Legislative Study Committee on Private Participation in Toll Projects
Panel on Peak Oil
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Mr. Chairman, Members of the Committee, my name is David Ellis. I am an Associate Research Scientist at the Texas Transportation Institute. I've been asked to be here today to talk a little about the price of motor fuel and the extent to which that price has affected consumption and, subsequently, vehicle miles traveled.

You have several charts in your packet that I hope will tell the story in a clear fashion. To speed things along I'll go through them briefly as a means of telling the fuel price/fuel consumption story – at least in Texas.

First, in Chart 1, you see that Texas gasoline consumption continues to rise. This chart tracks consumption from August of 1997 to May 2008. There is monthly variation, of course, but the general trend is up.

In Chart 2, you'll see the same thing regarding diesel fuel. Again, monthly variation, but a general trend upward.

However, in Chart 3, a somewhat different story begins to emerge regarding gasoline consumption. When we divide taxable gallons of gasoline by the estimated state population[1] in order to get a figure for the per capita consumption of gasoline, we see a slight downward trend. So, what Charts 1 and 3 mean when taken together, is that gasoline consumption continues to rise, but much of the increase is a function of population growth as opposed to increased levels of consumption on an individual basis.

Diesel fuel is a little different. In Chart 4 you'll see that per capita consumption of diesel fuel continues to increase on a per capita basis – primarily because it is used to move freight. And as long as people continue to buy things, trucks will continue to bring them. That's not to say that fuel price doesn't matter to truckers, it does. But as long as there is consumer demand, consumer products will be delivered.

In terms of the relationship between price and consumption, I'd ask you to look at Chart 5. Chart 5 shows the relationship between price and per capita consumption for all months between August 1997 and May 2008.

What you see there are two things: first, a gradual trend downward in per capita consumption according to the best fit line, but if you'll look at the equation in the top right-hand corner of the chart, you'll see an r-squared value of .19. What that is telling us is that the variation in price is explaining only about 19 percent of the variation in consumption.

As an example, you see a significant amount of variation in consumption in the narrow price band of $1.00 per gallon to $1.50 per gallon. Again, this chart represents all months. Certainly there are other factors like weather, for example, that can cause monthly variation in fuel consumption.

What's interesting is that when we look at all of the Februarys together or all of the Julys together, the story is a little different.

For example, if we look at all of the Februarys between 1998 and 2008 (Chart 6) – while the slope is downward, what we find is that there is not much correlation between the variance in price and the variance in consumption – an r-squared value of .22 – meaning the variance in price explains only 22 percent of variance in consumption.

But if we look at all of the Julys between 1998 and 2007 (Chart 7), we find a steeper slope to the line and a pretty significant correlation – an r-squared value of .88 – telling us that the variance in price explains 88 percent of the variance in gallons sold per capita.

So, what all of this means is that price doesn't influence consumption as much in February as it does in July. Looking at all months, what we find is a pattern such that price doesn't matter as much in terms of consumption in January through March and October through December. Starting in April and through September, consumption and price are more closely correlated. The months where consumption is most correlated with price are the summer months.

All of this makes sense in a way. A much higher percentage of our driving in the non-summer months is taken up by going to work, school and other necessary trips. While in the summer, a higher percentage of the driving is discretionary – vacation trips and the like. As consumers, we're more sensitive to fuel price on discretionary trips than we are on non-discretionary trips. And what you hear on television and read in the newspapers tends to support this – with many reports of families altering vacation plans during the summer. The data suggest they would. We'll see what happens in September.

Chart 8 looks at this same data from a different perspective. It compares year-to-year change in consumption per capita with year-to-year change in price expressed in 2008 dollars.

For example, if the January price in 2008 was 10 percent more than January 2007 and January 2008 consumption was 10 percent less than January 2007, the dot that represents this relationship would be in the upper left-hand quadrant – where the chart says "Consumption Down – Price Up".

We can see from this chart that the pattern of the dots is tall and narrow – in other words, the variation along the consumption (the vertical) axis is pretty large compared to the variation in price (the horizontal) axis. If price were the only factor that determined consumption, the pattern would be at a 45 degree angle from the upper left quadrant down to the lower right quadrant. But again, what we see is a nearly vertical pattern that's pretty narrow – a lot more variation in price than variation in consumption.

All of this might be leading you to believe that I'm now contradicting reports that have been in the media or the Federal Highway Administration about people driving less. But, really, I'm not.

The data I've presented today represent trends over a 10 year period. I think the recent increases to over $4.00 per gallon of gasoline have caused individuals and families to more carefully consider their driving decisions and to make adjustments. That is reflected in the most recent per capita consumption figures. But I also think we may see history repeat itself to some degree. We may be in the early stages of a short-term adaptation by consumers while, in the long-term, as history might suggest, we may revert back to something like "normal".

Chart 9 will show you what I mean. Chart 9 traces vehicle miles traveled (VMT) in the United States from 1936 through an estimate for 2008. Along the way, you'll see several short-term drops in VMT. The first shown here was during World War II, when we rationed fuel and tires and, additionally, had some 16 million men and women who served in the military during that period. Then, in the early 1970s the fuel price increased 33 percent and VMT dropped by 2.5 percent. In the late 1970s and early 1980s we experienced another round of fuel price increases and saw another decrease in VMT. Now, we've seen a 46 percent increase in fuel prices in 2008 (based on January through April 2008 estimates) and a 2.1 percent decrease in VMT compared to last year. But, in all of the cases, after a relatively short-term decline, VMT eventually returned to "normal" levels.

You probably want to know what's going to happen this time. So do I, but I don't. There are so many variables – some of them are just unknown, some of them are unknowable.

The list of what I don't know is long. For instance, what the price of fuel will be a year from now; the health of the national and Texas economies; when, or if, someone will invent a $30,000 hydrogen fuel cell car; or when, or if, someone will invent a mass-produced, gasoline-powered car that gets 100 miles per gallon, just for starters. (We've got a little bit to go on that, by the way. Right now, our fleetwide fuel efficiency in the U.S. is somewhere between 17.5 and 18.0 miles per gallon – probably a little less in Texas.)

Again, I don't know a lot – particularly about the future. But, if there are no cataclysmic events or stunning technological breakthroughs, I think the past might give us some clues. And I hope that will be of value to you.

I've attached other charts that you might find of interest as well.

Despite not knowing much, I'll be happy to try to answer your questions.

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[1] Population estimates are based on annual estimates of state population produced by the Texas State Data Center. The annual increase in population was then divided into 12 even increments to produce monthly population estimates for use in this analysis.

Chart 1: Gallons of Taxable Gasoline Sold in Texas by Month (in '000s)
(August 1997 thru May 2008)

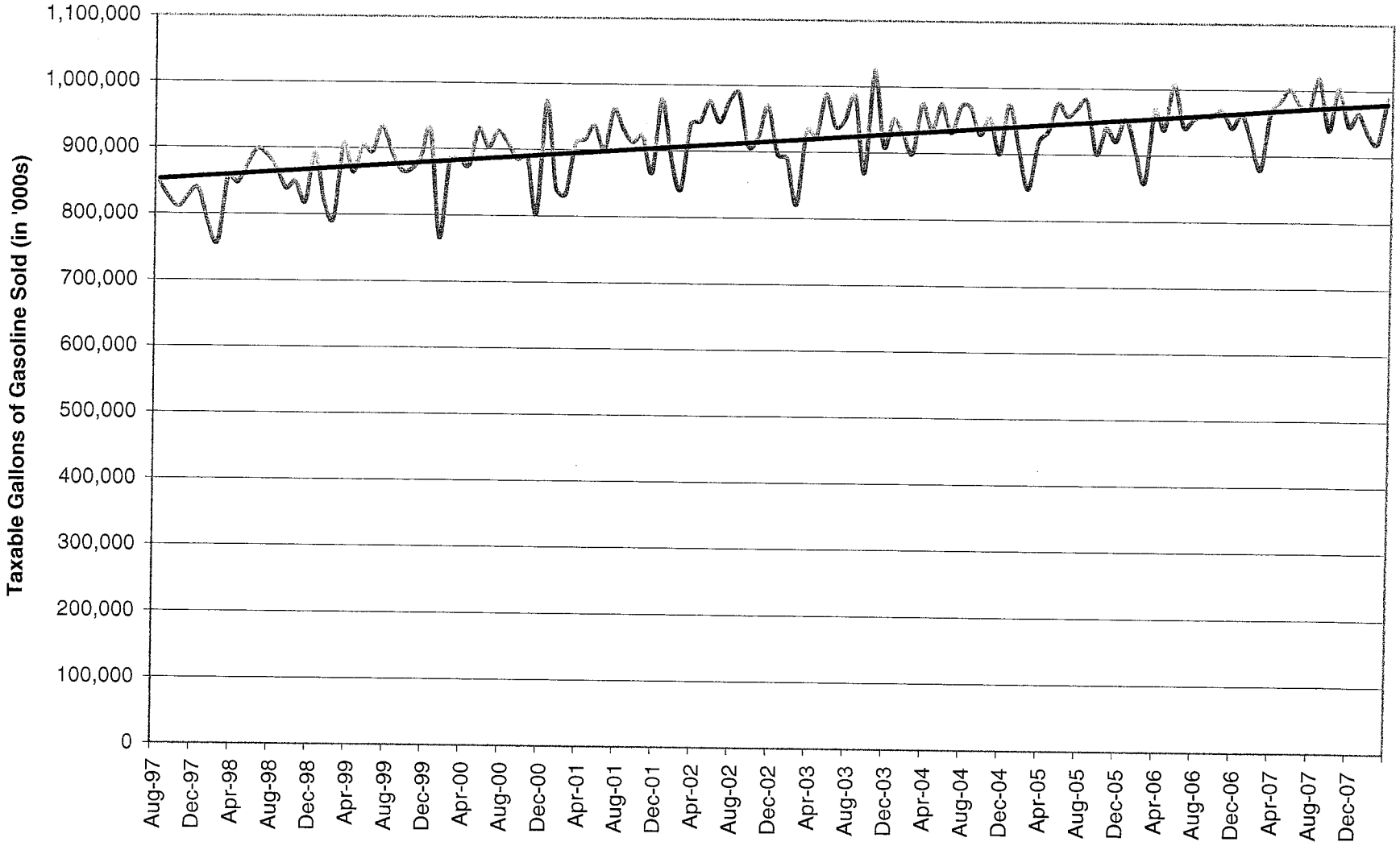


Chart 2: Gallons of Taxable Diesel Sold in Texas by Month (in '000s)
(August 1997 thru May 2008)

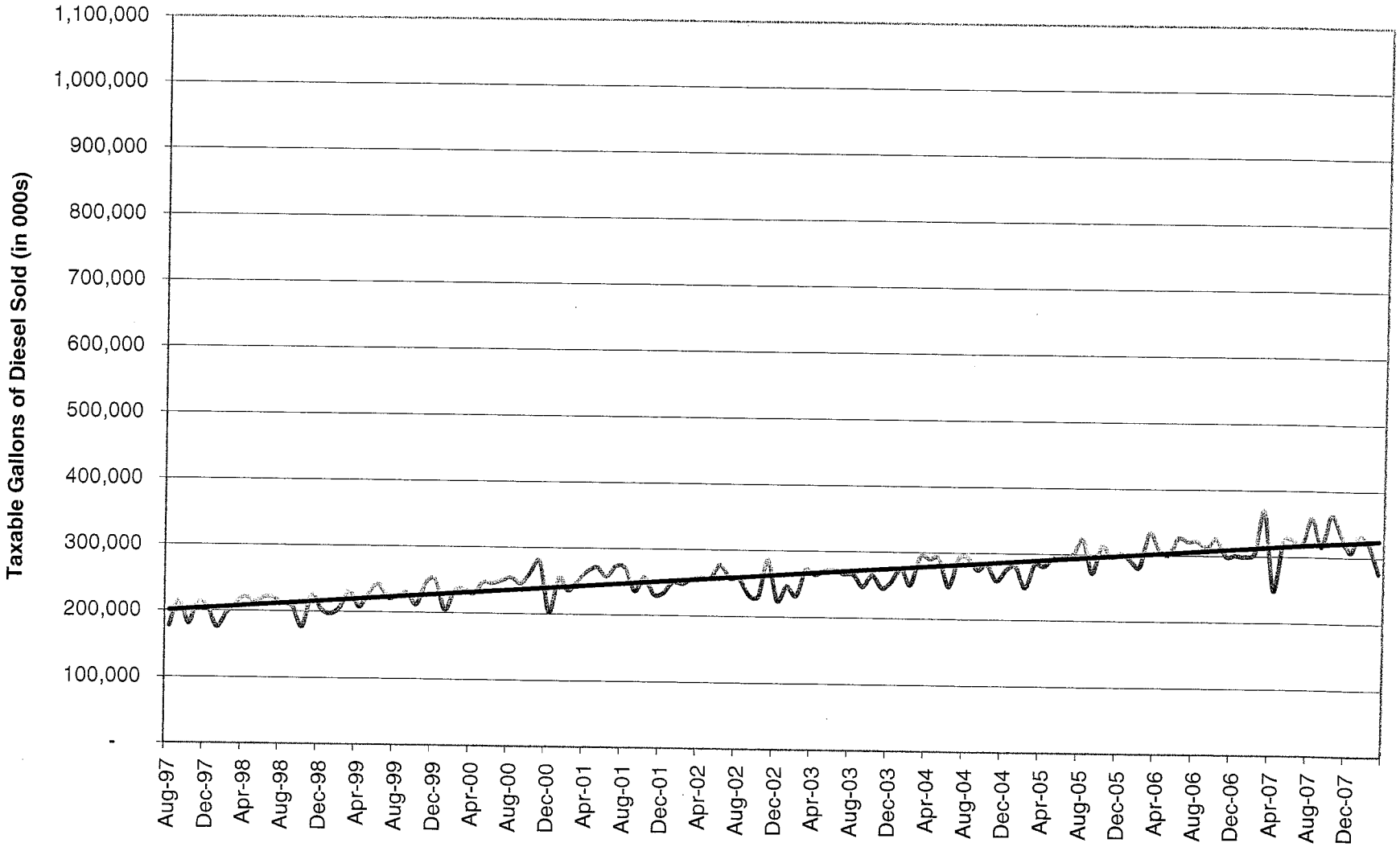


Chart 3: Estimated Gasoline Consumption per Capita in Texas by Month (August 1997 through May 2008)

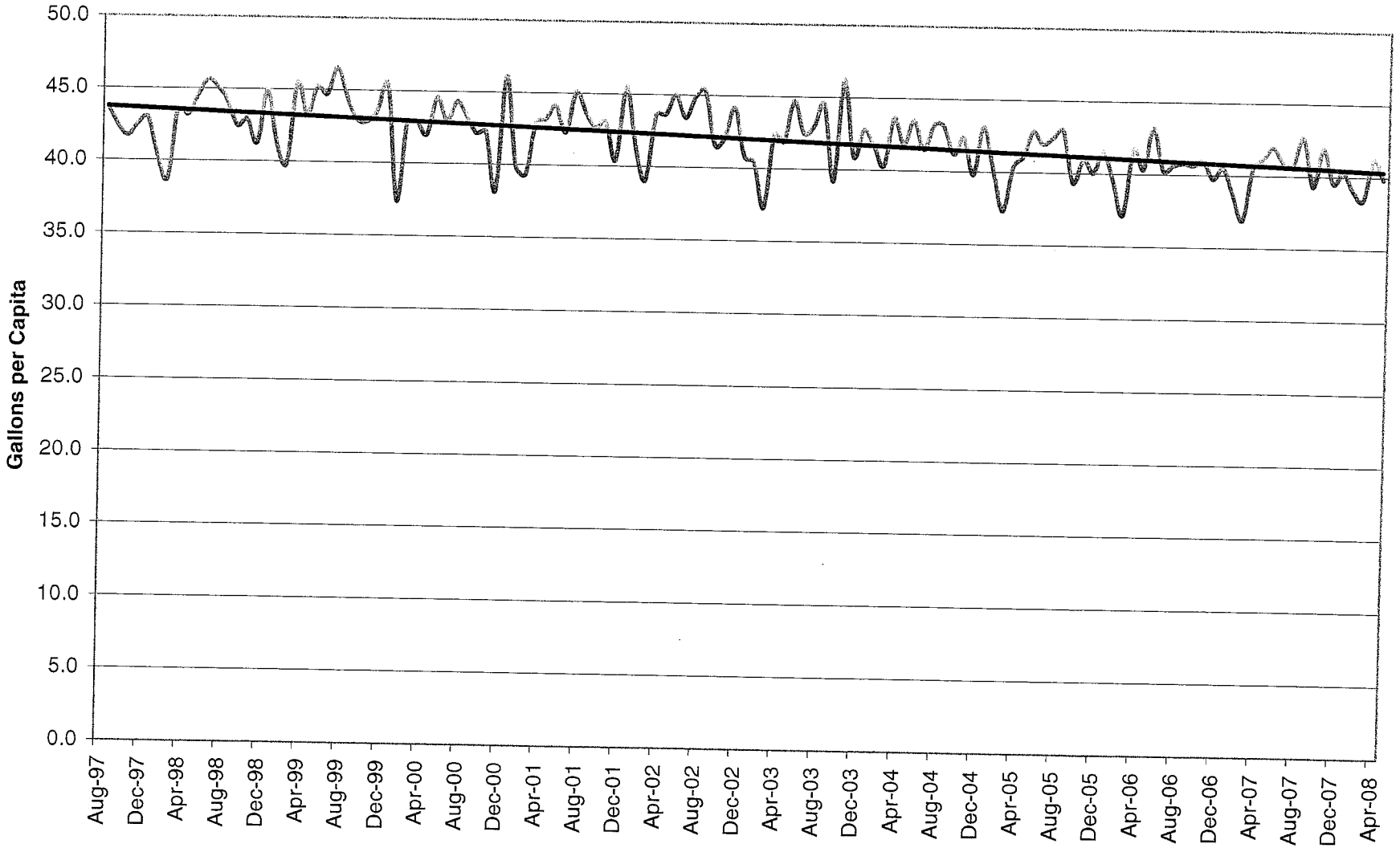


Chart 4: Estimated Diesel Consumption per Capita in Texas by Month (August 1997 through May 2008)

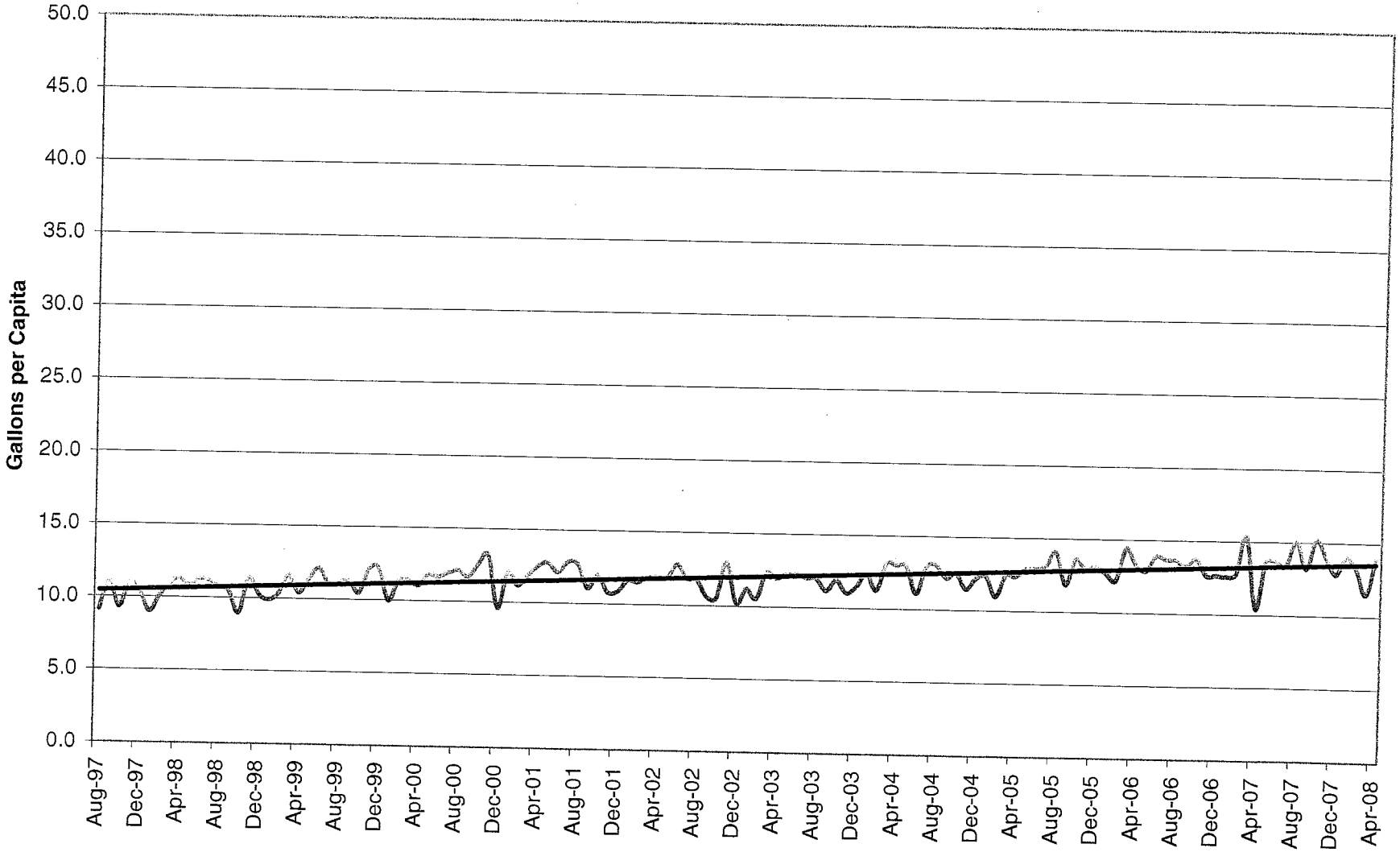


Chart 5: Per Capita Gasoline Consumption, All Months - Nominal $
(August 1997 to May 2008)

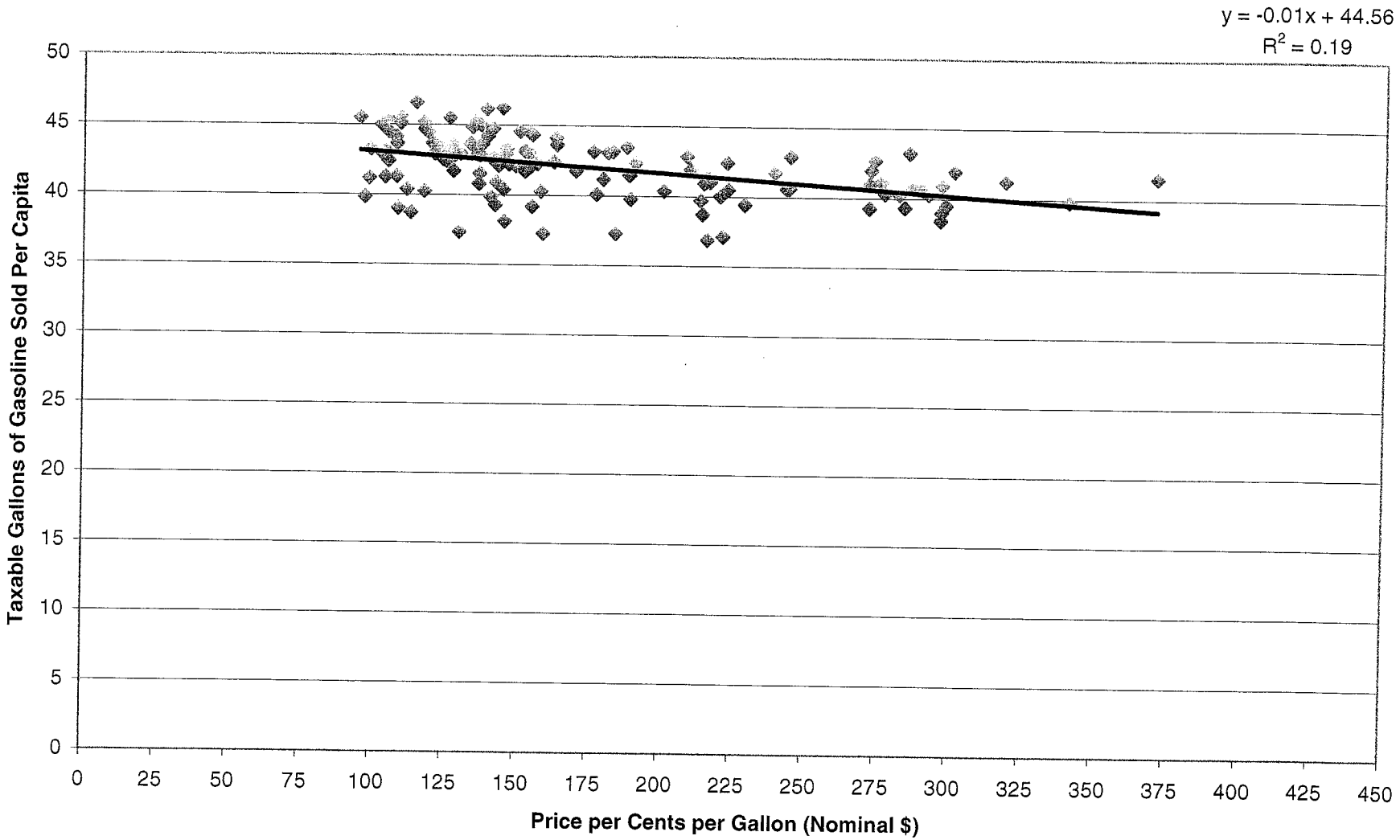


Chart 6: February Per Capita Gasoline Consumption - Nominal $
(1998 through 2008)

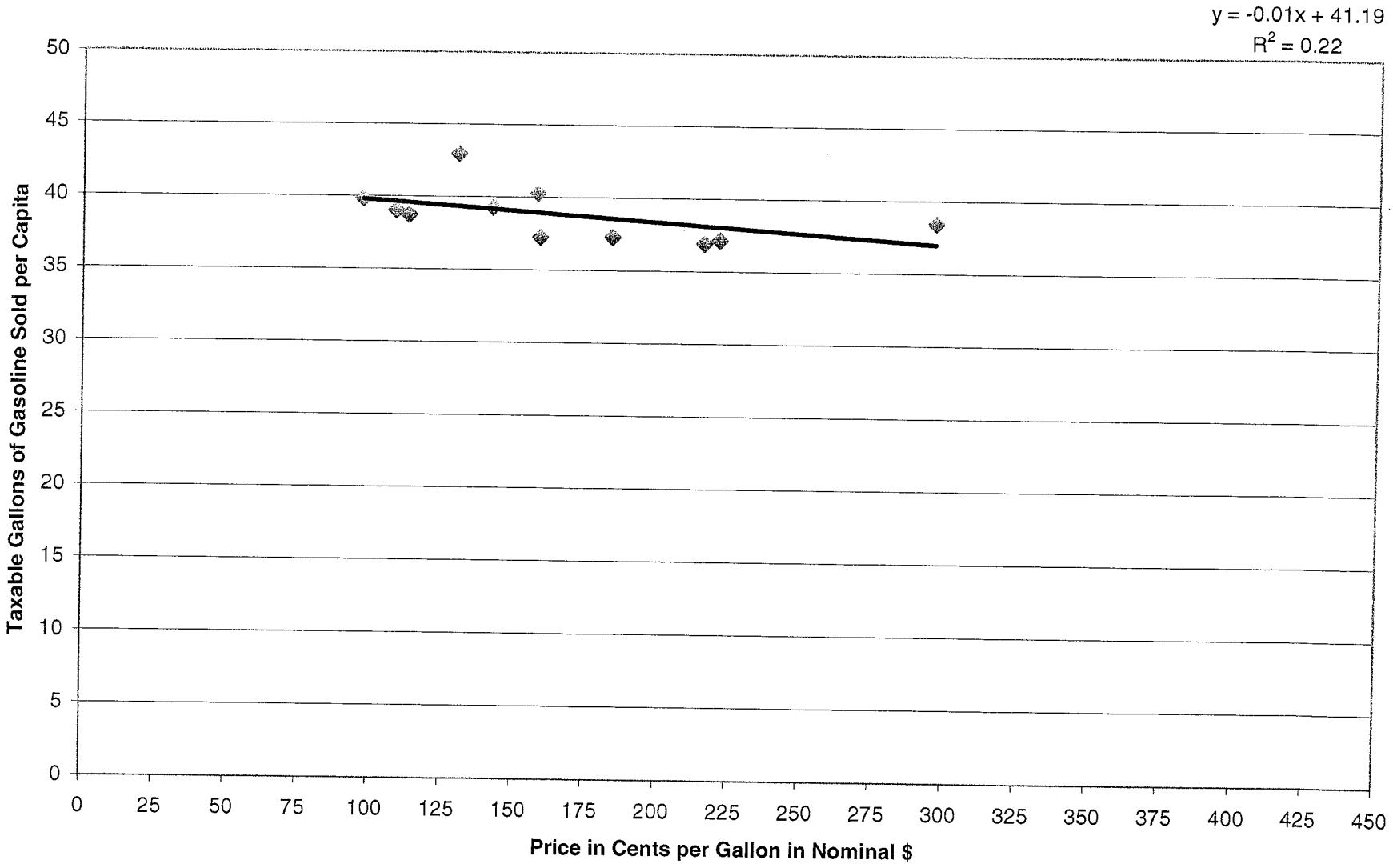


Chart 7: July Gasoline Per Capita Consumption - Nominal $
(1998 through 2007)

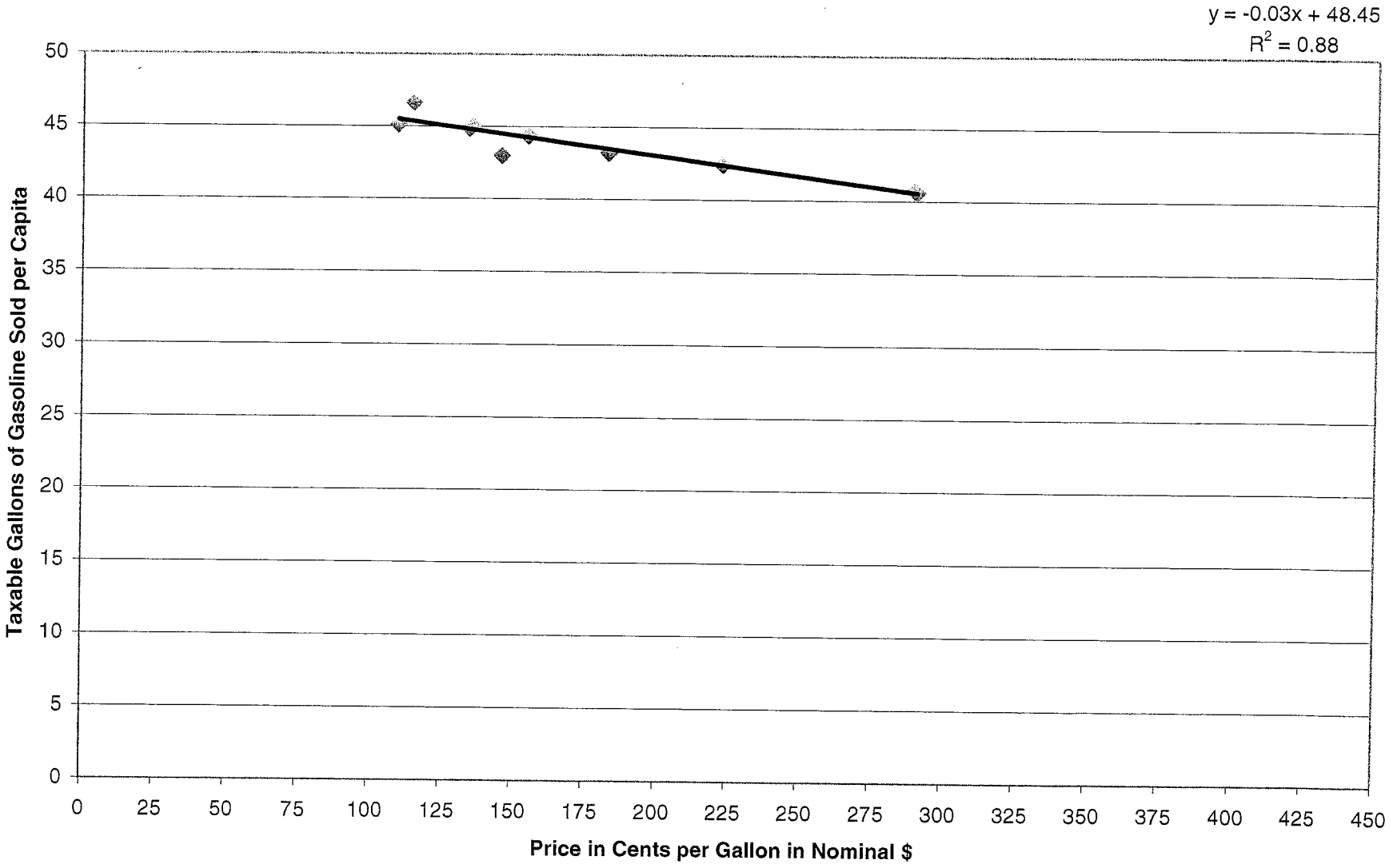


Chart 8: Year-Over-Year Percent Change in Consumption of Gasoline Per Capita Versus Year-Over-Year in Percent Change in Gasoline Price in Texas (All Months)

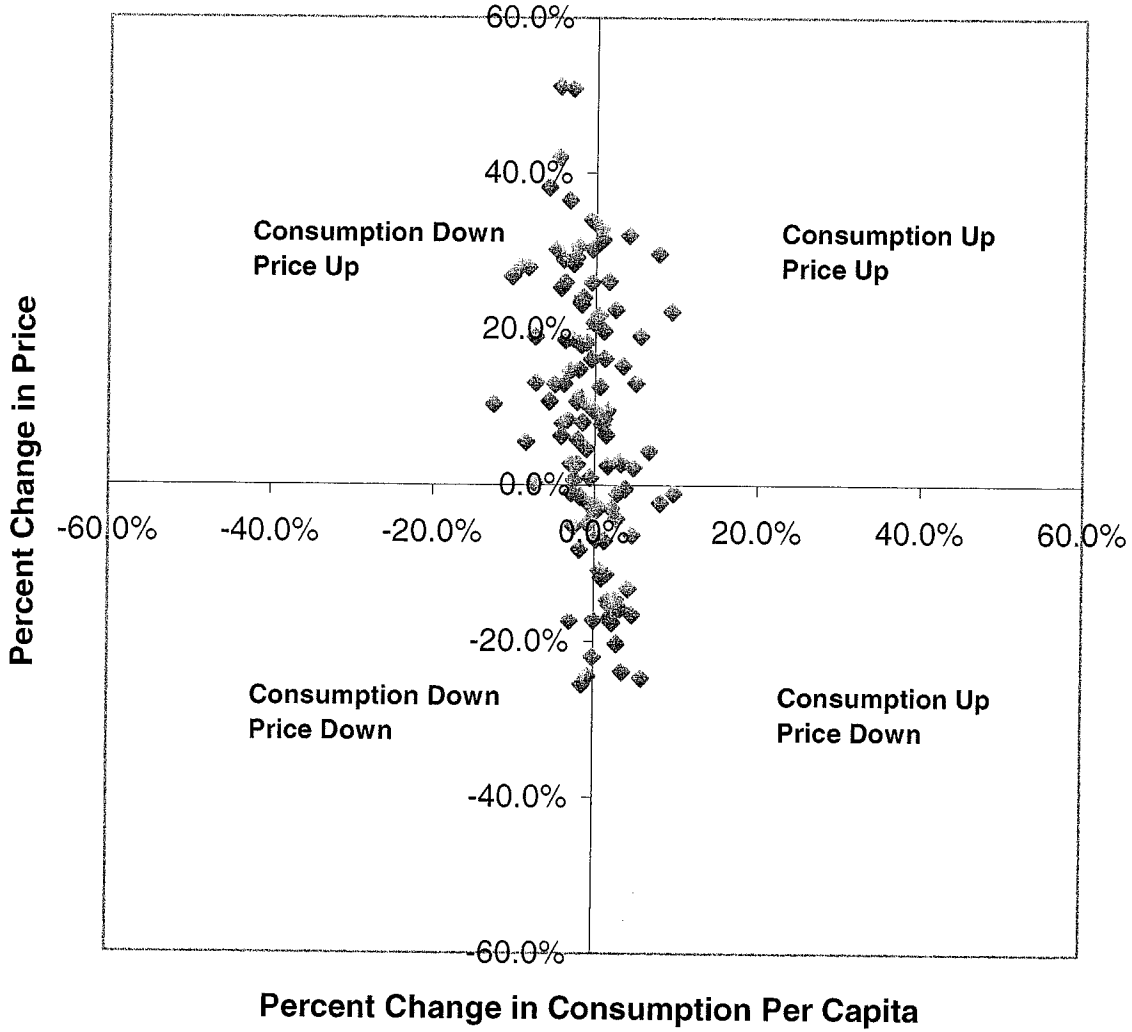
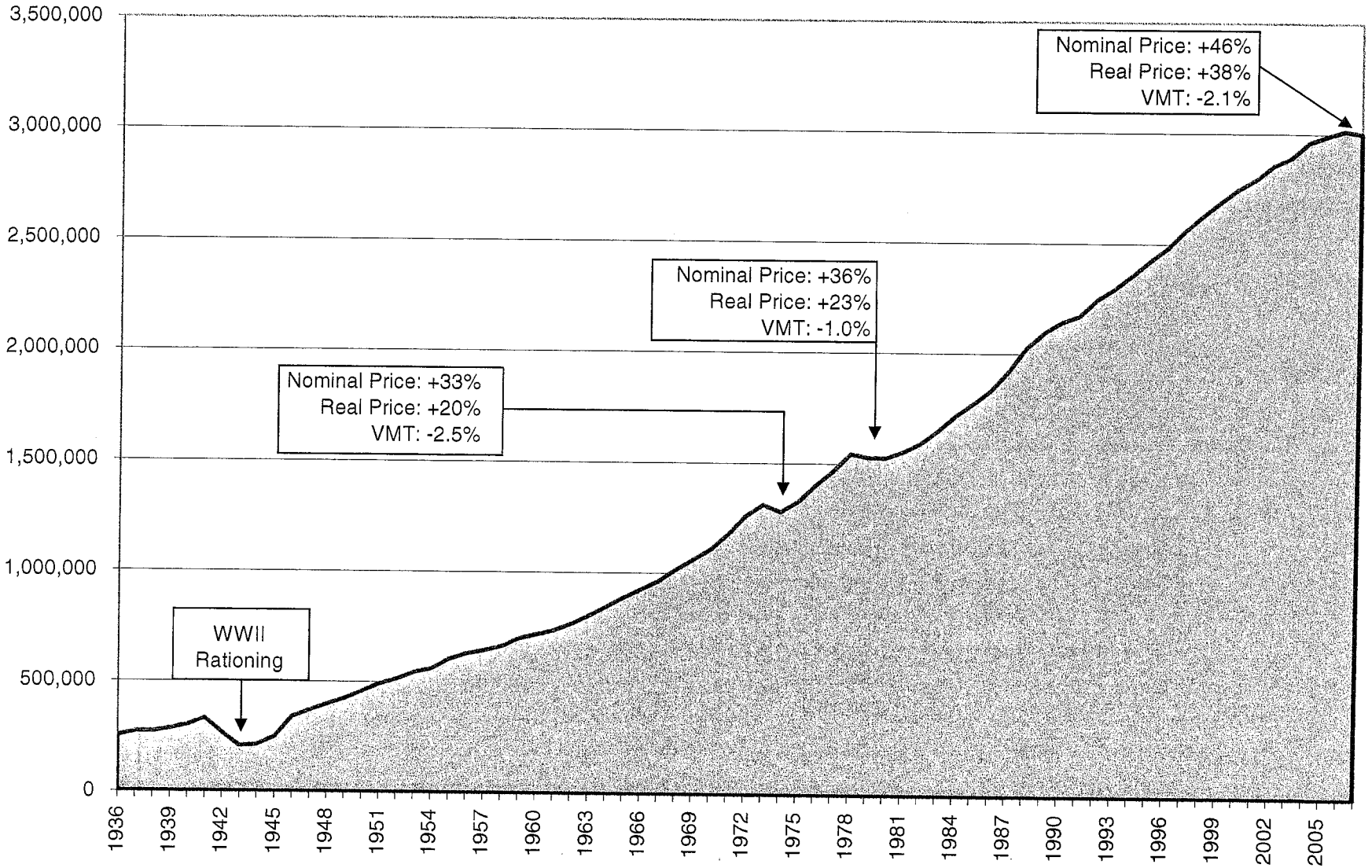
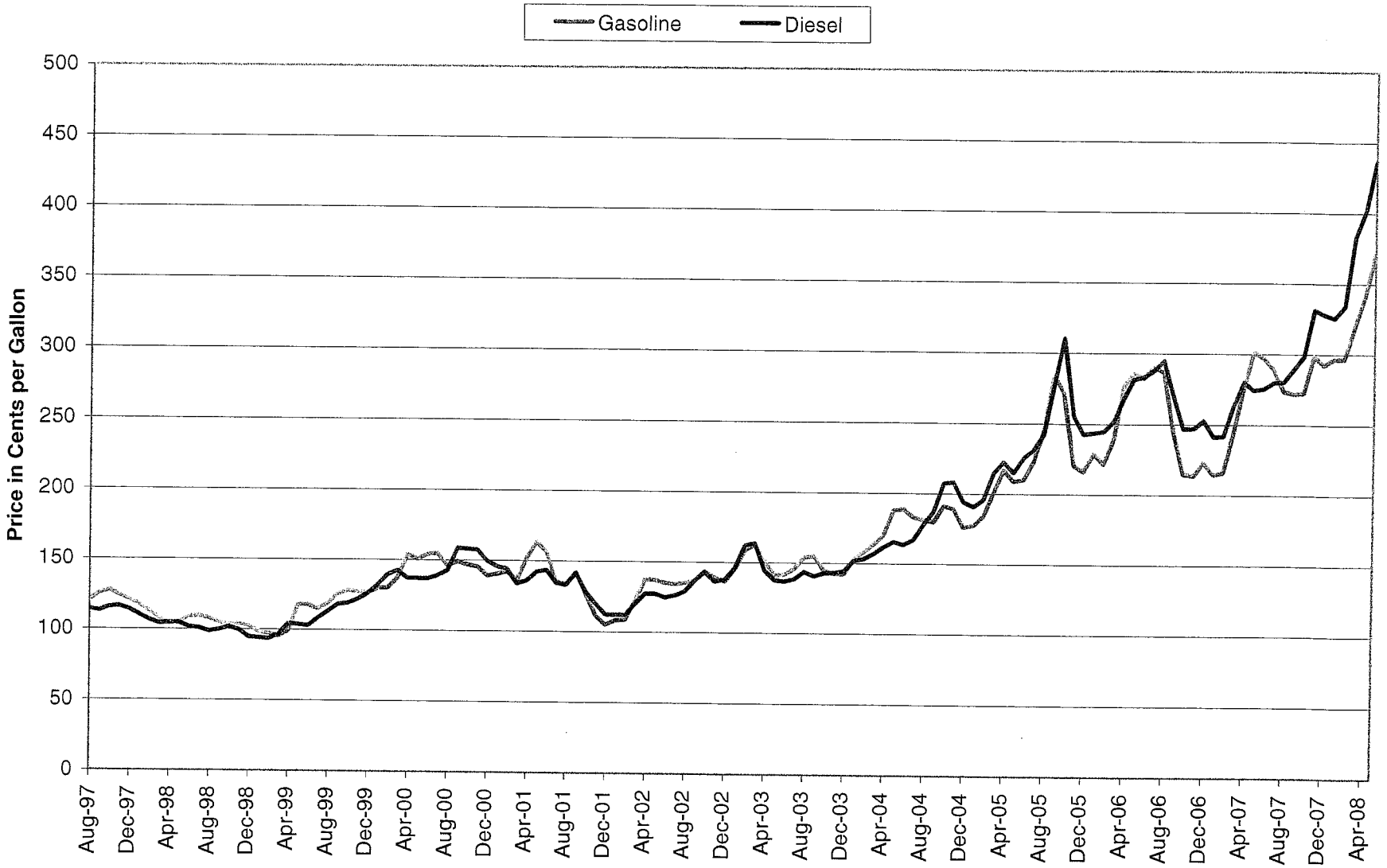


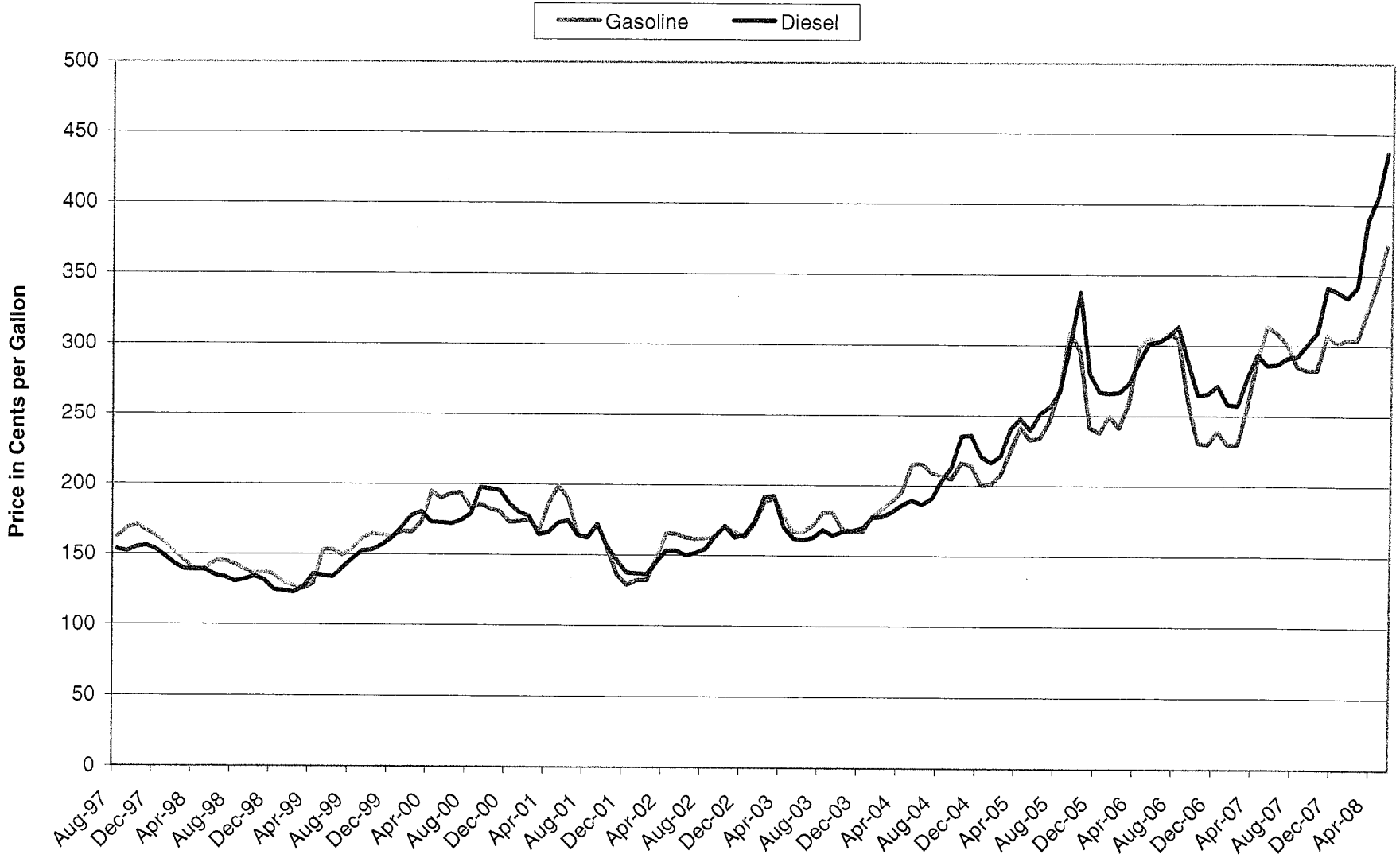
Chart 9: Vehicle Miles Traveled in the United States (in millions): 1936 through 2008
(2007 VMT is estimated. 2008 VMT in based on data through April 2008.)
(*Source: Federal Highway Administration*)



Gasoline and Diesel Fuel Prices in Texas in Nominal Dollars
August 1997 to May 2008



Gasoline and Diesel Fuel Price in Texas in Constant Dollars (May 2008 $)
August 2007 to May 2008



Nominal vs. Constant Dollar Price of Gasoline - Nationwide
(as adjusted by the Consumer Price Index)

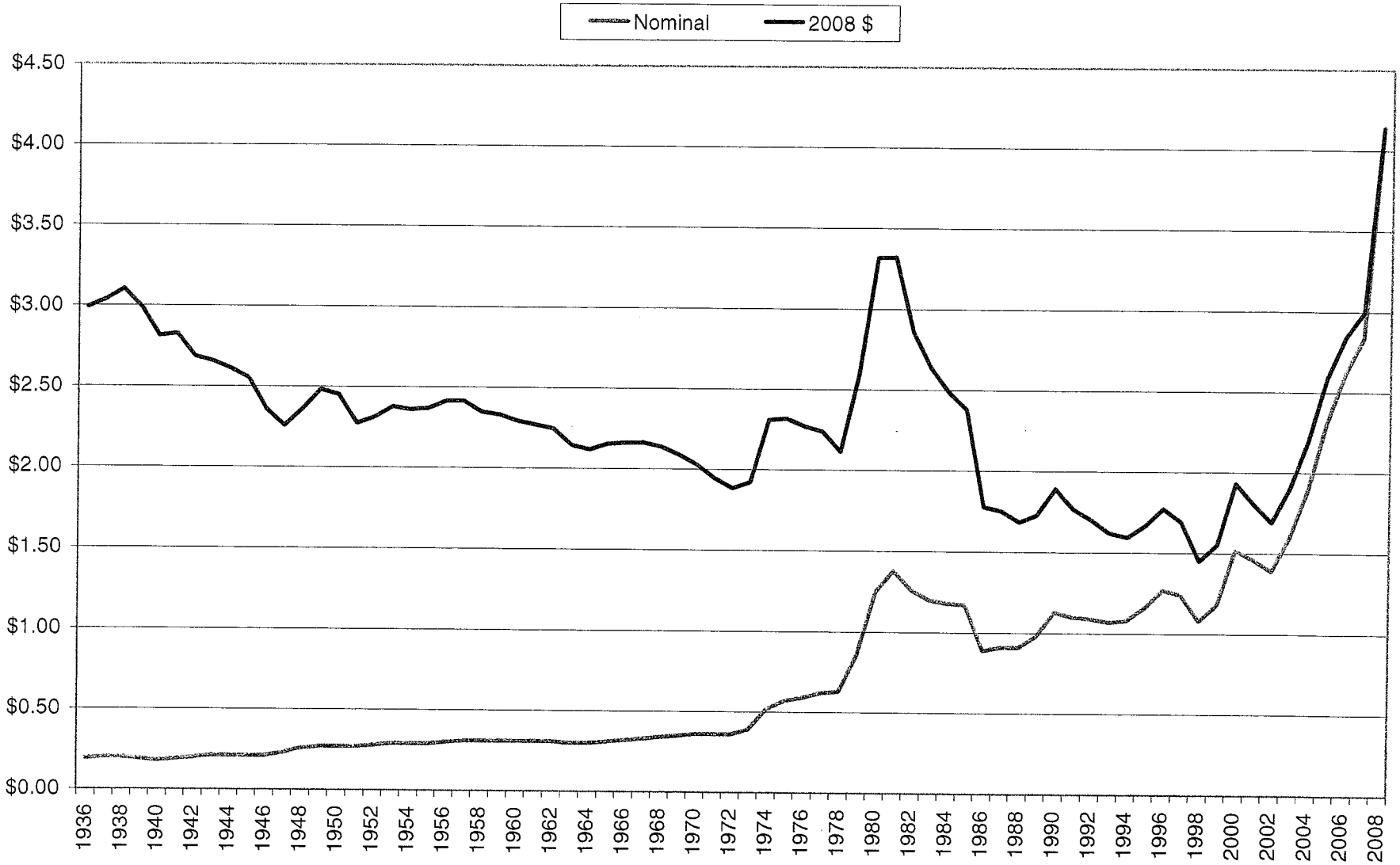
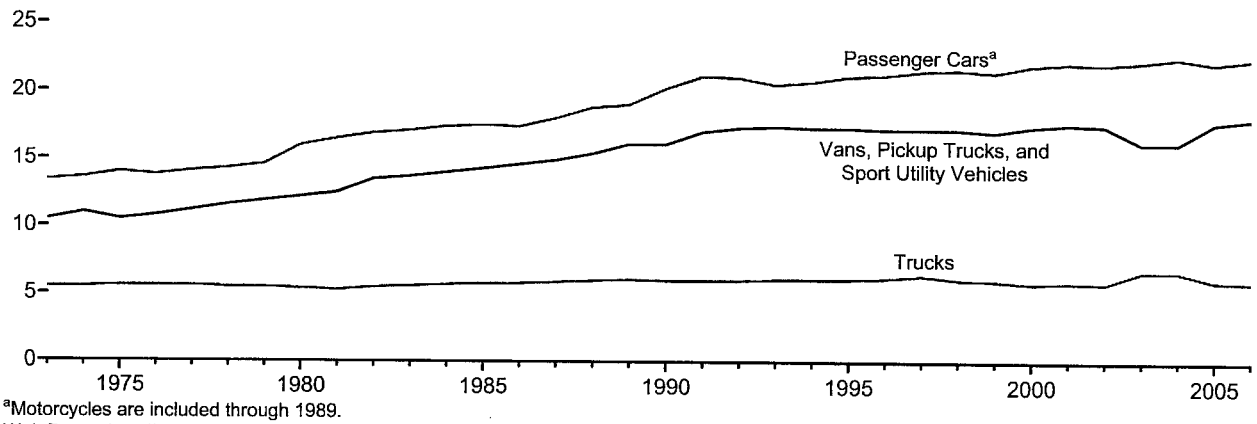


Figure 1.8 Motor Vehicle Fuel Rates, 1973-2006
(Miles per Gallon)



[a]Motorcycles are included through 1989.
Web Page: http://www.eia.doe.gov/emeu/mer/overview.html.
Source: Table 1.8.

Table 1.8 Motor Vehicle Mileage, Fuel Consumption, and Fuel Rates

	Passenger Cars[a]			Vans, Pickup Trucks, and Sport Utility Vehicles[b]			Trucks[c]			All Motor Vehicles[d]		
	Mileage (miles per vehicle)	Fuel Consumption (gallons per vehicle)	Fuel Rate (miles per gallon)	Mileage (miles per vehicle)	Fuel Consumption (gallons per vehicle)	Fuel Rate (miles per gallon)	Mileage (miles per vehicle)	Fuel Consumption (gallons per vehicle)	Fuel Rate (miles per gallon)	Mileage (miles per vehicle)	Fuel Consumption (gallons per vehicle)	Fuel Rate (miles per gallon)
1973	9,884	737	13.4	9,779	931	10.5	15,370	2,775	5.5	10,099	850	11.9
1974	9,221	677	13.6	9,452	862	11.0	14,995	2,708	5.5	9,493	788	12.0
1975	9,309	665	14.0	9,829	934	10.5	15,167	2,722	5.6	9,627	790	12.2
1976	9,418	681	13.8	10,127	934	10.8	15,438	2,764	5.6	9,774	806	12.1
1977	9,517	676	14.1	10,607	947	11.2	16,700	3,002	5.6	9,978	814	12.3
1978	9,500	665	14.3	10,968	948	11.6	18,045	3,263	5.5	10,077	816	12.4
1979	9,062	620	14.6	10,802	905	11.9	18,502	3,380	5.5	9,722	776	12.5
1980	8,813	551	16.0	10,437	854	12.2	18,736	3,447	5.4	9,458	712	13.3
1981	8,873	538	16.5	10,244	819	12.5	19,016	3,565	5.3	9,477	697	13.6
1982	9,050	535	16.9	10,276	762	13.5	19,931	3,647	5.5	9,644	686	14.1
1983	9,118	534	17.1	10,497	767	13.7	21,083	3,769	5.6	9,760	686	14.2
1984	9,248	530	17.4	11,151	797	14.0	22,550	3,967	5.7	10,017	691	14.5
1985	9,419	538	17.5	10,506	735	14.3	20,597	3,570	5.8	10,020	685	14.6
1986	9,464	543	17.4	10,764	738	14.6	22,143	3,821	5.8	10,143	692	14.7
1987	9,720	539	18.0	11,114	744	14.9	23,349	3,937	5.9	10,453	694	15.1
1988	9,972	531	18.8	11,465	745	15.4	22,485	3,736	6.0	10,721	688	15.6
1989	[a]10,157	[a]533	[a]19.0	11,676	724	16.1	22,926	3,776	6.1	10,932	688	15.9
1990	10,504	520	20.2	11,902	738	16.1	23,603	3,953	6.0	11,107	677	16.4
1991	10,571	501	21.1	12,245	721	17.0	24,229	4,047	6.0	11,294	669	16.9
1992	10,857	517	21.0	12,381	717	17.3	25,373	4,210	6.0	11,558	683	16.9
1993	10,804	527	20.5	12,430	714	17.4	26,262	4,309	6.1	11,595	693	16.7
1994	10,992	531	20.7	12,156	701	17.3	25,838	4,202	6.1	11,683	698	16.7
1995	11,203	530	21.1	12,018	694	17.3	26,514	4,315	6.1	11,793	700	16.8
1996	11,330	534	21.2	11,811	685	17.2	26,092	4,221	6.2	11,813	700	16.9
1997	11,581	539	21.5	12,115	703	17.2	27,032	4,218	6.4	12,107	711	17.0
1998	11,754	544	21.6	12,173	707	17.2	25,397	4,135	6.1	12,211	721	16.9
1999	11,848	553	21.4	11,957	701	17.0	26,014	4,352	6.0	12,206	732	16.7
2000	11,976	547	21.9	11,672	669	17.4	25,617	4,391	5.8	12,164	720	16.9
2001	11,831	534	22.1	11,204	636	17.6	26,602	4,477	5.9	11,887	695	17.1
2002	12,202	555	22.0	11,364	650	17.5	27,071	4,642	5.8	12,171	719	16.9
2003	12,325	556	22.2	11,287	697	16.2	28,093	4,215	6.7	12,208	718	17.0
2004	12,460	553	22.5	11,184	690	16.2	27,023	4,057	6.7	12,200	714	17.1
2005	12,510	567	22.1	10,920	617	17.7	26,235	4,385	6.0	12,082	706	17.1
2006[P]	12,427	554	22.4	10,986	612	18.0	25,290	4,300	5.9	12,016	697	17.2

[a] Through 1989, includes motorcycles.
[b] Includes a small number of trucks with 2 axles and 4 tires, such as step vans.
[c] Single-unit trucks with 2 axles and 6 or more tires, and combination trucks.
[d] Includes buses and motorcycles, which are not shown separately.
P=Preliminary.
Note: Geographic coverage is the 50 States and the District of Columbia.

Web Page: http://www.eia.doe.gov/emeu/mer/overview.html.
Sources: • **Passenger Cars, 1990-1994:** U.S. Department of Transportation, Bureau of Transportation Statistics, *National Transportation Statistics 1998*, Table 4-13. • **All Other Data:** • **1973-1994**—Federal Highway Administration (FHWA), *Highway Statistics Summary to 1995*, Table VM-201A. • **1995 forward**—FHWA, *Highway Statistics*, annual reports, Table VM-1.