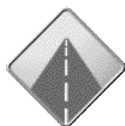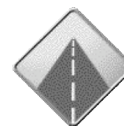# Dynamic Impacts of Tax Law Changes

Greg Harkenrider
Office of State Budget Director
Commonwealth of Kentucky
September 22, 2004

Road Map

- Differentiate between static and dynamic impacts
- Suggest times when dynamic scoring is appropriate
- Demonstrate complementary relationship between dynamic and static scoring
- Describe dynamic modeling techniques used in Kentucky
- Discuss tax-by-tax results

Regional Economic Models, Inc. (REMI)
(States that use REMI for dynamic modeling)

- Arkansas
- Connecticut
- Florida
- Georgia
- Illinois
- Indiana
- Iowa
- **Kentucky**

- Maine
- Michigan
- Minnesota
- Missouri
- New York
- Texas
- Vermont
- Wisconsin

The Modern Literature
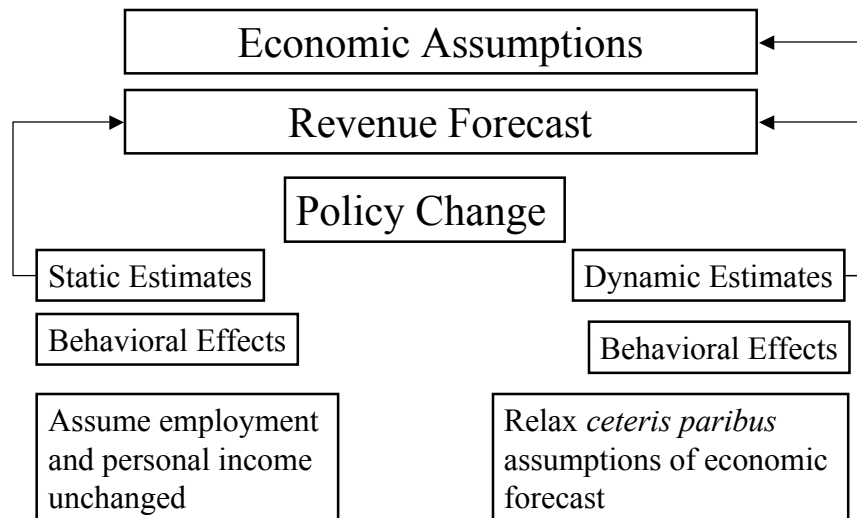(Dominated by discussions of the Laffer Curve)

- Hypothesized a relationship between tax rates and tax revenues
- Unclear which tax rate equates to the maximum revenue yield
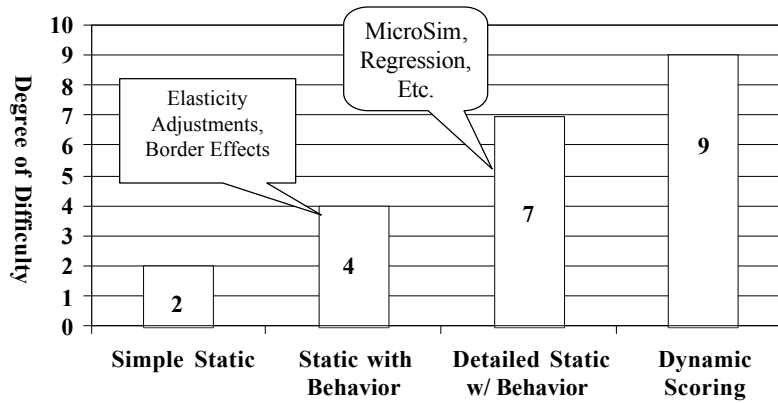

The Laffer Curve
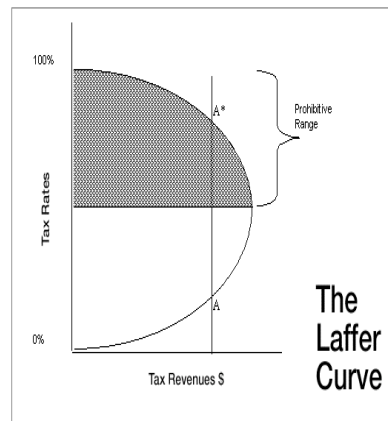
Focus of Dynamic Analysis

- Baseline revenue forecasts make *ceteris paribus* assumptions about the underlying revenue structure.
- Certain changes to tax law may lead to changes in the underlying baseline economic assumptions.
- Therefore, in order to quantify the effects of violating *ceteris paribus* assumptions, dynamic scoring is used.
- Not grounded in Laffer Curve macro assumptions, as Laffer-type relationships would affect the static estimates (which are inputs to the dynamic model)

Static versus Dynamic Analysis

Economic Assumptions

Revenue Forecast

Policy Change

Static Estimates

Behavioral Effects

Assume employment and personal income unchanged

Dynamic Estimates

Behavioral Effects

Relax *ceteris paribus* assumptions of economic forecast
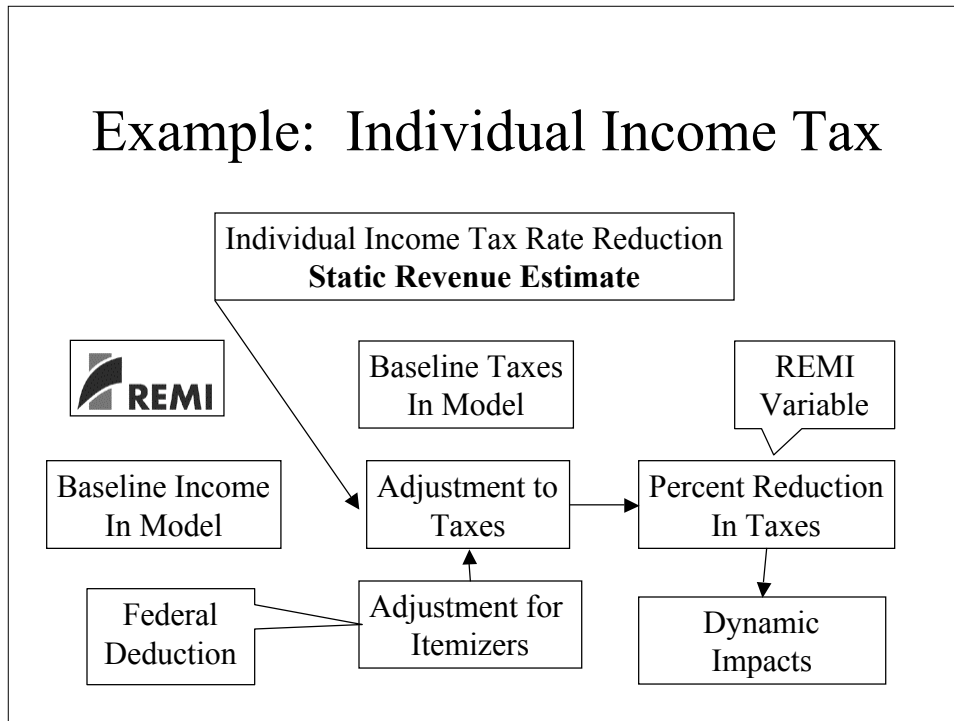
Degrees of Complexity

Static Estimates Used as Inputs to Dynamic Estimates

- In some cases, the static estimate of a tax change is used as an input into the dynamic estimation
  - Corporate License Tax
  - Individual Income Tax
  - Property Taxes

Example: Individual Income Tax

Individual Income Tax Rate Reduction
Static Revenue Estimate

REMI

Baseline Taxes
In Model

REMI
Variable

Baseline Income
In Model

Adjustment to
Taxes

Percent Reduction
In Taxes

Federal
Deduction

Adjustment for
Itemizers

Dynamic
Impacts

Dynamic Impacts of Individual Income Tax

Percent Reduction
In Taxes

Increase in
Competitive Position

Increase in
Disposable Income

Economic Migration

Increase in
Consumer Demand
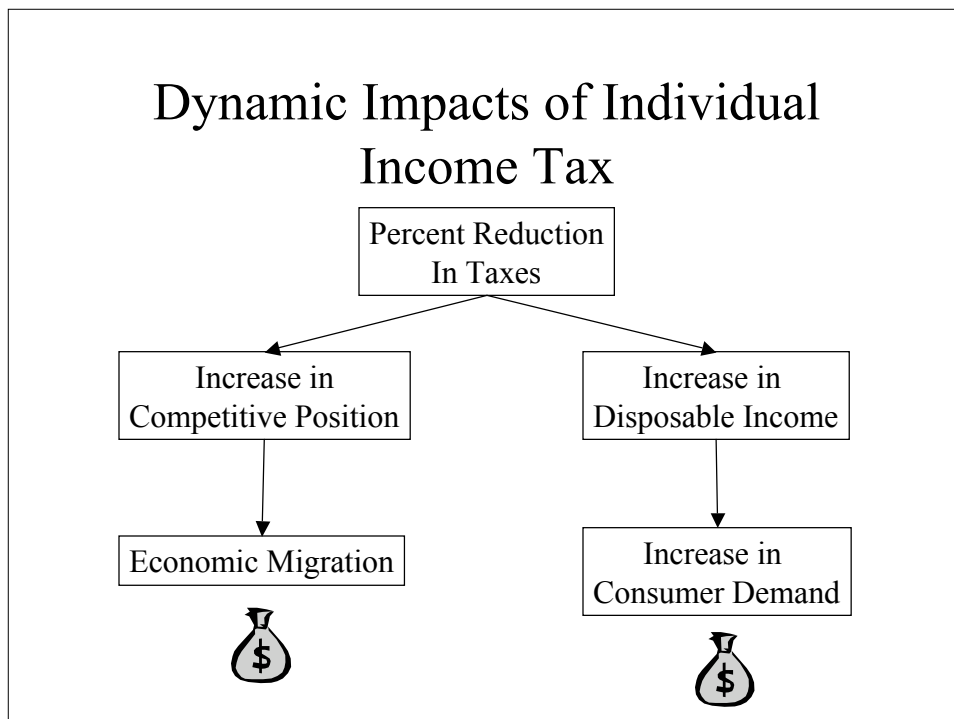
A More Complicated Example: Corporate License Tax

Repeal Corporate License Tax	→	Increases internal rate of return on capital

↓

More Investment in Kentucky	←	Increased Demand for Capital
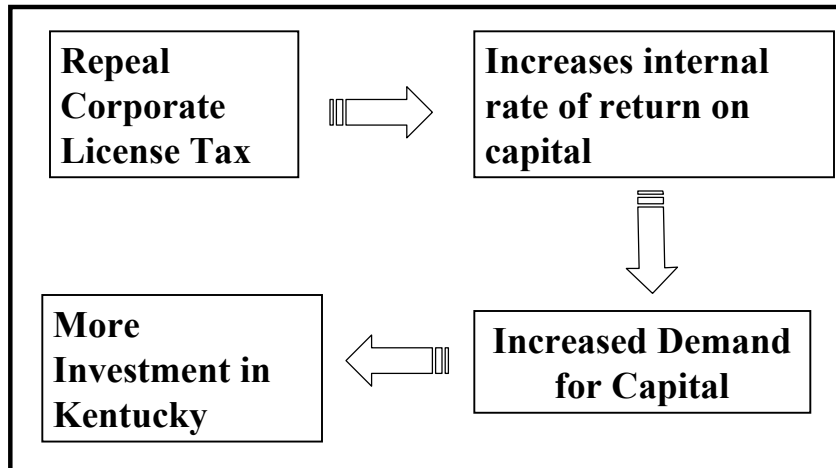
Complicating Factors
(Shock the cost of investment rather than level of investment)

If we are tempted to assert that money is the drink which stimulates economic activity, we must remind ourselves that there may be s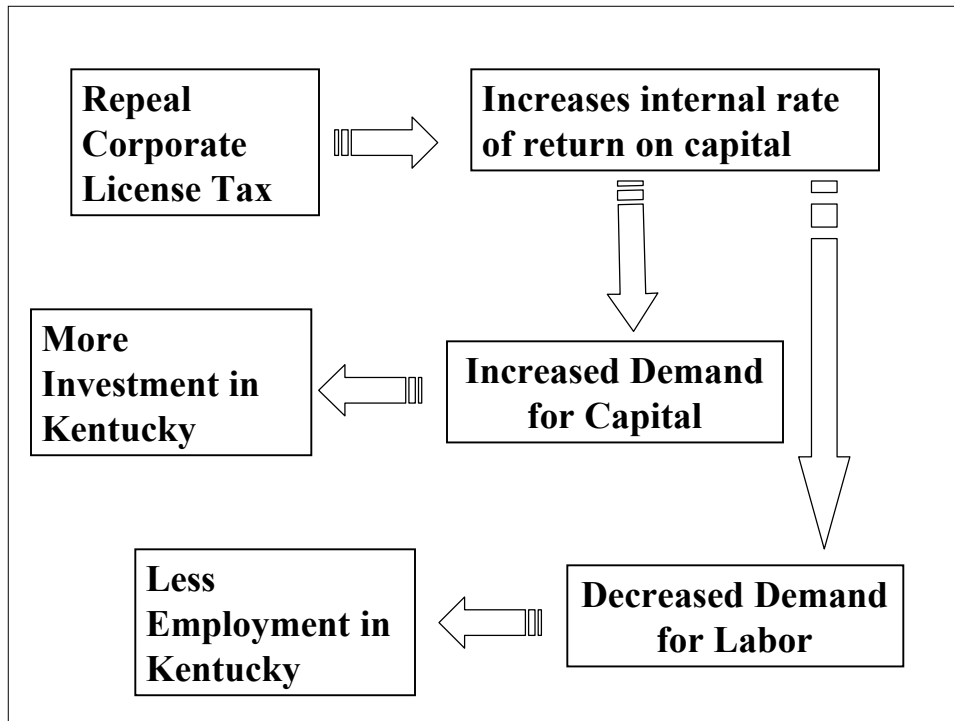everal slips between the lip and the cup … Whilst a decline in the rate of interest (or cost of capital) may be expected, *ceteris paribus,* to increase the volume of investment, this will not happen if the schedule of the marginal efficiency of capital is falling more rapidly than the rate of interest (cost of capital).

John Maynard Keynes
General Theory, pp 173
Parenthesis Added

Repeal Corporate License Tax → **Increases internal rate of return on capital**

Increases internal rate of return on capital → **Increased Demand for Capital**

Increased Demand for Capital → **More Investment in Kentucky**

Increases internal rate of return on capital → **Decreased Demand for Labor**

Decreased Demand for Labor → **Less Employment in Kentucky**

Corporate License Tax

Corporate License Tax Rate Reduction
Static Revenue Estimate ($196.6 mil)

REMI

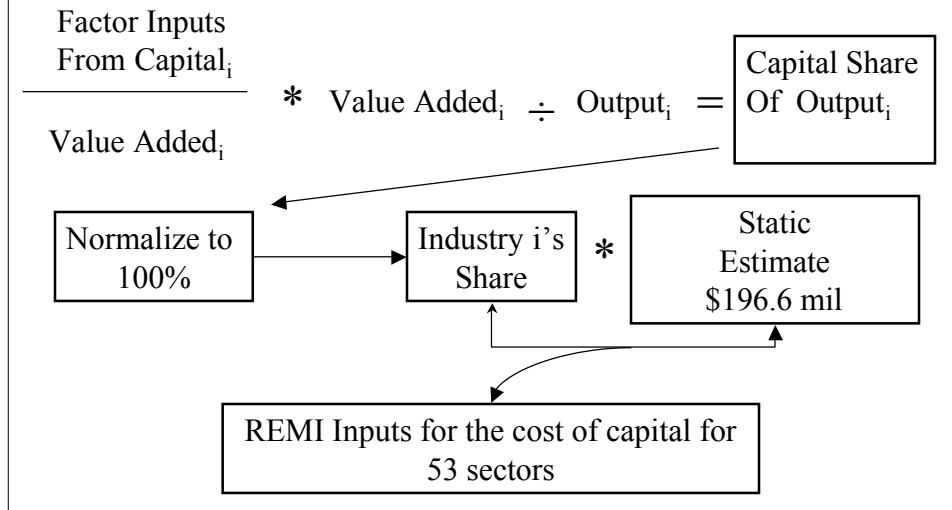Cost of Capital
By 53 Sector

REMI
Variable

53-Sector
Value Added

Divide Static Estimate
Across Industries → Adjustment to
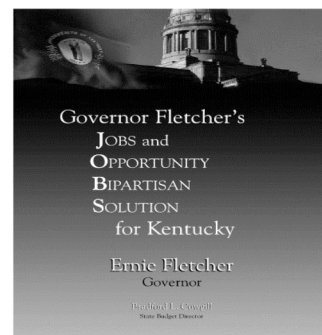Cost of Capital

Dynamic
Impacts

Details of License Tax Input
(Spreading $196.6 million static input across industries)

$$\frac{\text{Factor Inputs From Capital}_i}{\text{Value Added}_i} \; * \; \text{Value Added}_i \; \div \; \text{Output}_i \; = \; \text{Capital Share Of Output}_i$$

Normalize to 100%	→	Industry i's Share	*	Static Estimate $196.6 mil

REMI Inputs for the cost of capital for 53 sectors

Jobs for Kentucky Tax Plan

- Introduced in the 2004 Regular Session
- Modified slightly and passed the Senate, attached to the Budget Bill (HB 269)
- House wanted to decouple, never taken to a vote

Governor Fletcher's
JOBS and
OPPORTUNITY
BIPARTISAN
SOLUTION
for Kentucky

Ernie Fletcher
Governor

Bradford L. Cowgill
State Budget Director

Briefing Summary
March 11, 2004

Dynamic Scoring Grid

(Overall Package was revenue neutral over Biennium)

| Positive Dynamic Effects	Negative Dynamic Effects
Repeal of the corporate license tax	Alternative minimum calculation for business entities
Reduce rates on corporate income tax	Adding limited liability companies to corporate income tax base
Repeal property tax on intangible personal property	Removing new property from rate setting base on real property
Individual income tax reduction	Raising cigarette taxes
Enterprise initiative	Taxing other tobacco products
Sales tax holiday	Telecommunications tax reform
Tourism advertising initiative	Impose transient room tax

Initial Approach

- $100 million increments of each tax
  - Reduce Individual Income Tax
  - Reduce Corporate License
  - Increase Cigarette Excise
- Each tax was modeled separately in the model
- Relative magnitudes hint that excise taxes have smaller dynamic losses

Dynamic Grid
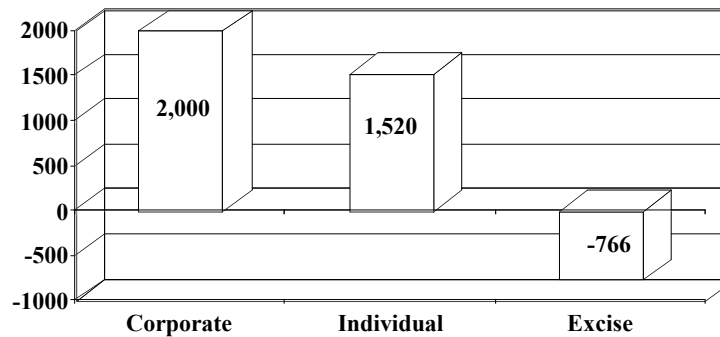(First full year of implementation)

Personal Income, Millions

Corporate: $83
Individual: $69
Excise: -$42
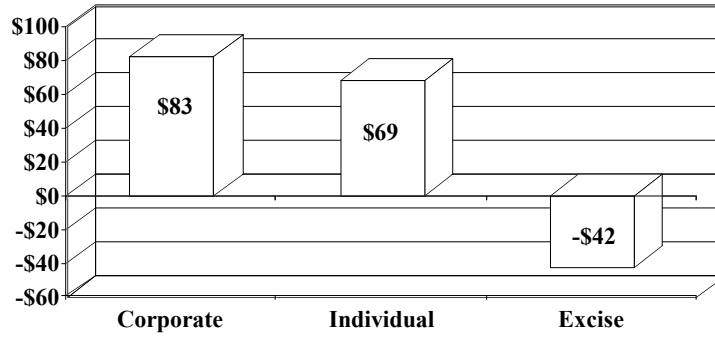
Dynamic Grid
(First Full Year of Implementation)

Employment Effects

Corporate: 2,000
Individual: 1,520
Excise: -766

Tree-Top Results

|	Baseline Job Growth	Job Growth with Impacts	Net Dynamic Impact	% of Baseline Job Growth	Revenue Impact ($ mil)
2005	34,747	39,091	4,344	12.5%	$7.1
2006	29,747	37,020	7,273	24.4%	$13.8
2007	31,256	38,985	7,729	24.7%	$16.1
2008	28,426	36,446	8,021	28.2%	$18.1

Back-End Model
(Turning Dynamic Impacts into Jobs and Revenue)

- For Employment, direct output of REMI
  - Since no jobs were used as inputs, all new jobs are indirect
  - Employment by sector
- For Revenues, multiple approaches
  - Quick and dirty percentage of personal income
  - More detailed tax estimates were also done
 - Population induced expenditures?

Top-View Revenue Impact

- Modernization package was scored statically for budgetary purposes
- Revenues depicted have isolated the dynamic impacts

Revenue (Millions)

FY06	FY07	FY08
12.5	14.2	16.0
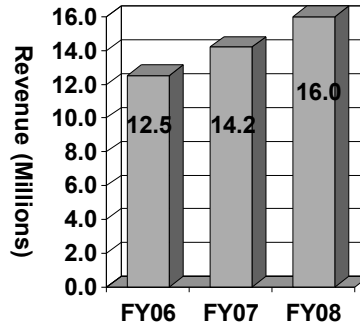
Top-View Jobs Impact

- REMI model was used to compute dynamic employment impacts
- Used conservative assumptions
- The figures reflect net new jobs, demonstrating that the stimulative effect of the tax plan more than swamps any counterbalancing employment effects

Jobs over CFG Baseline

FY 05	FY06	FY07	FY08
3,369	6,359	6,810	7,094
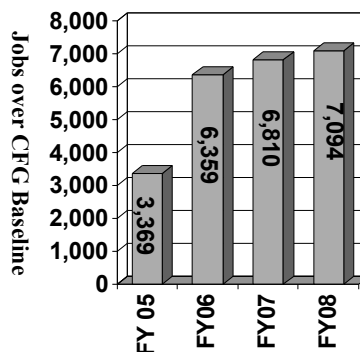
Distribution of Jobs

Employment Sector	2005	2006	2007	2008
Durables	163	298	341	369
Non-Durables	15	88	125	150
Total Manufacturing	**178**	**386**	**465**	**518**
Mining	3	5	6	7
Construction	617	1,780	1,728	1,667
Trans&Pub Util	24	64	72	74
Fin&Ins&Real Est	240	419	510	579
Retail Trade	141	670	793	873
Wholesale Trade	99	198	228	246
Services	2,038	2,739	2,863	2,941
Agri&For&Fish Serv	26	53	64	71
Total Non-Manufacturing	**3,187**	**5,928**	**6,262**	**6,458**
Total Government	**4**	**44**	**82**	**118**
Total Employment	**3,369**	**6,359**	**6,810**	**7,094**

Summary of Modeling Strategy

(Turning Static Impacts into Dynamic Inputs)

- Avoid using fiscal elements in the REMI model
- Preferable to use REMI policy variables that affect underlying economic behavior embodied in the tax law changes
- No handbook or standard procedure for modeling dynamic changes due to tax policy – Multiple approaches were used

Conclusions

- Dynamic Analysis is a useful tool for estimating the impact of changes in the tax code.
- Results are often relatively modest compared with expectations.
- Dynamic Scoring is a valid analytical approach when used properly and with conservative assumptions.

Questions ?