Inforum Long-Run Modeling

Lift 2100

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Outline

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

- Doug Nyhus. (2012). Long Term Health Spending and the Wider Economy.
  - Sponsored by Centers for Medicare and Medicaid Services
- Meade, Horst, Werling, et al. (2009). The Balancing Act: Climate Change, Energy Security, and the U.S. Economy.
  - Sponsored by Business Roundtable
  - Joint with Keybridge Research LLC

Previous Inforum Work (Continued)

- Doug Nyhus. (2008). Alternate Scenarios with LIFT to Help Frame the Sustainability of Medicare Entitlements.
- R. Monaco, J. Phelps. (1996). Health Care Spending and the Rest of the Economy: A Short Look at the Long Term.
- T. Dowd, R. Monaco, J. Janoska. (1996). Effects of Future Demographic Changes on the U.S. Economy: Evidence from a Long-Term Simulation Model.
- R. Monaco, J. Janoska, T. Dowd, C. Scandlen. (1996). LIFT 2050: A Framework For Making Very Long-term Economic Projections, with Illustrations.

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?
- Werling, Keehan, Nyhus, Heffler, Horst, Meade. (2014) The Supply Side of Health Care
  - 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

	LIFT 3	LIFT 2
Commodity Sectors	121	110
Input-Output Transaction Matrix	121 x 121	110 x 110
Industries	71	65
Consumption Types	83	83
Construction Types	26	25
Equipment Purchasing Sectors	71	65
Intellectual Property Investment	✓	–
NAICS/IO Account Standards	2007	2002
NIPA Benchmark	2009	2005

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

Additional Resources I

- See Research, Models, and Policy Analysis pages on www.Inforum.umd.edu.
- Meade, Horst, Werling, et al. (2009). The Balancing Act: Climate Change, Energy Security, and the U.S. Economy. businessroundtable.org/studies-and-reports/the-balancing-act-climate-change-energy-security-and-the-u.s.-economy.
- R. Monaco, J. Phelps. (1996). Health Care Spending and the Rest of the Economy: A Short Look at the Long Term. www.inforum.umd.edu/papers/wp/wp/1996/wp96010.pdf.

Additional Resources II

- T. Dowd, R. Monaco, J. Janoska. (1996). Effects of Future Demographic Changes on the U.S. Economy: Evidence from a Long-Term Simulation Model.
  www.inforum.umd.edu/papers/wp/wp/1996/wp96009.pdf.
- R. Monaco, J. Janoska, T. Dowd, C. Scandlen. (1996). LIFT 2050: A Framework For Making Very Long-term Economic Projections, with Illustrations.
  www.inforum.umd.edu/papers/wp/wp/1996/wp96001.pdf.
- Werling, Keehan, Nyhus, Heffler, Horst, Meade. (2014) The Supply Side of Health Care.
  www.inforum.umd.edu/services/projects/supplysideofhealthcare.html.

Additional Resources III

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