

Is Gasoline Demand Still As Responsive to Price?

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Outline

Why Do We Think it Might be Less Elastic?

Dahl Current Survey Work

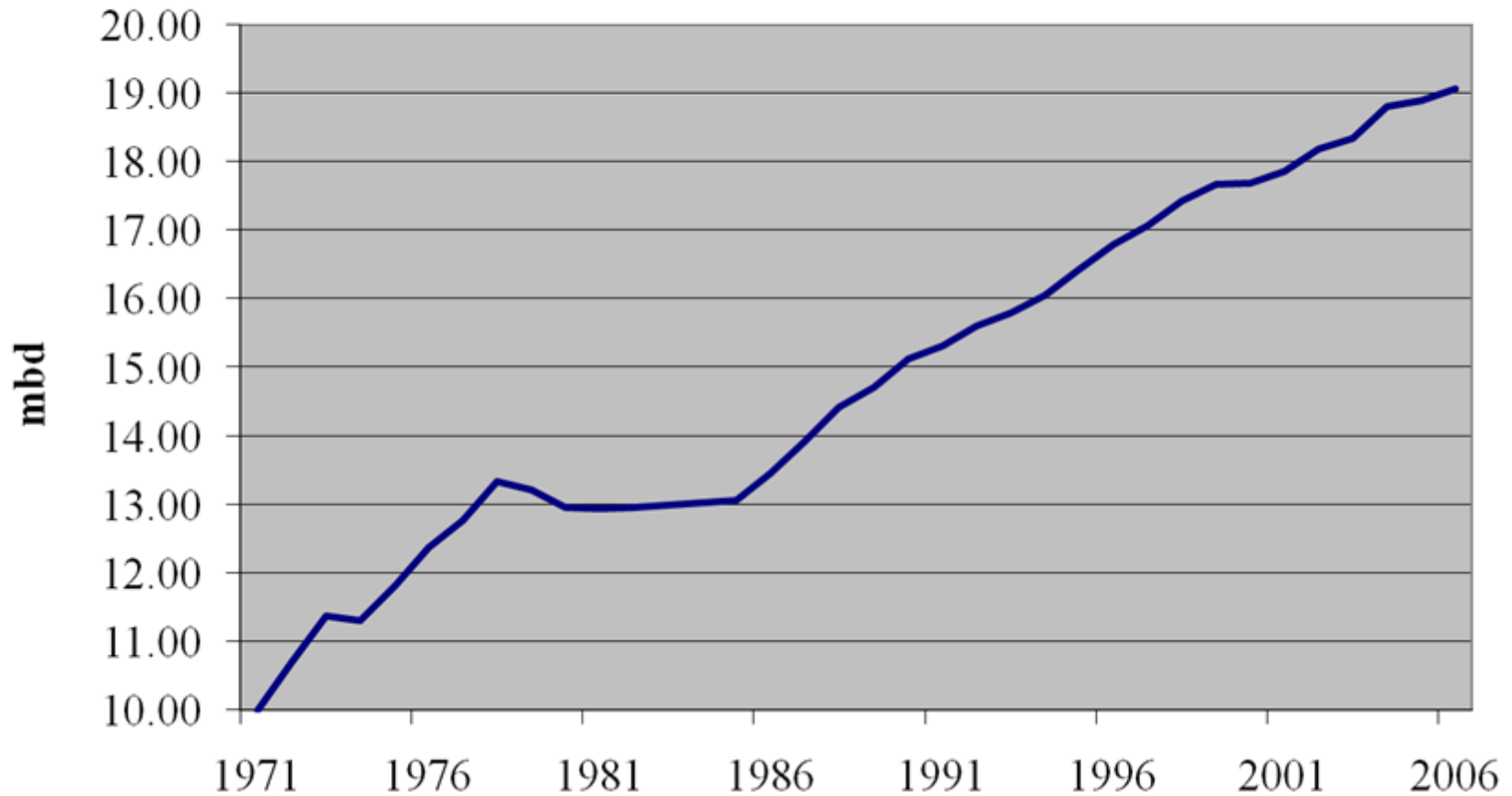
Methodology

Results and Analysis

Conclusion

Don't See Dips as in Past Price Run Ups

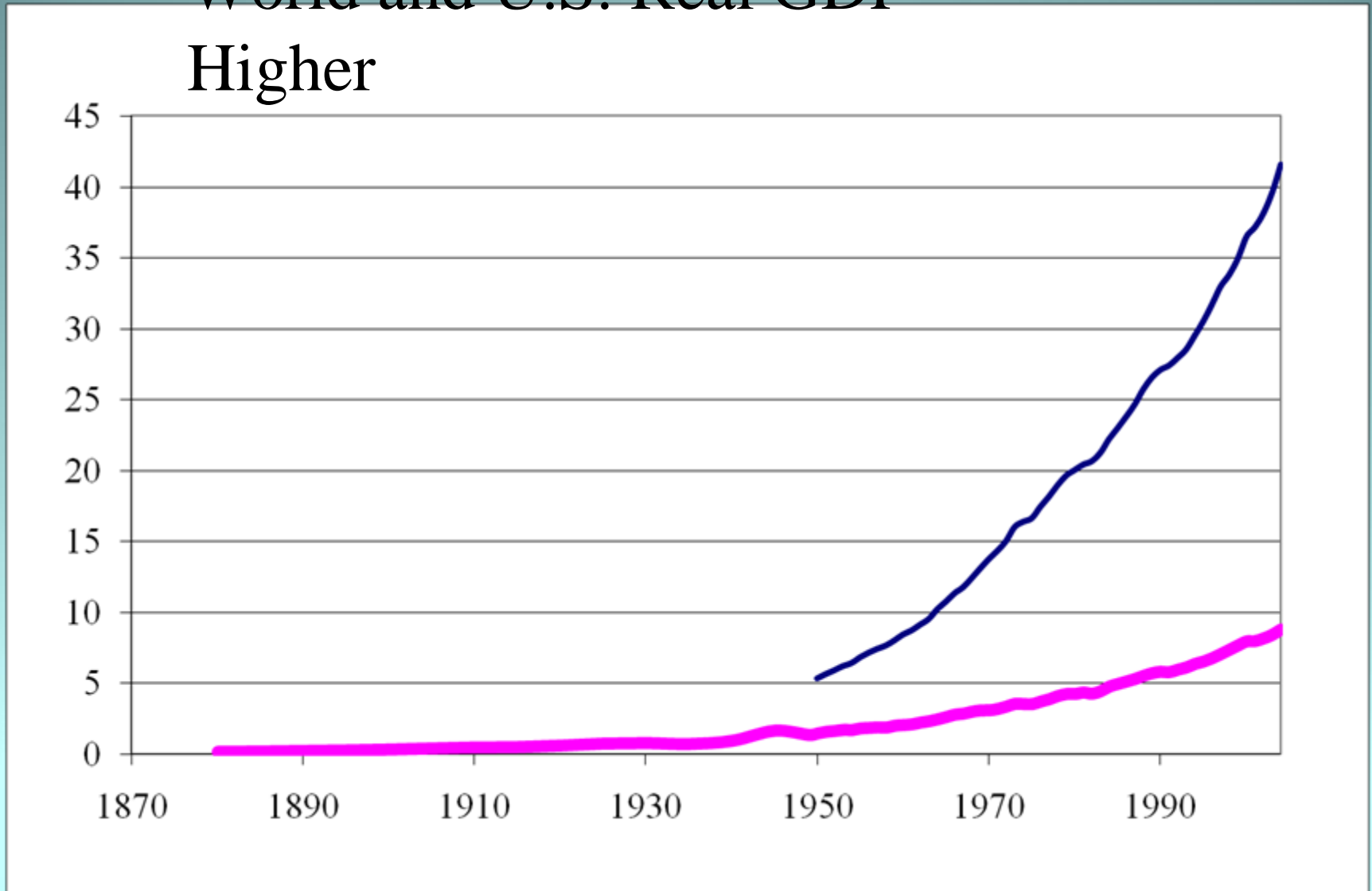
World Gasoline Highway Consumption



Why Less Elastic?

World and U.S. Real GDP

Higher



Dahl Current Lit Review ~ 260 gasoline studies

Study Frequency by Years

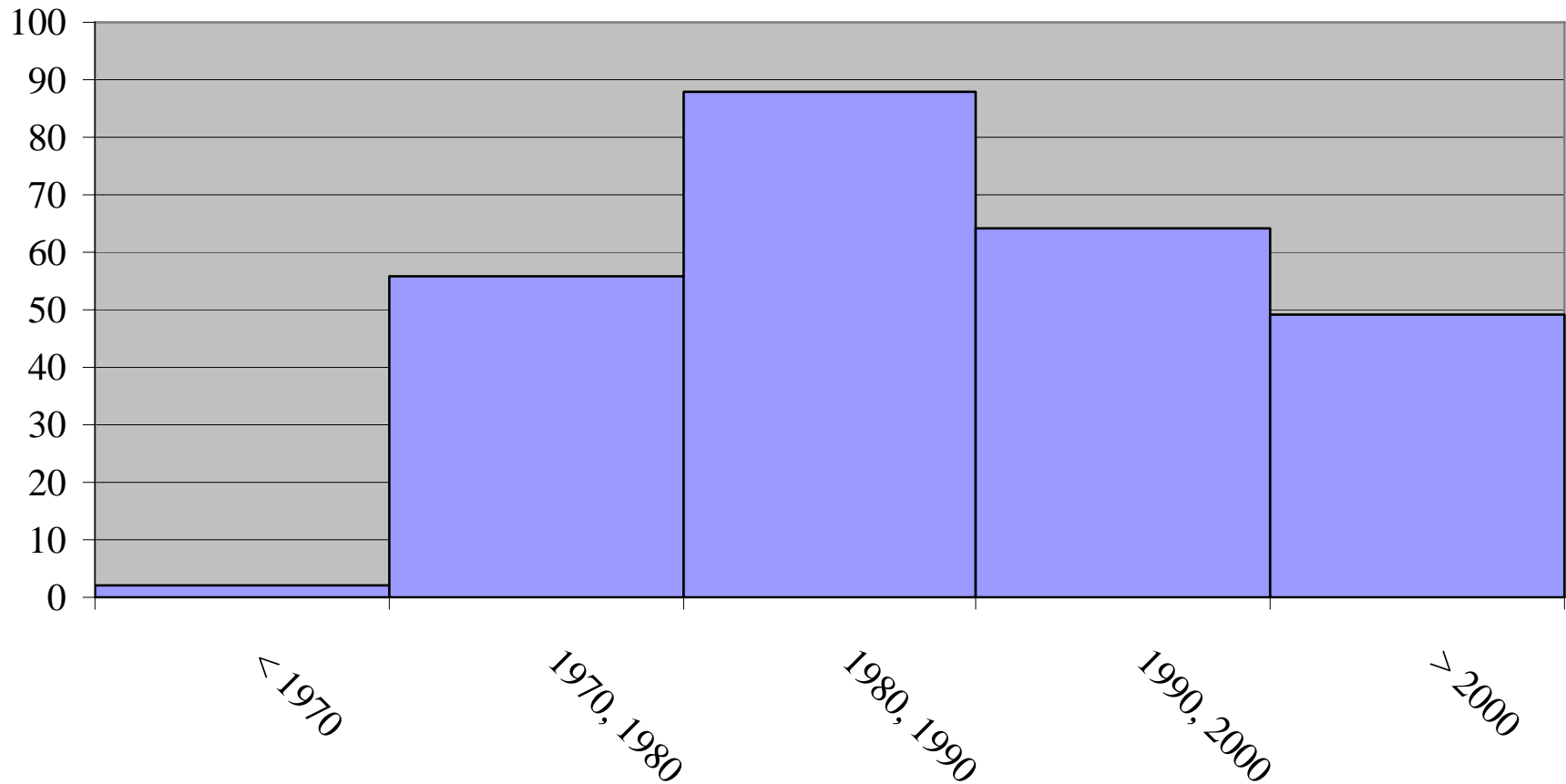
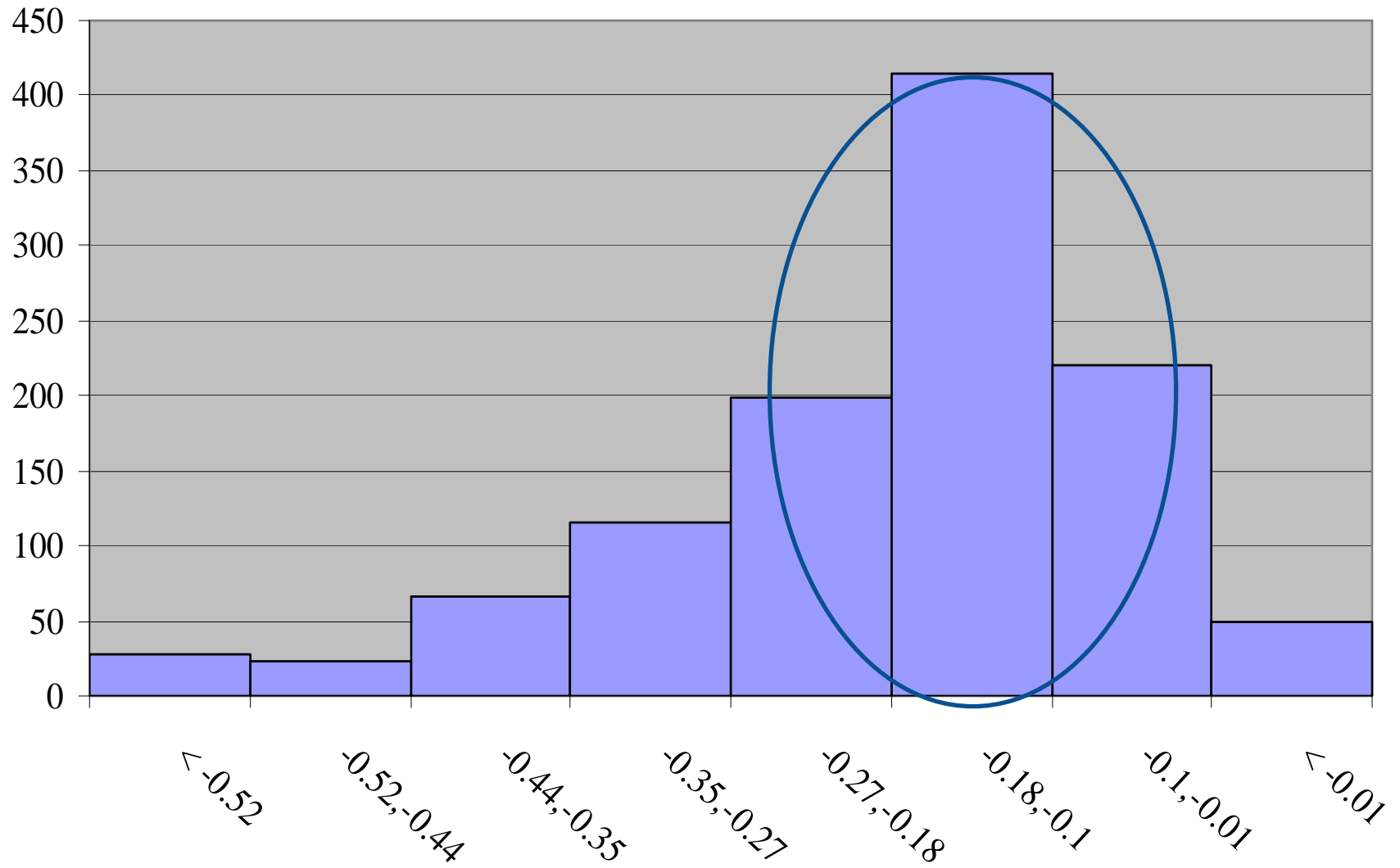


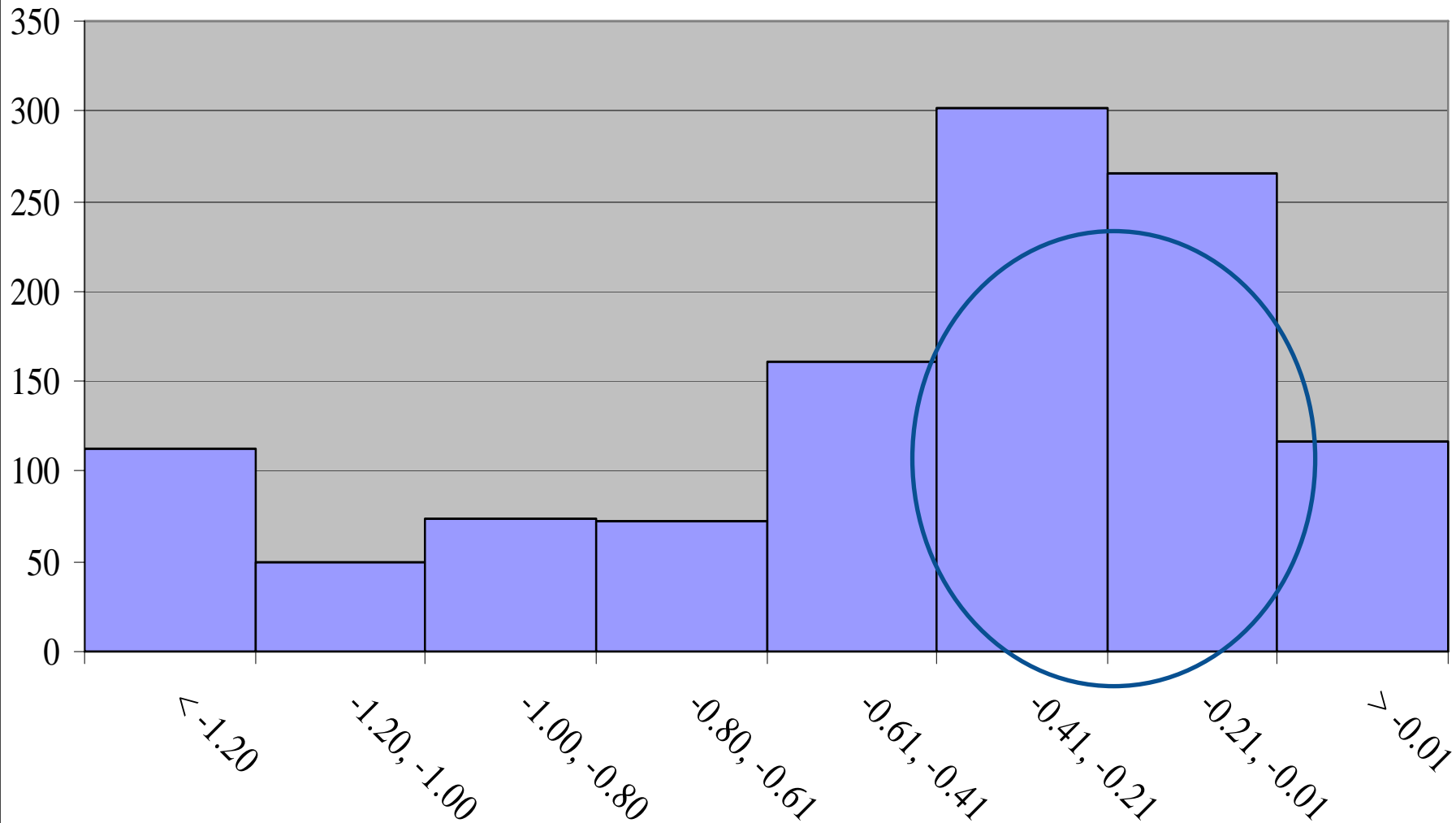
Table 1 Summary Statistics for Total Gasoline Demand Sample

	Psr	Pir	Plr	Ysr	Yir	Ylr	Qt-1
Avg	-0.178	-0.503	-1.598	0.294	0.582	1.508	0.672
Med	-0.150	-0.331	-0.557	0.250	0.590	0.784	0.720
Std	0.157	1.202	6.304	0.391	2.527	5.271	0.233
Min	-1.650	-18.410	-61.111	-2.630	-79.893	-40.000	-0.520
Max	0.900	21.770	5.893	5.536	5.483	38.889	1.188
#	1111	1155	1193	1055	1106	1156	871

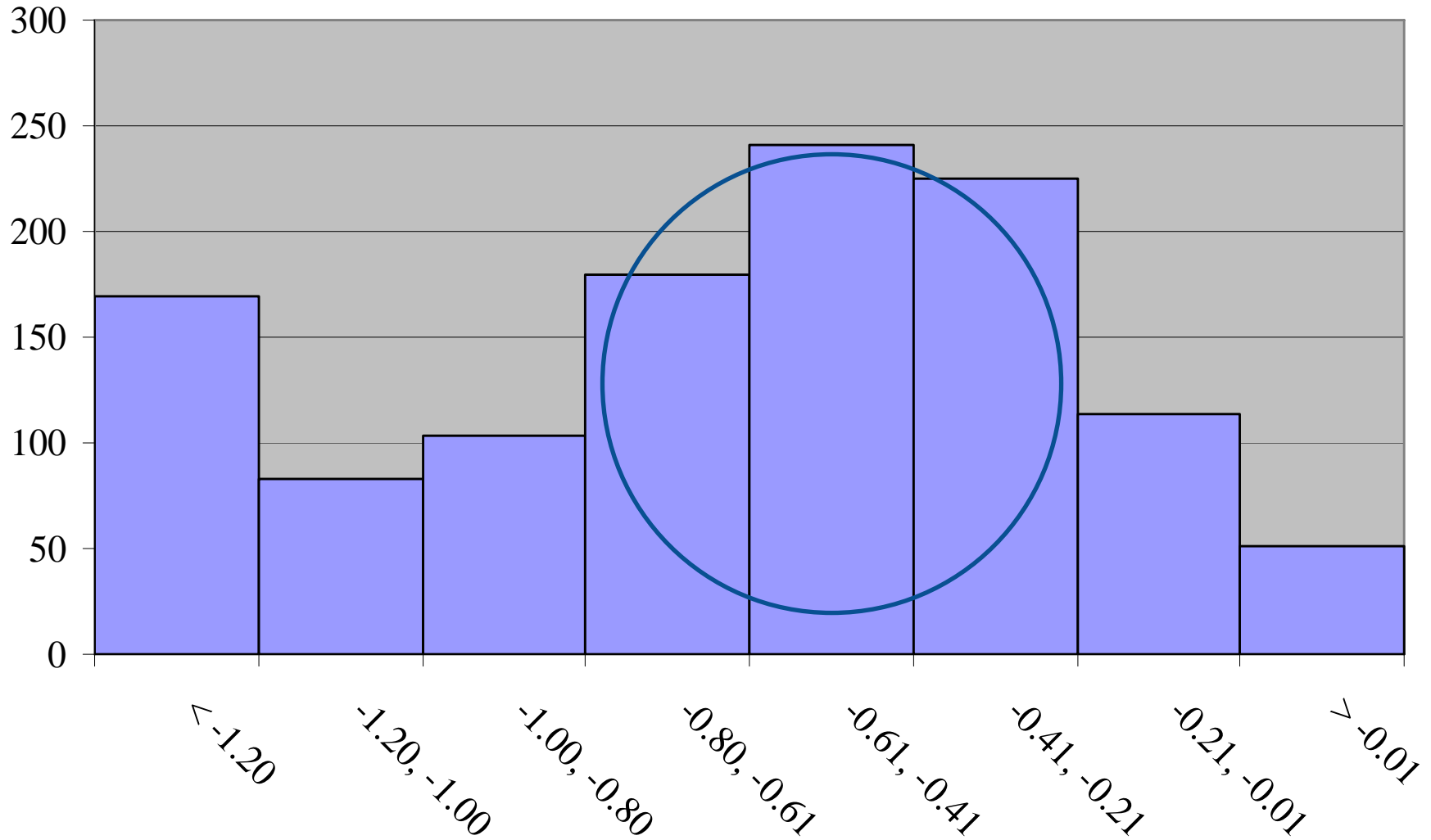
Psr Elasticity by Frequency



Pir Elasticity by Frequency



Plr Elasticity by Frequency



Literature Review

Most relevant recent study

Hughes et al. (2006)

G, US, monthly data

Finds less price elasticity 2000-2006 than 1976-1980

Our Methodology/Sample

**ARDL, general-to-specific modeling
systematic testing
variables, lags, stability**

23 countries

Australia, Belgium, Brazil, Canada, China

France, Germany, India, Indonesia, Iran

Italy, Japan, Korea, Mexico, Netherland

Russia, Saudi Arabia, Spain, Thailand, Turkey

USA, UK, Venezuela

Model

$$Q_t = \beta_0 + \sum_{i=0}^n \beta_{Gi} P_{G_{t-i}} + \sum_{j=0}^m \beta_{Dj} P_{D_{t-j}} + \sum_{k=0}^p \beta_{Yk} Y_{t-k} + \sum_{l=1}^q \beta_{\lambda l} Q_{t-l} + \sum_{s=0}^r \beta_{Us} U_{t-s} \\ + \sum_{v=0}^w \beta_{Iv} I_{t-v} + \sum_{x=0}^z \beta_{Fx} F_{t-x} + \varepsilon_t$$

Where

Q = Road Gasoline Per Capita

P_G, P_D = Real Price of Gasoline and Diesel

Y = GDP per capita

U = Urbanization rate

I = Industrial GDP level

F = Female labor force participation rate.

Our Contributions

Systematic testing across models

Data set spans many earlier studies

Structural variables

urbanization

industrial GDP

female labor force

Included substitution with diesel

Non-stationarity

Gasoline SR/LR Price Elasticity¹⁴

SR price elasticity:

Most (-0.42 to -0.02)

Median (-0.13)

LR price elasticity:

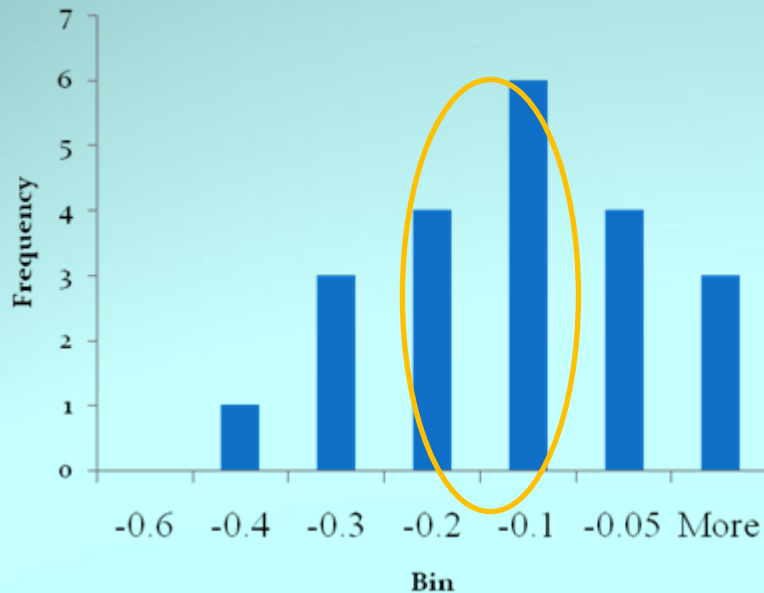
Most (-1.60 to -0.10)

Median (-0.65)

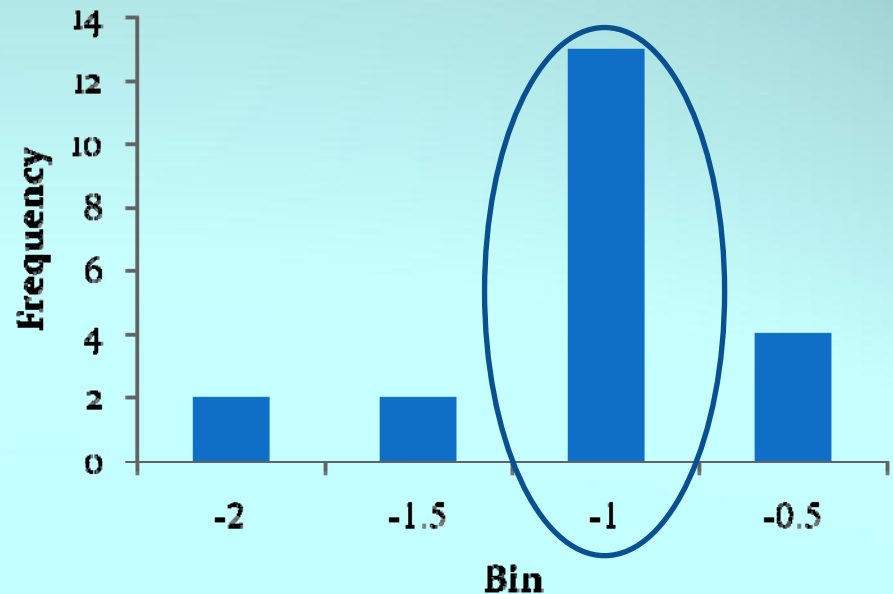
Literature summary(-0.2 to -0.3)

Literature summary (-0.6 to -0.9)

Pg(SR) Histogram



Pg(LR) Histogram



Methodology Sample

ARDL, general-to-specific modeling

23 countries

1970-2005

LE most often favored

Instability limited to 5 countries mostly developed

Generally, demand 2-3 times more elastic in LR than SR

Results - 1

Country	Adj.R ²	Pg-SR	Pg-LR	Y-SR	Y-LR	Y
Belgium	0.97	-0.39	-1.52	-0.32	-1.24	80 05
Std Error	0.04	-	0.12	-		
Belgium	0.99	-0.39	-0.73	0.57	1.06	70 79
Std Error	0.04	0.46	0.10	0.46		
Canada	0.94	-0.12	-0.93	0.10	0.75	80 05
Std Error	0.04	0.28	0.03	0.28		
Canada	0.97	-0.09	-0.19	0.39	0.80	70 79

Results - 2

Country	Adj.R ²	Pg-SR	Pg-LR	Y-SR	Y-LR	Y
France	0.98	-0.31	-0.65	0.60	1.26	70 84
Std Error	0.07	-	0.20	-		
France	0.99	-0.09	-0.28	-0.16	-0.50	85 05
Std Error	0.10	-	0.22	-		
Spain not co-integrated						
Spain	0.99	-0.16	-0.25	0.62	0.97	70 91
Std Error	0.07	0.49	0.27	0.49		

Results - 3

Country	Adj.R ²	Pg-SR	Pg-LR	Y-SR	Y-LR	Y
USA	0.91	-0.06	-0.18	0.14	0.44	89 05
Std Error		0.02	0.04	0.04	0.04	
USA	0.84	-0.17	-0.53	0.14	0.44	70 81
Std Error		0.03	0.08	0.04	0.08	

Sum Up

Most often the optimal model follow LE

Model stability

- ✓ **Only 5 countries have structural breaks**
- ✓ **(Belgium, Canada, Turkey, Spain, US)**
- ✓ **Not only during high price periods.**

Thank you,

Q/A