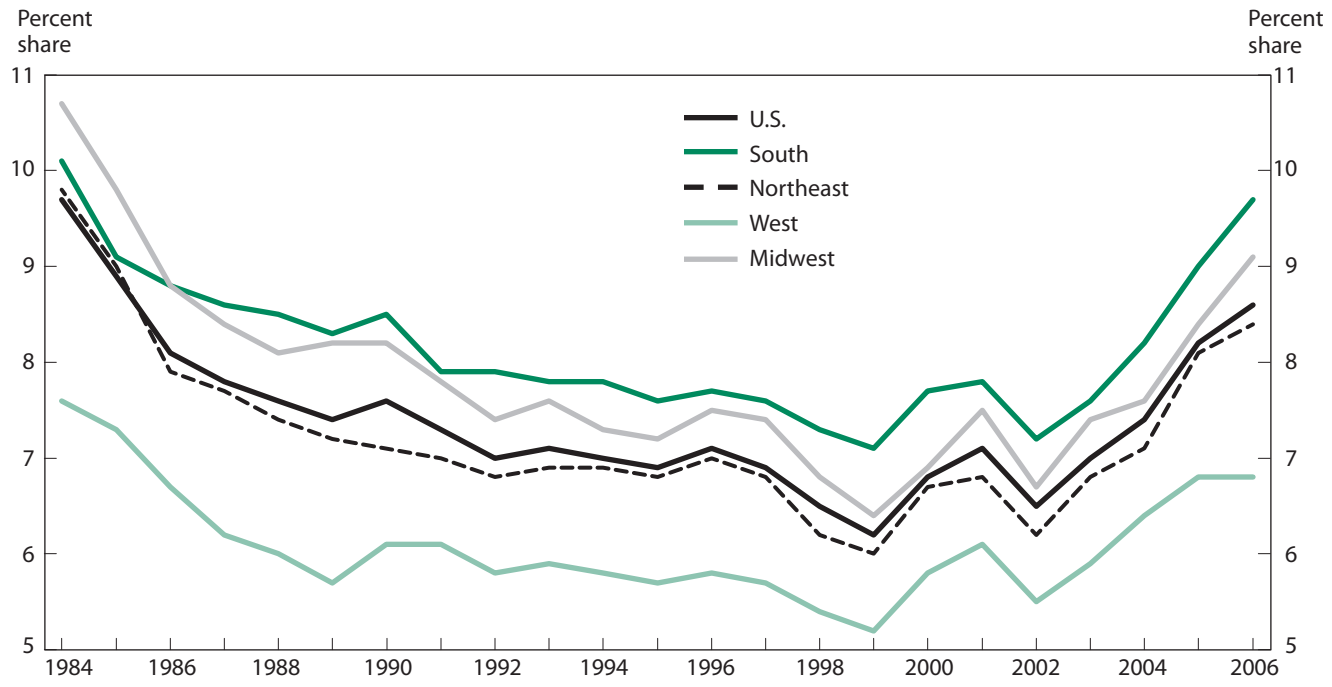
Analysis of energy components

Gasoline and motor oil: regional overview. Although the total energy share was in relatively constant decline until recent years, looking at the various energy components can shed additional light on the overall movement. Nationally, the largest portion of the household energy budget is represented by costs for gasoline and motor oil, and this typically holds true for the South as well. (See chart 2.) As a result, among the energy components, gasoline price increases or decreases typically will have the strongest impact on household budgets; their importance and broad visibility are why most discussions about energy costs begin—and often end—with gasoline.

About one-half of the cost of gasoline is tied directly to the cost of crude petroleum, so the cost of crude oil represents the biggest part of the final consumer price.[5] As shown in chart 3, retail price movements for gasoline (CPI) follow the same trend line as wholesale prices for crude petroleum and gasoline (as measured by the Producer Price Index). Retail price movements, though, are notably less volatile, rising and falling by only a small portion of the price movements recorded earlier in the production line. With few exceptions, the effects of economic and political developments on wholesale crude petroleum prices are quickly passed through to retail gasoline prices, albeit in a somewhat muted form.

Among the energy components, the gasoline and motor oil category exhibits the most consistent pattern between the regional and national ratios, both in direction and

Chart 1. Energy expenditures as a percent of total household expenditures, U.S. and regions, 1984–2006



magnitude of movement. (See chart 4.) Throughout the 22-year period, the South consistently has had the highest gasoline expenditure *share* among the regions, although the West has led in dollar terms since 1997. (Because motor oil expenditures are generally very low compared with gasoline expenditures, any reference to gasoline expenditures in this article is shorthand for gasoline and motor oil expenditures.) Household dollars spent on gasoline were equal for the United States and the South region in 2004, at $1,598. However, those equal dollar amounts translated into a larger share of total Southern expenditures than the U.S. average (4.1 percent and 3.7 percent, respectively). Between 2004 and 2006, gasoline expenditures rose more rapidly in the South, and the difference in share expanded even further, with the South standing at 5.3 percent and the Nation at 4.6 percent in 2006.

In each of the 22 years examined, consumers in the Northeast registered the lowest expenditure share among the regions. This pattern is not surprising, considering the greater use of public transportation in the Northeast. Lower motor fuel expenditures are further reinforced by the fact that households in the Northeast maintained the lowest average number of motor vehicles in 2006, namely, 1.6 per household. The ratio in the South and nationwide was higher, at 1.9 vehicles each. Interestingly, while the number of motor vehicles per household was higher in the Midwest and West (both at 2.1), their gasoline expenditure shares, 4.8 percent in the Midwest and 4.1 percent in the West, were below the South's 5.3-percent average. Data from the Energy Information Agency indicate that one explanation for this apparent anomaly is the greater number of vehicle-miles driven in the South. Specifically, in 2001, the South registered the highest number of miles driven per household, despite having a lower average number of vehicles than both the West and Midwest.[6] With the South having the highest share of gasoline costs among the regions, increases in gas prices represent a potentially larger burden on the typical Southern family than on families in other parts of the country.

Gasoline and motor oil: impact on total energy expenditures. The sharpest rate of decline in total energy expenditure shares occurred between 1984 and 1986, reflecting primarily the worldwide collapse of crude petroleum prices in 1986. Between 1984 and 1986, total household energy expenditures fell 9.0 percent in the South and the cost per share of energy declined from 10.1 percent to 8.8 percent. In 1990, the effects of the Iraqi invasion

Chart 2. **Total energy and energy component shares, U.S. and South region 1984–2006**

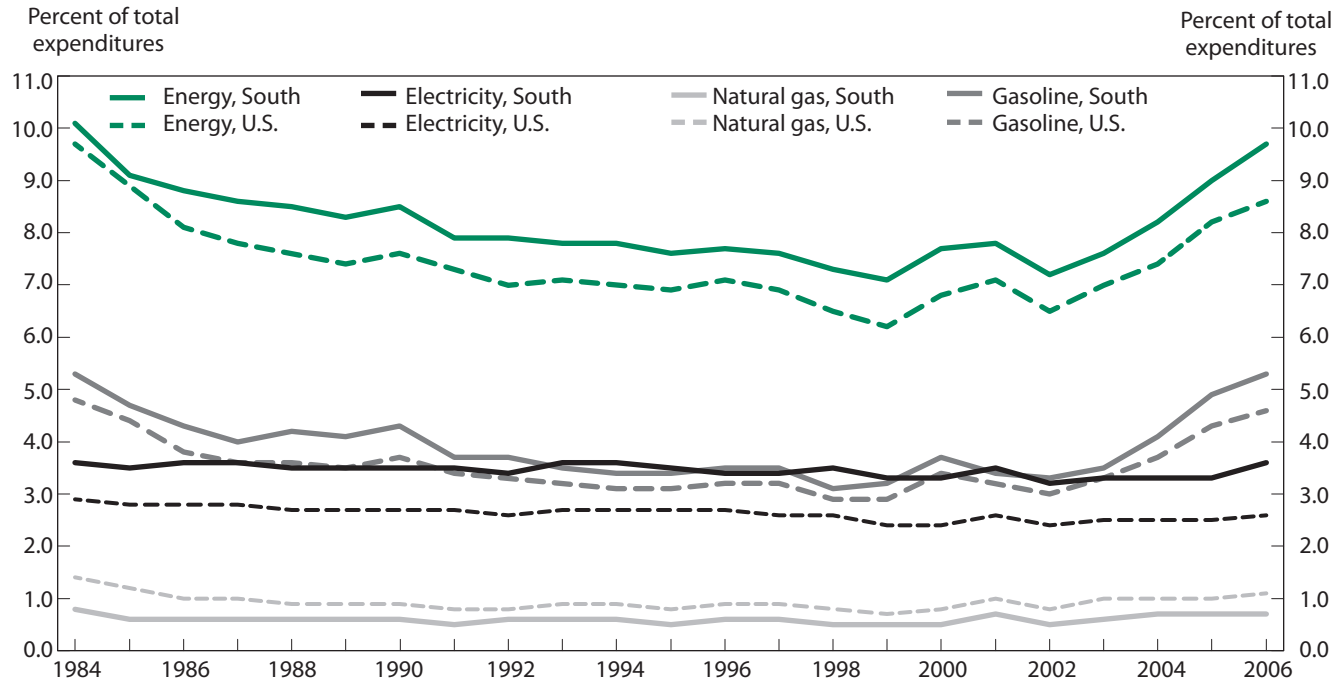


Chart 3. **CPI and PPI, annual percent change, gasoline and crude petroleum, 1984–2006**

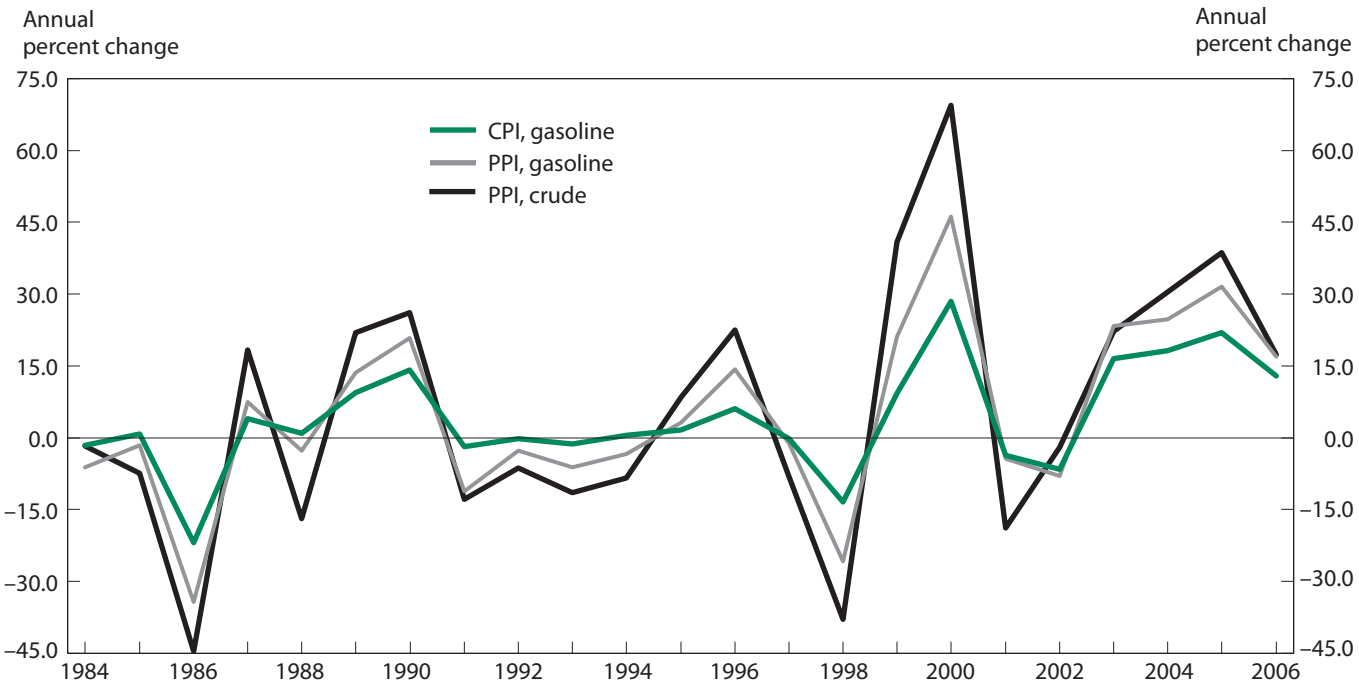
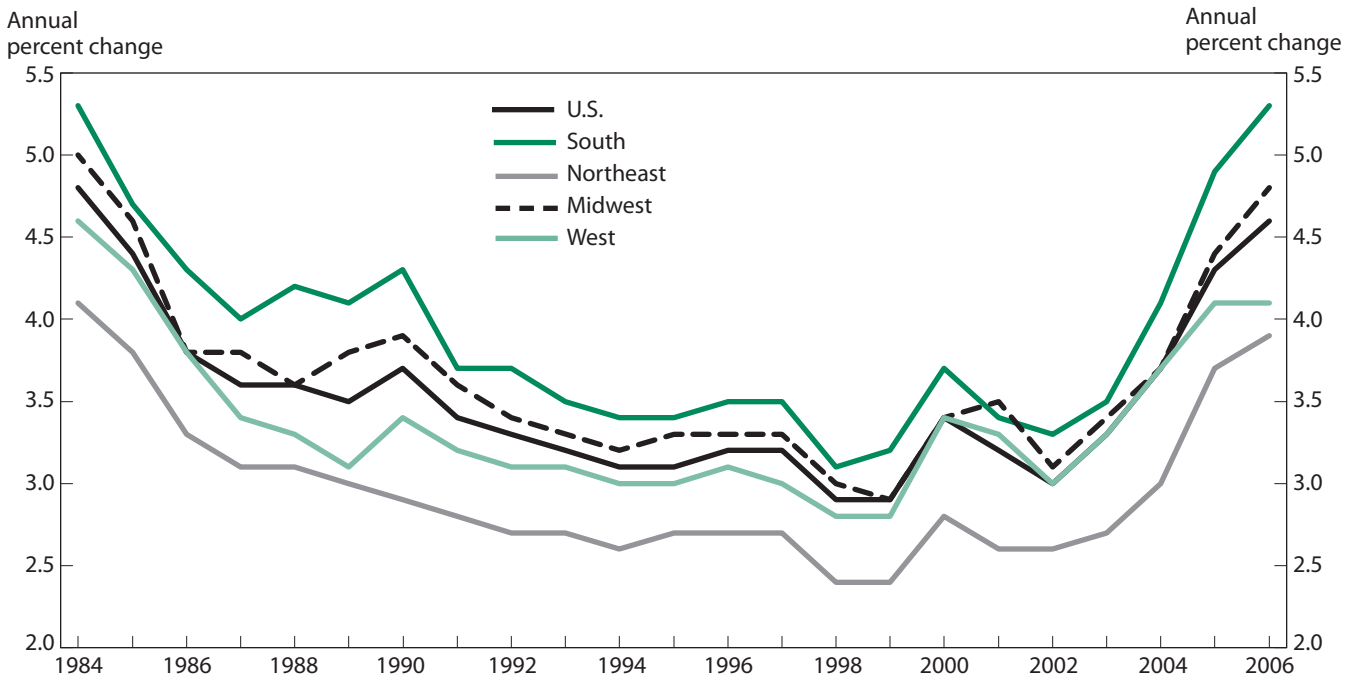


Chart 4. Gasoline and motor oil expenditures as a percent of total expenditures, by region, 1984–2006



of Kuwait were quite evident in the gasoline expenditure spike that year. With the end of the Gulf War in 1991, both gasoline and total energy share levels once again began a slow decline that was nearly uninterrupted through 1999. Primarily because of the lower petroleum prices, the share of household expenditures devoted to energy costs fell to an all-time low in 1999: 7.1 percent in the South and 6.2 percent in the Nation. (See table 1.)

By 2000, economic growth had returned to the Asian economies and the Organization of the Petroleum Exporting Countries (OPEC) had begun regaining more control of crude petroleum output and prices.[7] The jump in wholesale costs for crude oil was evident at the household level as total gasoline expenditures rose by more than 20 percent in both the South and the Nation. Slower rates of gain in other energy goods and services in the region helped to restrain the total energy expenditure increase to less than 15 percent, but cost shares still climbed. In 2000, energy costs accounted for 7.7 percent of household expenditures in the South and 6.8 percent in the United States. (See table 1.)

Gasoline prices exhibited volatile monthly price movements in 2001 and 2002, in all likelihood related to the terrorist attacks of September 11, as well as to supply fears resulting from the conflict in Afghanistan and the build-up to the 2003 invasion of Iraq. However, total gasoline dollars expended remained fairly flat, and expenditure shares actually declined. Furthermore, as a result of the gasoline share decline, the total household energy share dropped back to levels approximating those of 1998.

From 2002 to 2006, crude petroleum prices surged for a number of reasons, many of them geopolitical in nature. Concerns about supply disruptions centering on economic, labor, political, and war-related activities in countries such as Iran, Iraq, Nigeria, North Korea, and Venezuela caused frequent price spikes. But perhaps the biggest shock was Hurricane Katrina, which made landfall in August 2005, followed by Hurricane Rita on the Texas Gulf Coast in September. Immediately following Hurricane Katrina, 100 percent of oil production and 94 percent of natural gas production in the Gulf of Mexico were shut down (or "shut-in"), awaiting inspection.[8] By yearend 2005, 4 months after Hurricane Katrina, more than one-fourth of the Gulf of Mexico's oil production and nearly one-fifth of natural gas production remained shut-in.[9] Prices for domestic crude surged 22 percent in 2003, 30 percent in 2004, 39 percent in 2005, and 17 percent in 2006.

These crude petroleum price hikes sent gasoline ex-

penditure shares upward during the period. In the South, gasoline expenditures accounted for 3.3 percent of total household expenditures in 2002. By 2006, that share had climbed to 5.3 percent. Similarly, the total energy share rose from 7.2 percent to 9.7 percent of Southern household expenditures. The same scenario played out for the national average, although at lower percentage levels: gasoline expenditures went from 3.0 percent to 4.6 percent, and the total energy share climbed from 6.5 percent to 8.6 percent. (See table 1.)

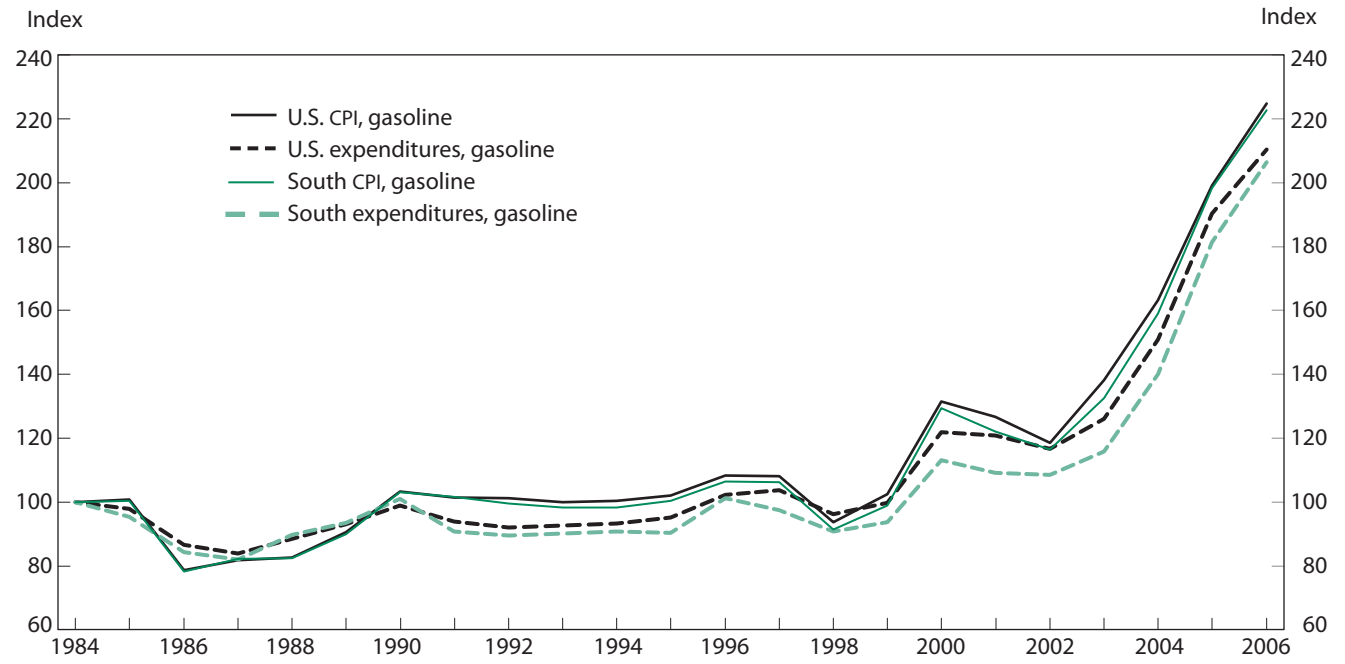
Chart 5 compares long-term movements in gasoline prices and expenditures in the South and the United States. Considering the length of time covered in this study, the CPI and CE indexes remained relatively close at the end of the period examined. Over the 22 years, gasoline prices, as measured by the South CPI for gasoline, rose 123 percent, while the South's gasoline and motor oil expenditure share rose 107 percent; movement in the national average was virtually the same. Although expenditures rose by a slightly smaller amount than prices during the period, the difference was marginal and indicates the relative inelasticity of demand for gasoline.

Natural gas. Utility costs in the South can be analyzed separately as electricity, natural gas, and fuel oil and other fuels. (See table 1.) Throughout the 22-year period, fuel oil and other fuels accounted for the smallest share of utility costs in the South, representing just 0.1 percent to 0.2 percent of total household expenditures since 1988. On average, their impact on regional budgets and total energy expenditures was negligible.

Residential natural gas costs in the South average about 3 times the level of fuel oil expenditures, yet still account for less than 1.0 percent of total household budgets. (See table 1 and chart 2.) With few exceptions, their effect on total regional energy costs is relatively small compared with the effect of gasoline and electricity. However, natural gas did contribute to the total energy share decline in 1985, as the share of natural gas fell from 0.8 percent to 0.6 percent. The decrease in the share of residential natural gas expenditures reflected the continued impact of deregulation on the natural gas industry. The remaining price controls on most interstate natural gas were lifted in January 1985.[10] On an annual average basis, wholesale natural gas prices declined steadily from 1984 through 1988.

Chart 5. Gasoline CPI and gasoline expenditures, U.S. and South, 1984–2006

[1984 = 100]

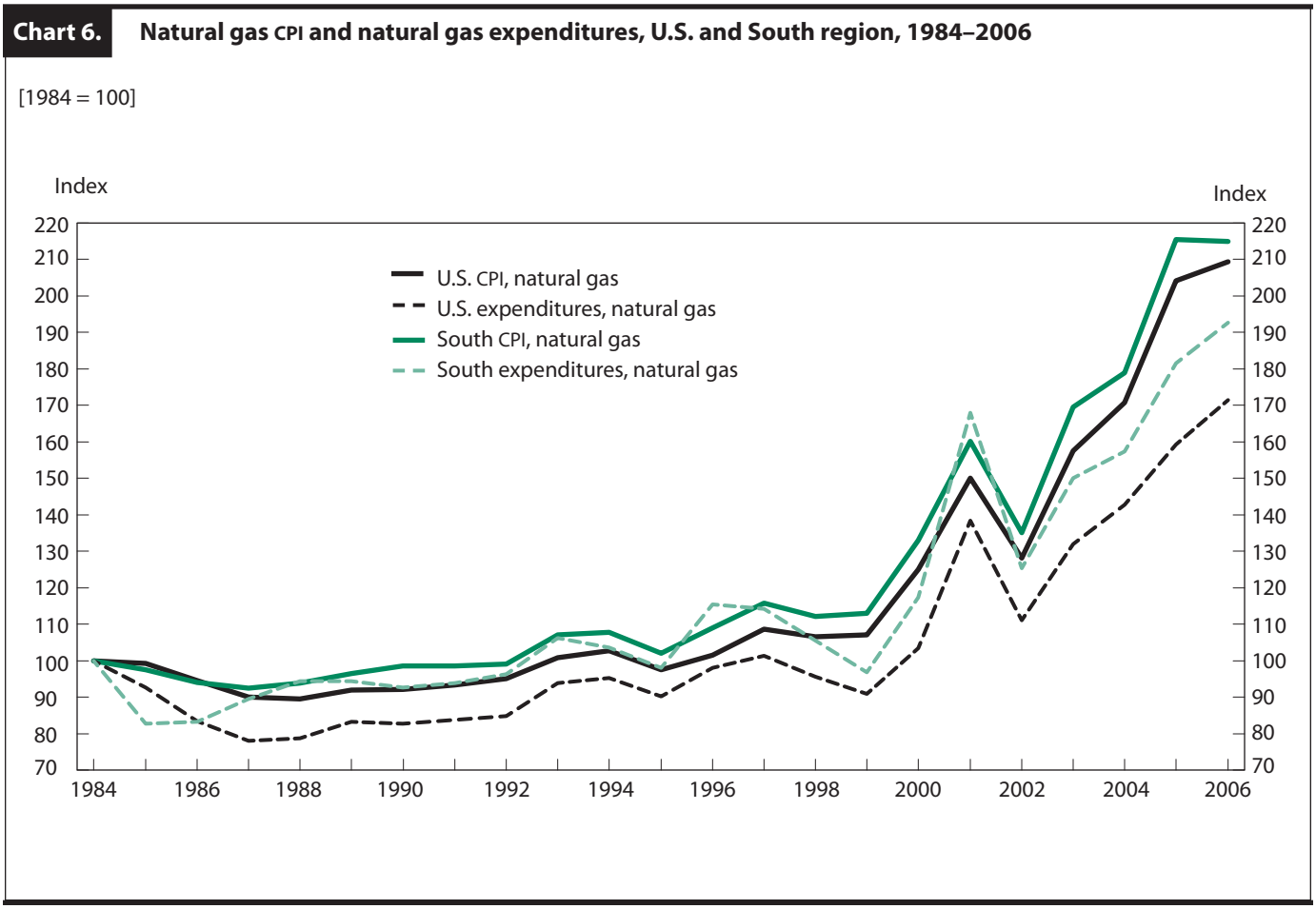


NOTE: U.S. expenditures and South expenditures for gasoline also include expenditures for motor oil.

Another period of interest regarding residential natural gas was from 2000 to 2002. On an annual average basis, wholesale prices for natural gas surged 70 percent in 2000, followed by an additional 10 percent in 2001. The causes for these increases included lower storage levels of natural gas and weather-related demand for it. Another cause was higher oil prices, which led some industrial consumers to switch to natural gas, thereby putting pressure on residential natural gas prices as well. Household expenditures for natural gas in the South initially rose about 20 percent in 2000, a more modest pace than the increase in wholesale prices. The 20-percent rise was followed by an increase of more than 40 percent in 2001. As a result of these gains, the South's share of household expenditures going to natural gas made a relatively large jump to 0.7 percent in 2001, up from 0.5 percent in 2000. Combined with higher electricity shares, this movement offset a decline in gasoline expenditures and kept the region's total energy expenditure ratio essentially constant from 2000 to 2001. The natural gas share dropped back to 0.5 percent in 2002, but because of a total increase of 60 percent in retail natural gas *prices* since 2002, the share rose to 0.6 percent in 2003 and to 0.7 percent in 2004, at which level it remained until 2006. (See table 1.)

A comparison of the long-term growth of prices and expenditures for natural gas, as measured by the CPI and the CE index, appears to indicate that demand for natural gas is somewhat more elastic than that for gasoline. (See table 2.) As shown in chart 6, consumer natural gas prices in the South rose by 115 percent between 1984 and 2006, but household expenditures for natural gas rose by only 93 percent. Movements in the final year of the period studied indicated highly elastic demand when natural gas prices slipped 0.3 percent and expenditures rose 6.1 percent in 2006. However, changes in a single year may just as easily reflect the impact of weather-related demand or other short-term changes. Furthermore, over the longer term, the impact of pure price elasticity is difficult to quantify because of issues of equal consumer access to services. According to data from the Energy Information Agency, the proportion of homes nationwide using electricity as the primary source of home heating increased from 17

Chart 6. Natural gas CPI and natural gas expenditures, U.S. and South region, 1984–2006



percent in 1981 to 29 percent in 2001.[11] The report noted further that unavailability of natural gas could be a major factor in the decline in the product's market penetration, as only 59 percent of U.S. homes using electricity for home heating reported access to natural gas in 2001. The sharper divergence between prices and expenditures seems more likely to represent an increased usage of electricity for home heating purposes and a concomitant decline in natural gas usage, which may *not* be related to pure price considerations.

Electricity. While residential natural gas costs represent a relatively small share of Southern expenditures, wholesale natural gas prices affect the region in another way. More electric utilities in the South rely on gas-fired generating plants to produce electricity than elsewhere in the country. For example, although the South region accounts for just 20 percent of delivered U.S. residential natural gas, it accounts for more than 50 percent of natural gas consumed by utilities to produce electricity.[12] This means that as wholesale natural gas prices rise, Southern consumers of electricity are more likely than consumers in other regions to feel the effects through higher retail electricity prices.

Although natural gas and crude petroleum are not direct fuel substitutes, their costs tend to move in a parallel fashion. To a certain extent, natural gas and fuel oil, a crude petroleum derivative, can be substituted for each other by both retail and industrial users. As these two fuels compete for similar markets, their pricing structures often follow suit in response to changing levels of supply and demand. As a result, higher crude petroleum prices affect Southern consumers through two different mechanisms: 1) the higher retail cost of gasoline at the pump and 2) higher electricity charges resulting from increases in natural gas costs to electric utilities.

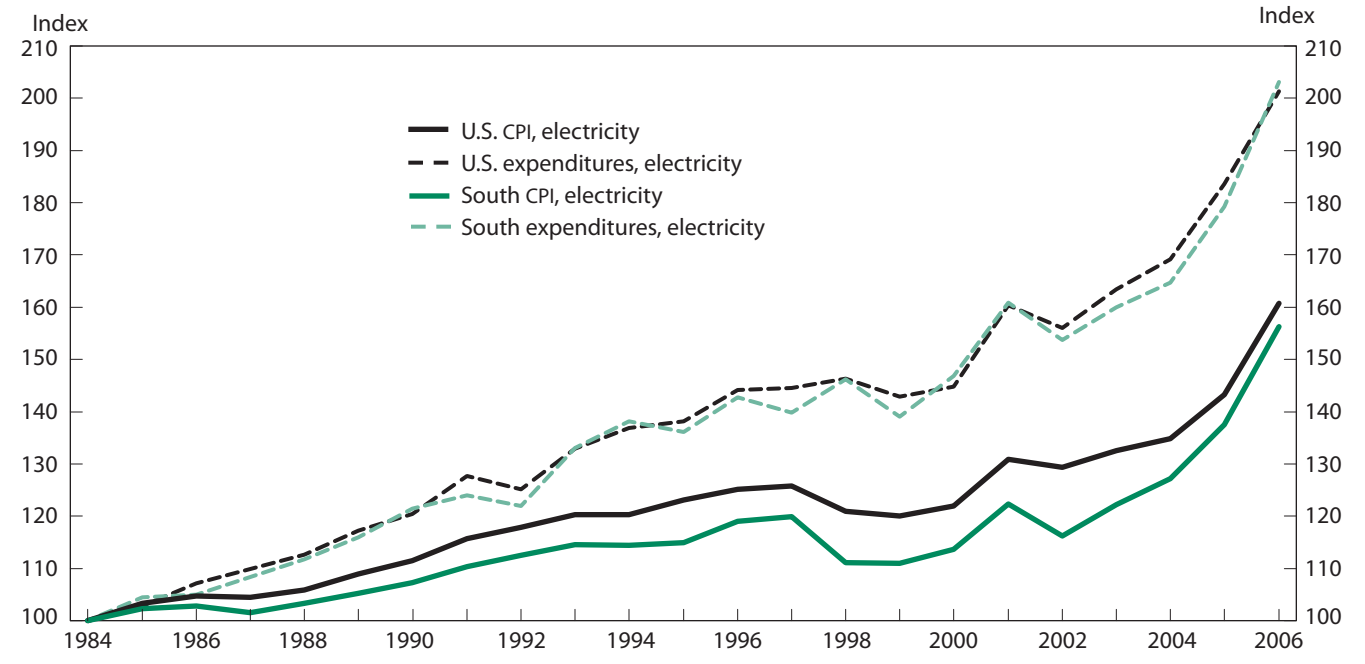
Costs for electricity account for notably higher shares of Southern household expenditures than the U.S. average. (See chart 2.) These above-average ratios make electricity price changes much more significant in the South than in the Nation as a whole. Much of the higher expenditure share is related to the quantity used, because homes in the South consume more electricity than do homes in other regions. This higher usage is due primarily to the prevalence of central air-conditioning systems used to combat higher temperatures and humidity during the summer.[13] In addition, the South uses electricity more intensively than natural gas to generate heat in the winter. In 2001, about 40 percent of households nationwide relied on electricity for their home heating needs, compared with nearly 60 percent of households in the South.[14]

For nearly a decade, gasoline was the largest component of Southern energy expenditures, but electricity overtook gasoline in 1993. Between 1993 and 2001, the two components remained relatively close, repeatedly shifting first and second rankings for highest energy share. In 2002, gasoline moved back into the top ranking, where it has since remained. Between 2002 and 2005, electricity shares were relatively stable at 3.2 percent to 3.3 percent of total expenditures in the South, compared with a much lower share of 2.4 percent to 2.5 percent nationally. Due to the greater importance of electricity costs in the Southern budget, that stability helped to moderate the rate of increase in total energy costs in the region during the period. However, in 2006, electricity prices in the South climbed 13.6 percent and expenditures rose by a nearly equal amount, 13.3 percent. This latest run-up pushed the South's electricity share to 3.6 percent, compared with a national share of 2.6 percent, and resulted in a sharper regional rise in total energy costs.

A long-term comparison of electricity prices with household electricity expenditures reveals a notable difference from the relationship between prices and expenditures in the gasoline and natural gas analyses. (See chart 7.) Between 1984 and 2006, retail electricity prices rose 56 percent—a relatively modest pace compared with the retail prices of other energy components in the South and, more importantly, well below the overall inflation rate of 88 percent. During the same period, average household *expenditures* for electricity in the South climbed 103 percent, indicating a sharp increase in usage.

One major factor in the increased usage is simply a result of homes growing larger over time. Between 1984 and 2006, the average square footage of new single-family homes increased 43 percent in the South—above the national average of 39 percent and the fastest rate of gain among all the regions.[15] However, the increased electricity needed to heat and cool the larger homes is only part of the explanation for greater expenditures. In 2001, electrical power required to run appliances in the home accounted for 51 percent of total electricity consumption in the residential sector.[16] The 22-year period of this study saw a surge in the usage and numbers of various appliances found in the typical home, such as microwave ovens, personal computers, several—and often big-screen—televisions, and multiple refrigerators. Despite measurable increases in energy efficiencies, the increased usage of electrical appliances has had an impact on power requirements in the home. Whether the slower rate of increase in electricity prices had any effect on consumer choices for

Chart 7. Electricity CPI and electricity expenditures, U.S. and South region, 1984–2006



larger homes and more appliances is left to other research, but what can be said is that electricity expenditures rose at a rate well above the price increase.

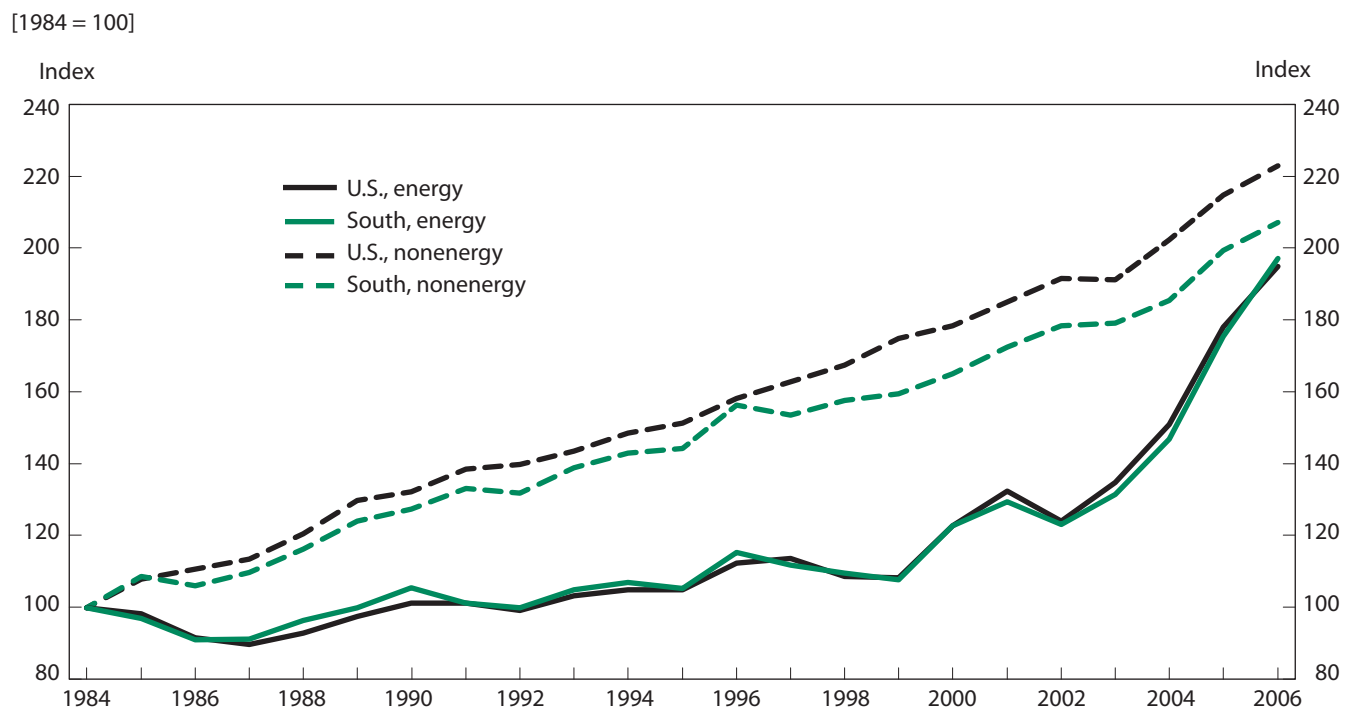
Analysis of nonenergy expenditures

It is a common perception that sharply rising energy costs have continually taken larger portions of the consumer budget. Yet, viewed over the long term, energy costs as a share of total consumer expenditures are currently *below* historic levels. If energy expenditures are less than expected, what categories have taken over the "spare" energy dollars in the South? Or are there any nonenergy categories that have risen at below-average rates? It is easiest to analyze the relative movements among the various expenditure categories by converting the dollar amounts for each component to an index based on 1984 = 100.

Total energy expenditures in the South rose 97 percent between 1984 and 2006, compared with a national increase of 95 percent. The increase in the South was led by gasoline and motor oil, a category that climbed nearly 107 percent. The second-fastest rise occurred in electricity expenditures, which rose 103 percent, followed by the relatively small component of natural gas, which increased 93 percent. Expenditures for fuel oil and other fuels actually declined 45 percent during the 22-year period. At the same time, Southern expenditures for all types of *nonenergy goods and services* rose 107 percent, 10 points above the 97-percent regional energy gain. Nationally, the picture was even clearer, as nonenergy expenditures jumped 123 percent compared with an energy gain of 95 percent. (See chart 8.)

Despite periods of sharp increases in energy prices during the last 22 years, households in both the South and the Nation were consistently spending less of their total budgets on *energy-related* goods and services and more on *nonenergy* goods and services, particularly during the first 15 years examined. This was due in part to the sharp decline in energy prices that occurred between 1984 and 1986, but just as important was the nearly constant rate of increase in expenditures for nonenergy-related goods and services. While the components of nonenergy expenditures have moved in different directions and at varying rates, the total nonenergy share showed a relatively constant rate of gain over time. Moreover, unlike energy expenditures, nonenergy costs never experienced a sharp decline in any year. As a result, it has taken 4 consecutive years of double-digit energy price surges to push total household energy expen-

Chart 8. Nonenergy expenditures and energy expenditures, U.S. and South region, 1984–2006



ditures to the point where they have even begun to close the gap on nonenergy expenditures.

Nonenergy expenditure categories rising at rates faster than total expenditures over the last 22 years include education, personal insurance and pensions,[17] nonenergy public services, health care, shelter, and entertainment. (See chart 9.) The category showing the fastest rate of gain was education, up 196 percent. As a share of total expenditures, education expenditures climbed to 1.6 percent, up from 1.1 percent. Although the share remains relatively low, it represents more than twice the average residential natural gas expenditure in the South. Excluding fuels and energy from the category of utilities, fuels, and public services leaves expenses such as water, sewer, trash, and telephone. Costs for these nonenergy public services rose at the second-fastest rate, up 164 percent during the period, and represented 3.6 percent of total expenditures in 2006, a share equaling that of electricity. One of the largest expenditures for the average household is costs for personal insurance and pensions (including Social Security); this category represented 10.6 percent of current consumption levels, greater than the total energy share of 9.7 percent. Despite a flattening in 2006, insurance and pensions rose 153 percent over the 22 years studied. Shelter costs, the largest single component of total expenditures, rose 139 percent, and the cost share reached 17.7 percent in 2006, up from 15.2 percent in 1984. Health care expenditures rose by the same percentage as shelter between 1984 and 2006 and stood at 6.2 percent of total household expenditures, up from 5.4 percent in 1984. Entertainment expenditures increased 112 percent over the 22-year period and accounted for 4.7 percent of average Southern consumption in 2006, close to the 5.3-percent share for gasoline and motor oil expenditures. Interestingly, entertainment costs, which may be the most discretionary expenditure category among these groups with above-average increases, have declined in the last 2 years; in 2006, entertainment costs represented 4.7 percent of regional household expenditures, while gasoline accounted for 5.3 percent.

Costs in a number of categories rose at rates below the overall average of 106 percent, as shown in Chart 10. Food purchases rose 85 percent as a slow rate of gain in costs for food at home (71 percent) offset much of the faster rate of increase in costs for food away from home (106 percent). The nominal dollars spent on apparel rose 35 percent from 1984, but as a share of expenditures, clothing costs fell to 3.9 percent in 2006, down from 6.0 percent in 1984. Still, at $1,737 in 2006, apparel expenses were well above ex-

Chart 9. **Selected expenditure groups rising faster than total expenditures, South region, 1984–2006**

[1984 = 100]

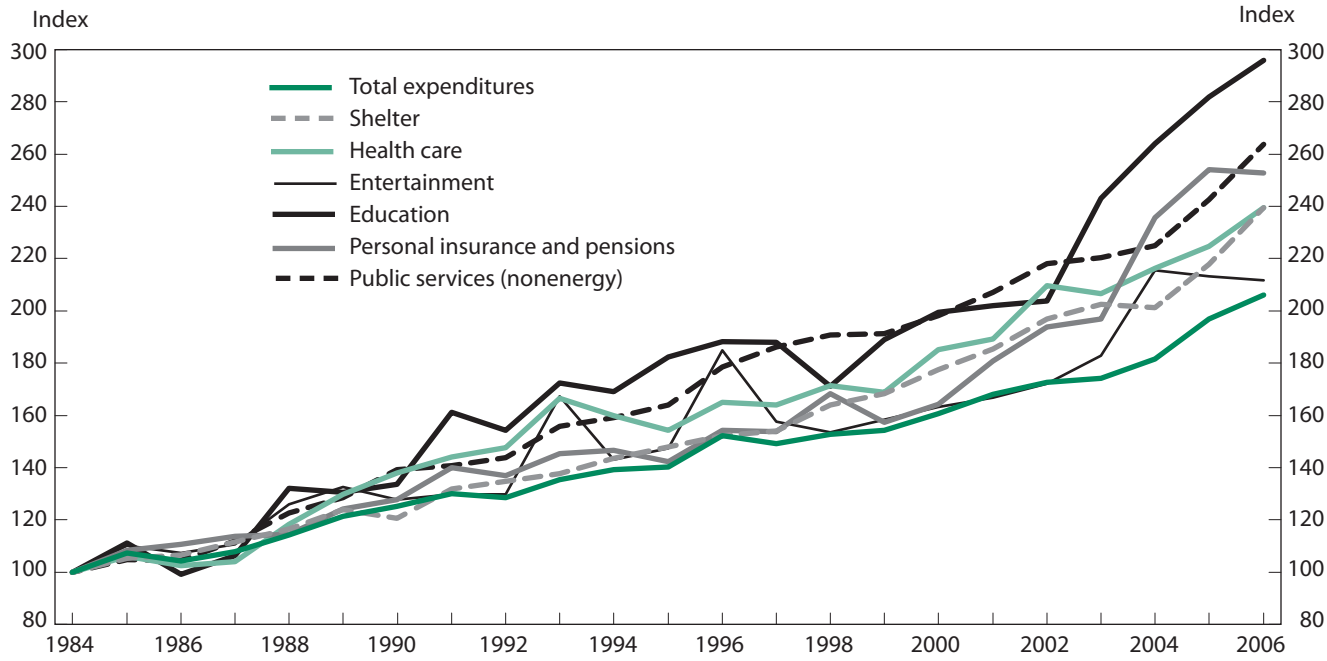
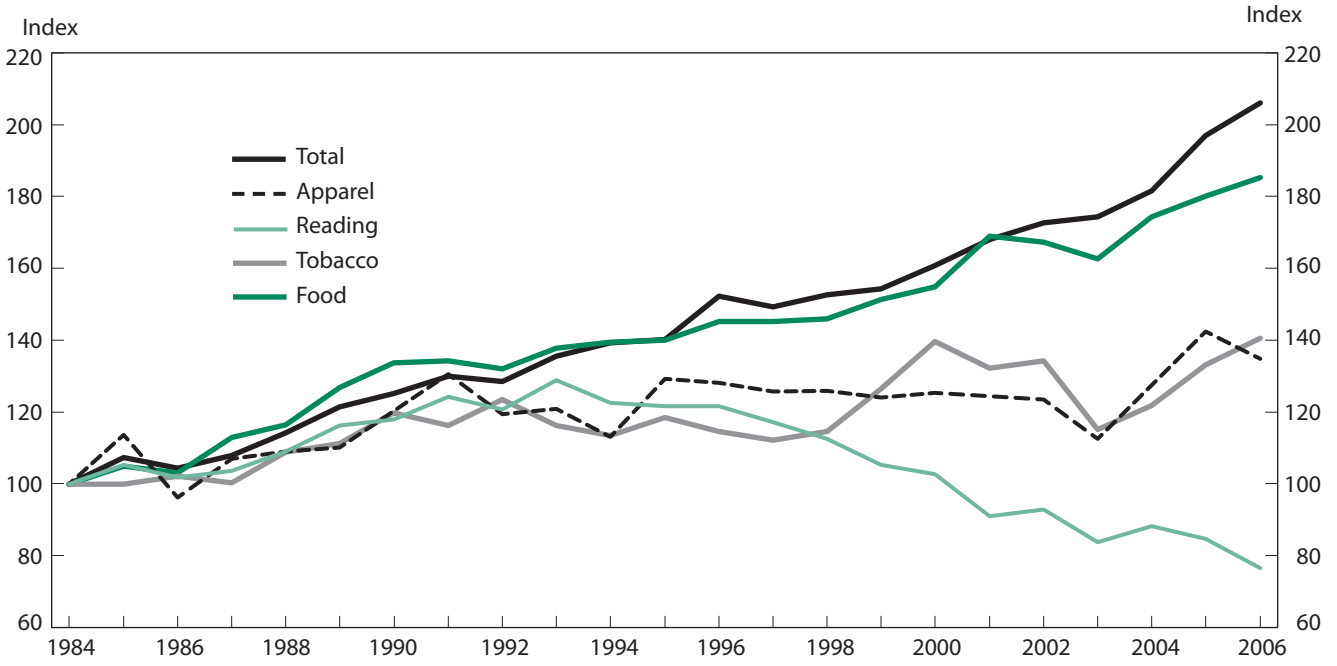


Chart 10. **Selected expenditure groups rising less than the average rate, South region, 1984–2006**

[1984 = 100]



penditures for electricity ($1,588) for the typical Southern consumer. A much smaller household expense, tobacco, averaged $336 per year in 2006, an increase of 41 percent from 1984. Nationwide, prices for tobacco and smoking products (as measured by the CPI-U, U.S. City Average) rose more than 370 percent during the same period, indicating a dramatic curtailment in household consumption. Reading costs fell both in dollar terms and as a percent of total expenditures; reading expenses accounted for just 0.2 percent of total expenditures in 2006, compared with 0.5 percent in 1984.

A category that deserves extra attention is nonenergy transportation, a special grouping derived by subtracting gasoline expenses from total transportation expenditures. (See table 3.) Throughout the period of study, this large category accounted for roughly 14 percent to 17 percent of total Southern expenditures and even exceeded average shelter costs in many years. Like expenditures for total transportation, nonenergy transportation expenditures rose at a slightly below average rate of 93 percent during the period. Chart 11 indicates that there were several reasons for this slower rate of gain. The largest factor was net outlays for new cars, particularly in the middle part of the period. Despite substantial volatility, net outlays for new cars went from rates of increase above those of the nonenergy transportation component during the early years to rates below the average by 1989. Automobile finance charges followed a similar pattern in the early years, rising at an average pace until 1990. This trend was followed by several years of decline, so that average auto finance expenditures did not reach 1990 levels again until 1996. Public transportation expenditures also played a role in slowing the overall rate of gain of nonenergy transportation expenditures, particularly after 1998. The public transportation slowdown was most likely a result of lower airline prices brought about by deregulation, as well as a result of lower consumption of airline services following the attacks of September 11. Countering these slower advances were substantially higher rates of gain for automobile insurance charges and net outlays for used cars, which together accounted for more than 40 percent of nonenergy transportation expenditures in 2006.

A share-analysis format illustrates an interesting interaction in nonenergy transportation costs. (See chart 12.) Used-car net outlays as a percent of expenditures began a sharp decline in 2002 and were followed by a dramatic drop in new-car outlays in 2004. The net result was that the total transportation share remained relatively flat, about 19 percent, as rising gasoline expenditures were balanced by declining automobile purchases. Despite the

Table 3. Indexes of household expenditures for selected transportation items in the South, Consumer Expenditure Survey, 1984–2006

[1984=100]

Year	Total transportation	Gasoline and motor oil	Nonenergy transportation	Vehicle purchase (net outlay)			Auto finance charges	Vehicle insurance	Public transportation
				Total	New car	Used car			
1984	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1985	111.3	95.3	117.0	126.3	139.6	103.0	117.8	102.4	114.9
1986	110.6	84.4	120.0	128.3	137.2	117.6	111.2	113.1	99.5
1987	106.1	82.1	114.8	114.8	120.2	107.3	114.0	126.9	106.4
1988	118.9	89.8	129.3	135.5	134.4	138.9	119.4	134.6	111.2
1989	114.7	93.4	122.4	118.6	113.8	126.4	130.2	151.3	111.7
1990	122.7	101.0	130.5	124.0	124.7	123.0	134.1	162.4	132.4
1991	121.1	90.7	132.0	127.1	114.0	147.1	118.6	173.1	111.2
1992	117.6	89.5	127.7	119.5	105.0	138.9	111.6	182.7	95.7
1993	124.5	89.7	136.9	131.2	120.2	147.3	102.7	189.6	117.6
1994	142.0	90.7	160.3	160.1	159.5	160.7	104.3	206.9	148.9
1995	139.8	90.3	157.5	156.1	127.8	196.1	117.8	203.3	144.7
1996	160.4	101.3	181.5	189.1	154.7	234.5	132.9	206.3	168.1
1997	149.6	97.5	168.3	166.5	141.9	201.2	129.8	217.0	129.3
1998	152.8	90.7	175.1	176.7	145.0	216.2	142.6	203.9	165.4
1999	158.6	93.7	181.9	188.9	169.7	215.0	140.3	211.6	152.1
2000	166.7	113.1	185.9	194.3	155.9	249.2	141.9	223.0	150.5
2001	172.2	109.1	194.8	207.8	170.5	257.8	153.1	234.9	149.5
2002	170.9	108.5	193.2	195.7	171.5	227.4	175.2	257.0	141.0
2003	176.2	115.8	197.8	212.2	210.9	212.4	158.1	270.1	134.6
2004	167.2	140.1	176.9	174.1	155.4	198.4	138.4	281.8	148.9
2005	184.7	181.3	185.9	193.1	169.7	220.5	130.2	262.4	155.9
2006	196.4	206.5	192.8	198.5	180.4	224.0	131.0	260.9	168.1

Chart 11. Indexes of selected nonenergy transportation expenditures, South region, 1984–2006

[1984 = 100]

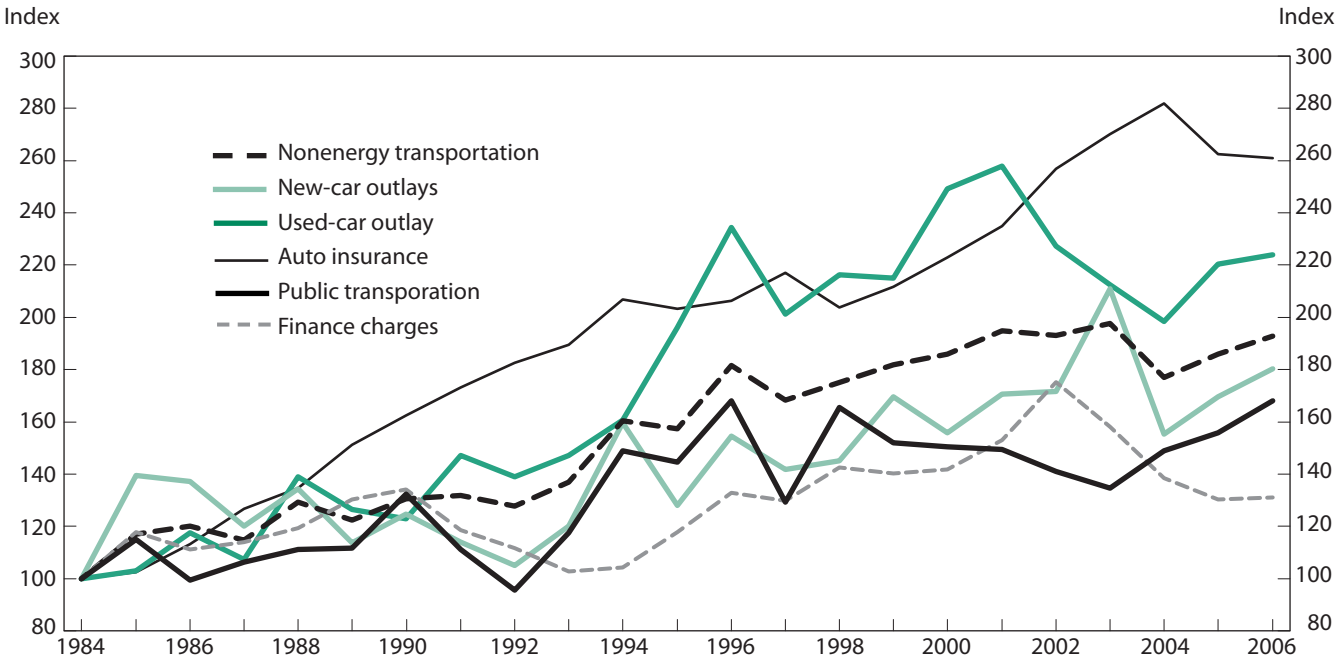
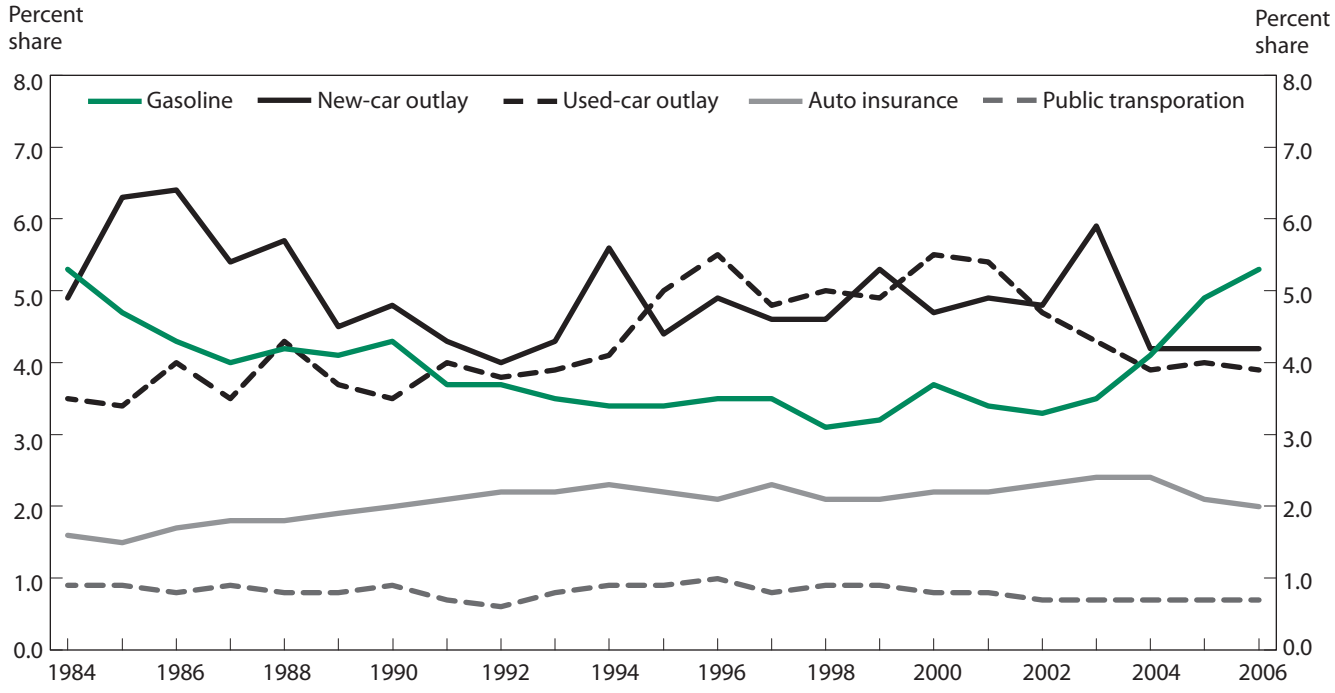


Chart 12. Selected transportation expenditures as a percent of total household expenditures, South region, 1984–2006



NOTE: Expenditures for gasoline also include expenditures for motor oil.

continued above-average increase in gasoline prices in 2005 and 2006, both new- and used-car net outlays once again began rising, as shown in Chart 11. One explanation for the movement of total transportation over the last 3 years could be that households initially responded to surges in gasoline costs by curtailing their nonenergy transportation expenses, particularly auto purchases.

EXAMINING 22 YEARS OF HOUSEHOLD EXPENDITURES AND PRICES in the South census region, the analysis presented in this article has found that despite sharply increasing energy prices in recent years, the average Southern budget still allocated a smaller share of total expenditures to energy costs in 2006 than it did in 1984. The same result was found at the national level, as well as in the other three regions of the country.

Compared with other regions of the United States, the South expends the largest share of its total budget on energy-related goods and services. Above-average expenditure shares for both gasoline and electricity are responsible for the higher energy ratio. Residential natural gas costs have had relatively little impact in the South, due to their extremely small cost share. However, because the South is a more intensive user of electricity than the other regions, and because electric utilities in the South rely more on natural-gas-fired generators, the cost of natural gas to these companies affects the consumer of retail electricity in the South. The analysis also has found that the South region's expenditures for electricity have risen at nearly twice the rate of increase in electricity prices—a product of greater consumption of electricity in the Southern home. Higher consumption has resulted from a number of factors, including larger sizes of new homes, a greater percentage of homes using electricity for central air-conditioning and heating, new types of appliances in the home, and increases in the number of certain appliances (for example, two refrigerators instead of one) kept in the home.

The decline in energy cost shares over time reflects primarily the steady rate of increase in expenditures for nonenergy goods and services. Although energy prices frequently surge at double-digit rates, they may also decline at the same or greater rates, allowing expenditures to follow suit. In contrast, household expenditures for nonenergy items have shown a remarkably smooth and constant rate of increase over time. During the last two decades, as households have shifted dollars away from energy, shares also have fallen for various categories, such as clothing, reading, and food. Expenditure categories showing above-average rates of gain include education, health care, shelter, and nonenergy public services. The transportation category overall rose at a below-average rate over the long term, and in recent years consumption has shifted toward energy-related transportation expenditures at the expense of non-energy-related transportation consumption. □

Notes

ACKNOWLEDGEMENT: The author thanks Stan Suchman, Carmen Lacy, and Carlo Fioretti for their assistance in the preparation of this article.

[1] The South Census region consists of Alabama, Arkansas, Delaware, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, West Virginia, and the District of Columbia.

[2] For further information on the Consumer Expenditure Survey, see "Consumer Expenditures and Income," *Handbook of Methods* (Bureau of Labor Statistics), chapter 16. An updated online version of the section is located on the Internet at **www.bls.gov/opub/hom/pdf/homch16.pdf** (visited April 1, 2007).

[3] For further information on the Consumer Price Index, see "Consumer Price Index," *Handbook of Methods* (Bureau of Labor Statistics), chapter 17, on the Internet at **www.bls.gov/opub/hom/pdf/homch17.pdf** (visited April 1, 2007).

[4] The States (including the District of Columbia) that compose the census divisions are as follows: South—Alabama, Arkansas, Delaware, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, West Virginia, and the District of Columbia; Northeast—Connecticut, Maine, Massachusetts, New Hampshire, New York, New Jersey, Pennsylvania, Rhode Island, and Vermont; Midwest—Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin; West—Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming.

[5] As of May 2007, crude oil costs accounted for 46 percent of the retail price of gasoline. For further information, see Energy Information Administration, "Gasoline and Diesel Fuel Update," on the Internet at **http://tonto.eia.doe.gov/oog/info/gdu/gasdiesel.asp** (visited June 21, 2007).

[6] See Energy Information Agency, "Household Vehicles Energy Use, Latest Data and Trends," on the Internet at **www.eia.doe.gov/emeu/rtecs/nhts_survey/2001/tablefiles/page_a02.html** (visited June 28, 2007).

[7] For further information, see William F. Snyders, Jon Weinhagen, and Amy Popick, "Producer price highlights during 2001," *Monthly Labor Review*, July 2002, pp. 3–15.

[8] For further information, see Energy Information Agency, "Impact Assessment of Offshore Facilities from Hurricanes Katrina and Rita," on the Internet at **www.gomr.mms.gov/homepg/whatsnew/newsreal/2006/060119.pdf** (visited June 21, 2007).

[9] As of December 29, 2005, oil production shut-in in the Gulf of Mexico stood at 27.37 percent and the natural gas shut-in rate was 19.54 percent. For further information, see Minerals Management Service, "Hurricane Katrina/Hurricane Rita Evacuation and Production Shut-in Statistics Report as of Thursday, December 29, 2005," on the Internet at **www.mms.gov/ooc/press/2005/press1229.htm** (visited June 1, 2007).

[10] Craig Howell and Andrew Clem, "Inflation remained mild again during 1985," *Monthly Labor Review,* April 1986, pp. 17–21.

[11] See Behjat Hojjati and Stephanie J. Battles, "The Growth of Electricity Demand in U.S. Households, 1981–2001: Implications for Carbon Emissions" (Energy Information Agency); on the Internet at **www.eia.doe.gov/emeu/efficiency/2005_USAEE.pdf** (visited June 21, 2007).

[12] See "Share of Total U.S. Natural Gas Delivered to Consumers" (Energy Information Agency), on the Internet at **http://tonto.eia.doe.gov/dnav/ng/ng_cons_pns_dcu_SAL_a.htm** (visited June 21, 2007).

[13] "Texas Quick Facts" (Energy Information Agency), on the Internet at **http://tonto.eia.doe.gov/state/state_energy_profiles.cfm?sid=TX** (visited June 21, 2007).

[14] For further information, see "Residential Energy Consumption Survey," Table 3, Electricity Consumption and Expenditures in U.S. Households by End Uses and Census Region, 2001 (Energy Information Agency), on the Internet at **www.eia.doe.gov/emeu/recs/byfuels/2001/byfuel_el.pdf** (visited October 31, 2007).

[15] For further information, see "Characteristics of New Housing" (U.S. Census Bureau), on the Internet at **www.census.gov/const/www/charindex.html** (visited June 28, 2007).

[16] For further information, see Stephanie J. Battles and Behjat Hojjati, Energy Information Agency, "Two Decades of U.S. Household Trends in Energy-Intensity Indicators: a Look at the Underlying Trends" (Energy Information Agency), on the Internet at **www.eia.doe.gov/emeu/efficiency/2005_IAEE.pdf** (visited June 28, 2007).

[17] Data for this category for 2004–06 are not strictly comparable to data for earlier years, because of changes in the way that total income levels and, therefore, Social Security contributions, are imputed for missing observations. However, the category must be included in the analysis because of its importance to the average household.