Inforum Long-Run Modeling

Lift 2100

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Inforum Outlook Conference 2016
Outline

1. Introduction and History
2. The Inforum Lift 2100 Model
   - The LIFT Model
   - The DPM Model
3. Applications – Modeling for the Long Run
   - Health Care Analysis
   - Technology and Climate Change Analysis
4. What is Next?
   - Continued Model Development
   - Improved Calibration and Additional Applications
5. Conclusions
Introduction to Inforum Long-Run Modeling Efforts

- **Macro-Interindustry Model**
  - Horizon extended beyond typical 25-30 years (to 2100)
  - Consistency of structural model particularly useful

- **Potential Uses**
  - Energy & Climate Change, Alternative Technologies
  - Government Budgets: Retirement and Health, Policy Analysis, Test Consistency of External Forecast Assumptions
  - Implications of health, demographics, immigration, population trends

- **Results**
  - Indicators of government debt, program sustainability, employment requirements, carbon emissions, water usage, ....
Previous Inforum Work

  - Sponsored by Centers for Medicare and Medicaid Services

  - Sponsored by Business Roundtable
  - Joint with Keybridge Research LLC


Other Related Work

- Congressional Budget Office (standard to 2026, long-run to 2046): Federal revenue and expenditure, economics

- Social Security Administration (2090): Retirement transfers, demographic, economics

- Centers for Medicare and Medicaid Services (2090): Health Spending, Health Transfers

- Energy Information Administration (2040): Energy prices, imports / exports, etc.
LIFT – Long-run Interindustry Forecasting Tool

- 110 Commodities: Output, Prices, Final Demand
- 65 Industries: Employment, Productivity, Value Added, Equipment and Software Investment Purchasing
- 83 Personal Consumption Types
- 19 Private Construction Types
- Federal and State and Local Government: Consumption, Investment, Transfers, Revenue
- 110X110 A Matrix: Commodity by Commodity
- Full Macro Accounting: Real GDP, Inflation, Aggregate Productivity, Personal Income, ....
LIFT – Adjustments for the Long Run

- Began with standard LIFT model and forecast to 2040
- Extended A matrix to 2100 using trends
- Extended exogenous projections, e.g. transfer spending, energy prices
- Adjust exogenous and endogenous components to satisfy project assumptions and hit targets
Inforum Demographic Projections Model

- Population and composition key to many analyses and to projecting labor supply
- Sometimes employ Census or SSA projections, but need additional flexibility
- Currently configured with Census historical data – population by sex and age
- Projections of Fundamentals (currently exogenous)
  - Fertility Rates (SSA - Inforum)
  - Mortality Rates (SSA)
  - Immigration Distribution by Age/Sex (SSA)
- Recently used DPM to extend Census history with alternative total population specifications
  - Adjusted total net immigration each year to satisfy total population target
  - Results internally consistent for all age/sex categories
Analysis of Health Care in the Long Run

- Ongoing work with the Centers for Medicare and Medicaid Services
- Assess sustainability of Medicare and health expenditure trends
- Expand detail of basic economic assumptions and evaluate coherence
LIFT – Modeling Health Care in the Long Run

- Build a Base Case projection to 2090, calibrate to exogenous assumptions
  - Health
    - National Health Expenditure projections
    - Medicare Transfer Payments
  - Real GDP, GDP Inflation, Population, Labor Force, Unemployment
  - Other Exogenous: Energy Prices, Social Security Transfer Payments, Medicaid Transfers, Federal Spending, ...
- Construct alternative cases, review implications of alternative assumptions
  - Higher health care prices
  - Higher Medicare spending levels
Health Care Study Objectives

- Check consistency and feasibility of economic assumptions:
  - High spending in USA on health; average age continues to rise
    - e.g. Nominal health spending grows at nominal GDP rate +1%
  - Health industry productivity growth slower than average
  - Implies rising health shares of GDP and employment.
    Sustainable?

  - Determined economy-wide requirements of satisfying health care demand
  - This project considers supply requirements from all industries
  - Could be used to assess sustainability
Lift Analysis of Technology and Climate Change

- What policies could encourage development of technologies that limit emissions?
- Considered various levels of carbon taxation
- Considered advanced technologies include
  - Efficiency: Buildings and Automobiles
  - Electricity Production: Renewables, Nuclear, CCS, Grid Improvements
  - Energy Production: Biofuels, Advanced Oil and Gas Production
Lift Calibration for Energy and Climate Change Analysis

- **Enhanced Efficiency:**
  - Buildings and Transportation
    - Reduce IO coefficients for Industrial/Commercial energy purchases, Residential and Government Consumption

- **Energy Production**
  - Electricity: Reduce IO coefficients for coal consumption, raise coefficients for Natural Gas/Nuclear
  - Biofuels: Raise IO coefficients for purchases from Agriculture and Forestry sectors
  - Adjust investment spending, perhaps labor productivity / other

- **Carbon Emissions**
  - Calculate carbon emissions according to real output by commodity; assess carbon taxes
  - Assess impact on prices/competitiveness, effects on government revenue
## LIFT – New Model Developments

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Demographics Projection Model

- Work to make fertility rates endogenous – link to unemployment, wages, other
- Potential to model endogenous mortality rates and net immigration
- Considering linkage of health costs to detailed age / sex projections
New Applications and Calibration

- Tune current model and projections: Energy technology / efficiency / carbon emissions
- Develop population, demographic, immigration model
- Implications of health care expenditure on survival, population, economic growth
- Evaluation of government debt sustainability
Conclusions

- LIFT 2100 model developed in 2016 and is ready for use
- Inforum has long history of long-run projections and analysis
- Ongoing efforts to improve model and extend capabilities
- More information available on web site and upon request


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