LONG TERM HEALTH CARE SPENDING

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BACKGROUND

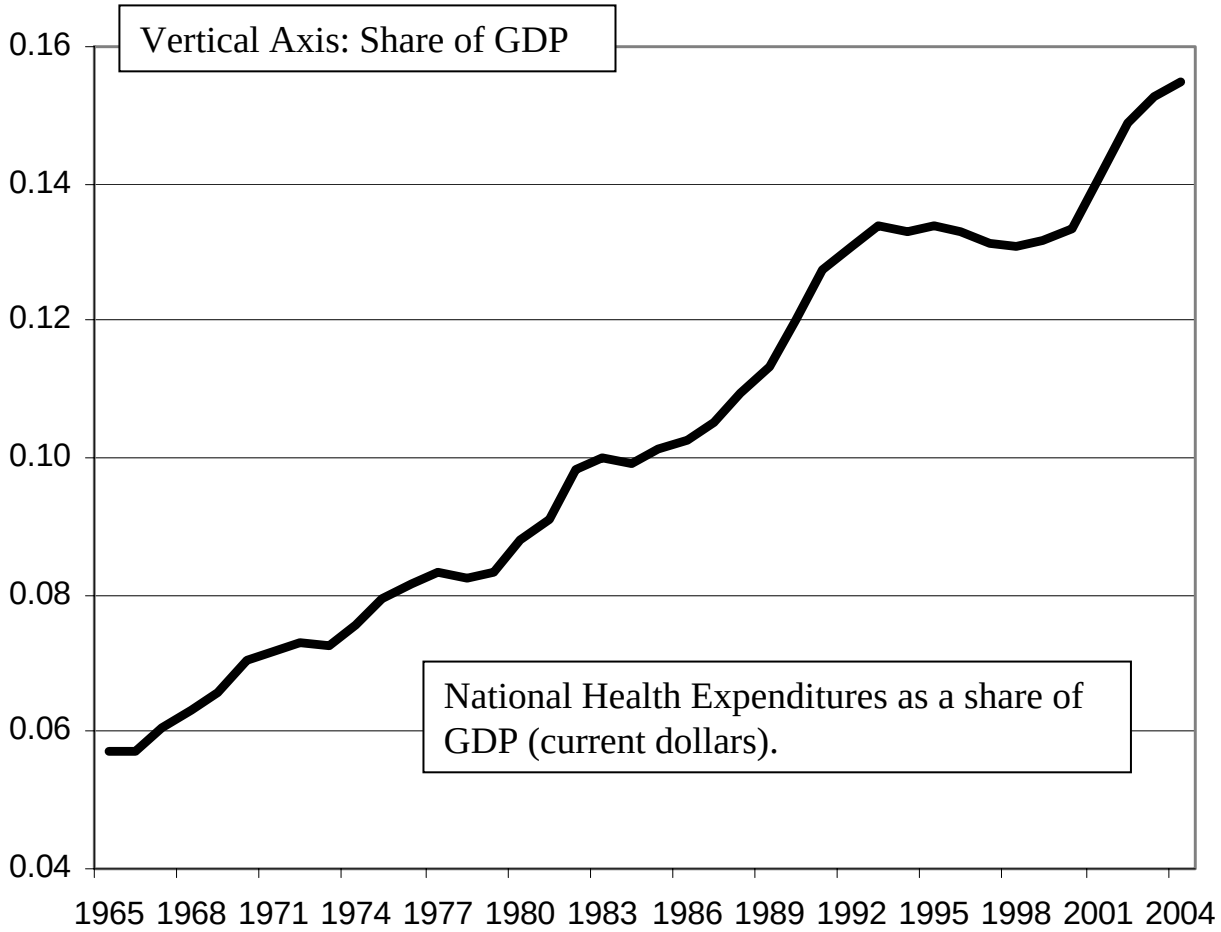
- 2000 Technical Review Panel recommendations
  - "GDP + 1"
  - "*...more rigorous analysis of... potential market forces that could act—without new legislation—to slow Medicare expenditure growth.*"

- Current growth rule, GDP + $\delta(t)$:

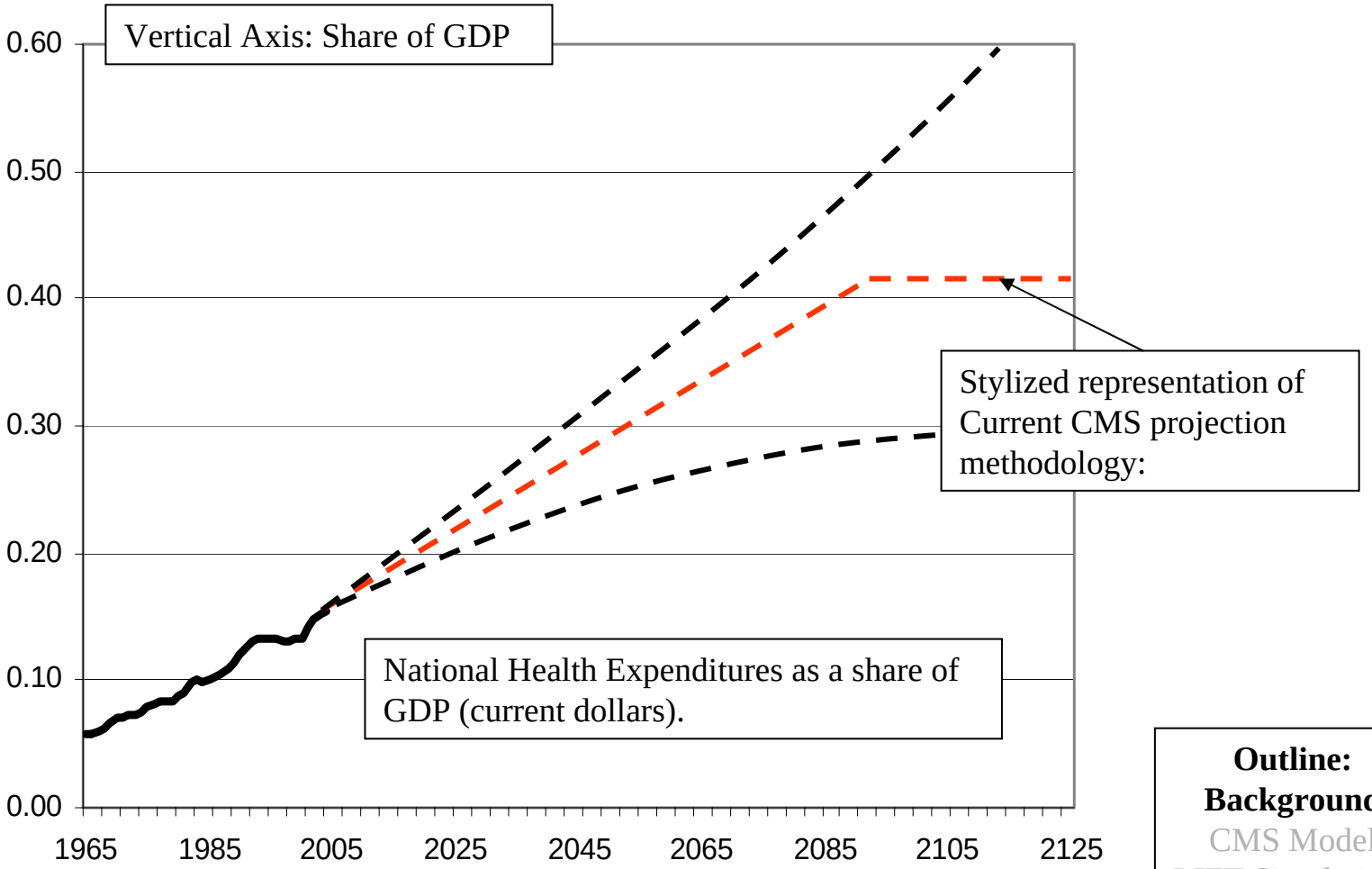
$$\delta(t) = \begin{cases} 1, & t \le t^* \\ 0, & t > t^* \end{cases}$$

- CMS OACT Research Activities:
  - Large-scale econometric model of economy and medical sector
  - Smaller scale general equilibrium model

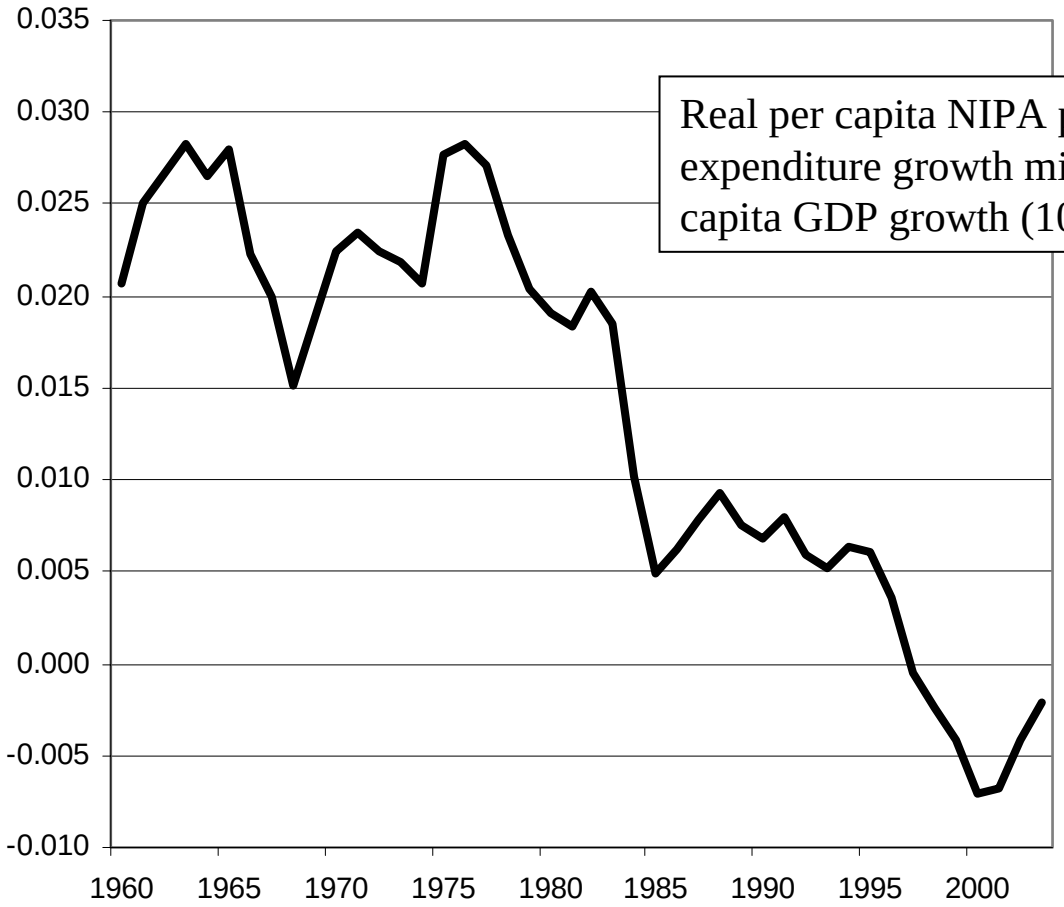
BACKGROUND: HISTORICAL SHARE GROWTH



BACKGROUND: ALTERNATIVE PROJECTIONS



BACKGROUND: MEDICAL-GDP GROWTH DIFFERENTIAL

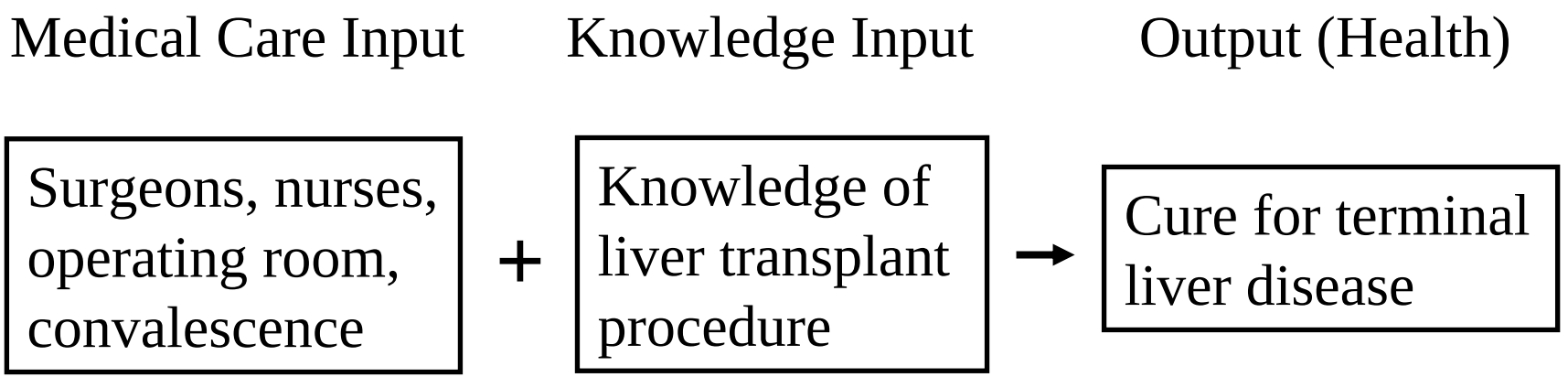


CMS MODEL: OVERVIEW

- General Equilibrium Model
- Consumption/savings based on logic of Ramsey Growth Model
- Factors accounting for medical spending growth:
  - Income
  - Demographics
  - Medical sector productivity
  - Technological innovation (new product introductions)
- Contribution: Model gives an economic explanation of how the technological level of medical care ("standard of care") is determined.
- "Current Law

CMS MODEL: PRODUCTIVITY

- Example:



CMS MODEL: PRODUCTIVITY

- Consensus of health economists: primary driver of medical spending growth is technological innovation.

- Two types of technological change (Newhouse, 1978; Weisbrod, 1991; Chernew, et al., 1998; Cutler and McClellan, 2001)
  - "Process-innovative": Reduction of inputs required to provide a certain level of health. E.g., fewer employee hours required to produce one day of care.
  - "Product-innovative": E.g., the introduction of a new treatment.
  - "Product-innovative" technological change can be either *cost-decreasing* (substitution of new, cheaper treatment for an older, more expensive one), or *cost-increasing* (new treatment is expansive, affecting patients with previously untreatable conditions), or both.

CMS MODEL: PRODUCTIVITY

- Product innovative technological change examples:
  - Cost-decreasing: drug that replaces complicated surgical procedure
  - Cost-increasing: development of a treatment for a previously untreatable condition (e.g., liver transplant, LVAD)
  - Both: Angioplasty.

- Health is produced via medical care input and "technology input." In each period, new treatments are introduced. To take advantage of health benefits associated with new treatments, consumers must purchase more medical care.

CMS MODEL: PRODUCTIVITY

- Health status represented by an index. Problems with this approach.
- How do you measure health?
- Health has many dimensions
- Health affected by things other than medical care
- Precedents in the cost-benefit-analysis literature: YOL, QALY

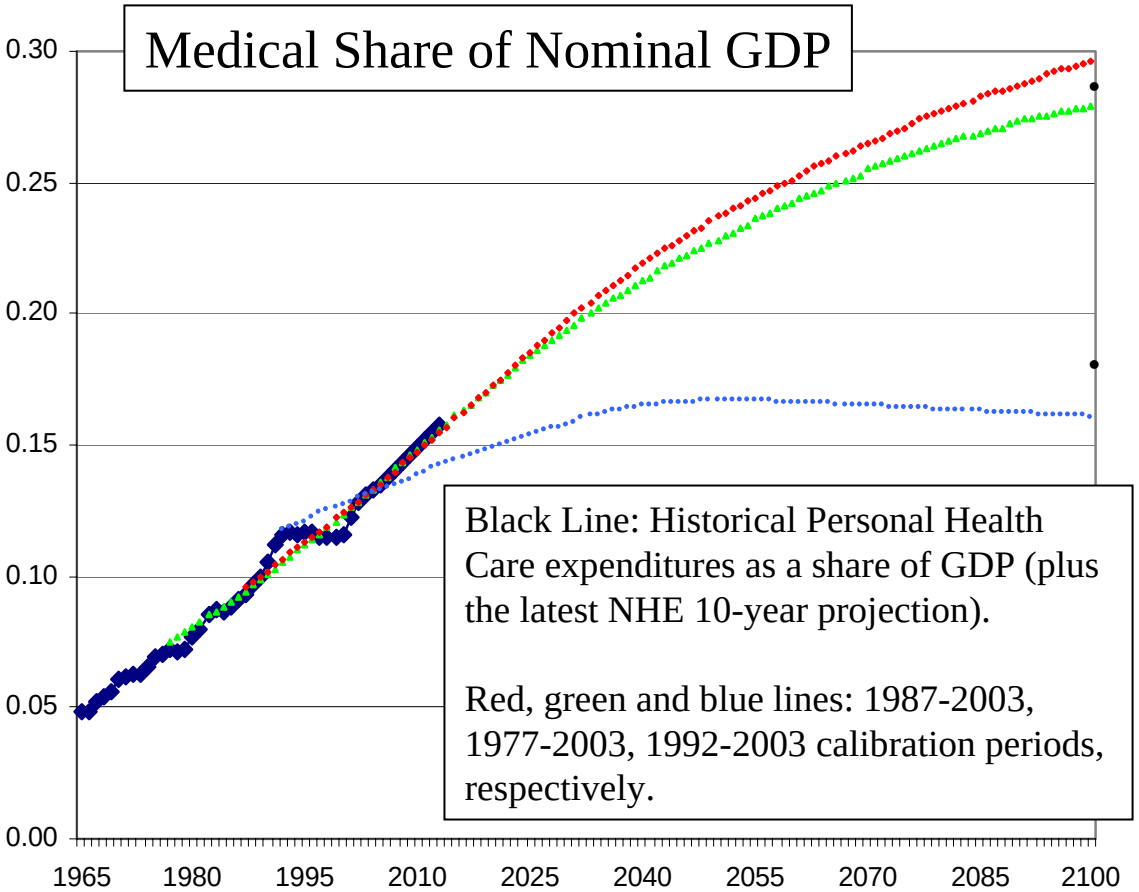
CMS MODEL: CALIBRATION

- Model parameters determined via:
  - Calibration to a reference period
  - Previous studies (econometric estimates)
  - Judgment

- Cannot observe medical innovation (improvement in health outcome). Model infers rate of medical innovation that is consistent with historical pattern of medical spending.

- Simulations of medical spending generated by assuming that calibrated parameters hold in the future.

CMS MODEL: EXAMPLE SIMULATIONS



The chart at left shows an example simulation with a more detailed version of the CMS model (e.g., that includes income and demographic effects.

Each line shows a simulation that is calibrated to a different reference period. The model computes the unobservable "deep parameter" (technological innovation) so as to replicate the observed pattern of medical care spending.

LIFT SIMULATIONS: KEY ASSUMPTIONS

- From the SSA Trustees' Report
  - Population and its age structure
  - Labor force
  - Labor productivity (by modifying Lift's industry trends).
  - Therefore, Lift's GDP approximates SSA assumption
- Personal health care spending assumptions:
  - GDP+1:
    - Approximate NHE projections to 2013
    - Real growth per age-gender weighted population (AGWP) exceeds growth of GDP per capita by 1% in long-run
      - Age-gender weights for population from CMS
      - This assumption was made for each of 8 health care spending categories
      - Transition from 2013 to this assumption by 2040
  - CGE-based health spending share of GDP
    - 1977 - 2003 calibration
    - 1992 - 2003 calibration

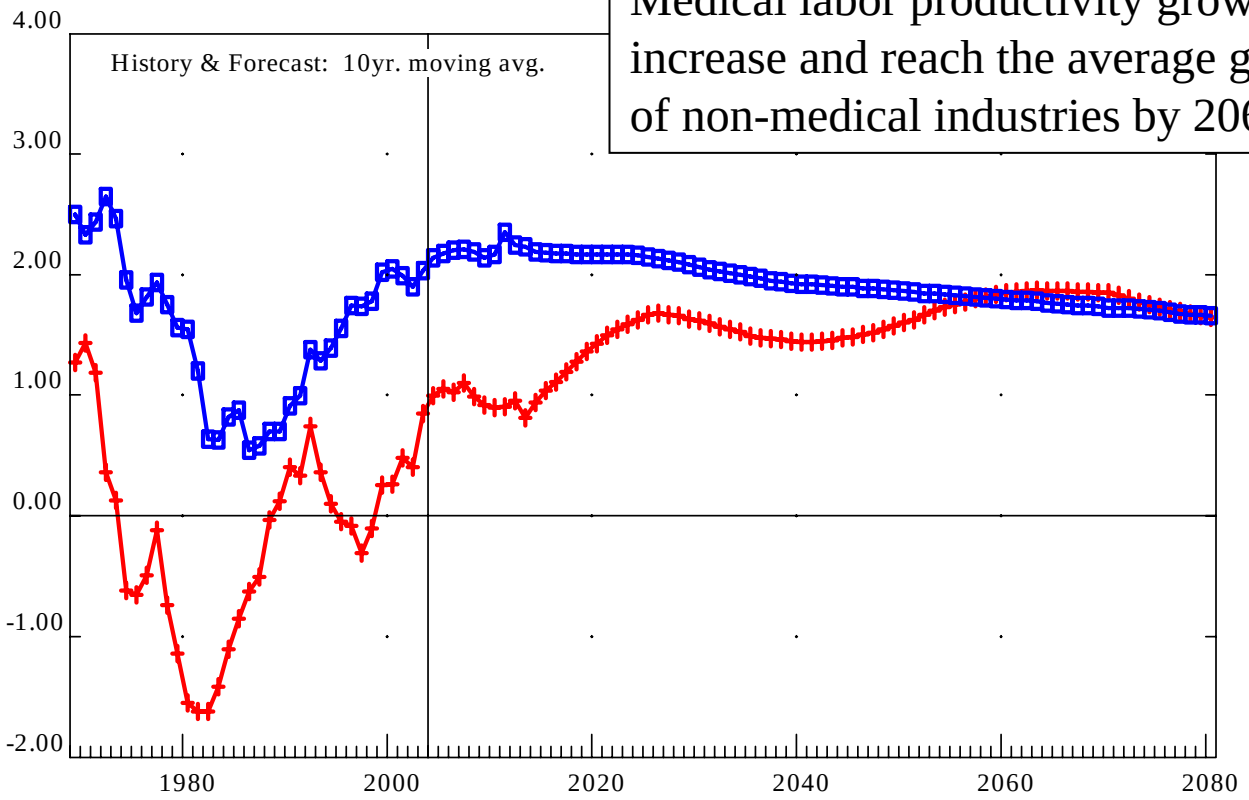
LIFT SIMULATIONS: ASSUMPTIONS

- Public funding of health care spending (implementation of "current law")
  - GDP+1 simulation
    - Medicare (A,B,D) from Trustees Report as shares of nominal GDP
    - Medicaid proportional to Medicare parts A and B
  - Alternate simulations with CGE-based health spending assumptions
    - Medicare (A,B,D): share of health spending implied by the GDP+1 simulation
    - Medicaid proportional to Medicare parts A and B
  - Therefore, in all simulations with Lift, Medicare and Medicaid account for the same share of spending for health

- Tax rates adjust, to meet budget targets
  - Federal target: deficit is about 1.5% of GDP
  - S&L target: budgets are balanced.

LIFT: LABOR PRODUCTIVITY GROWTH RATES

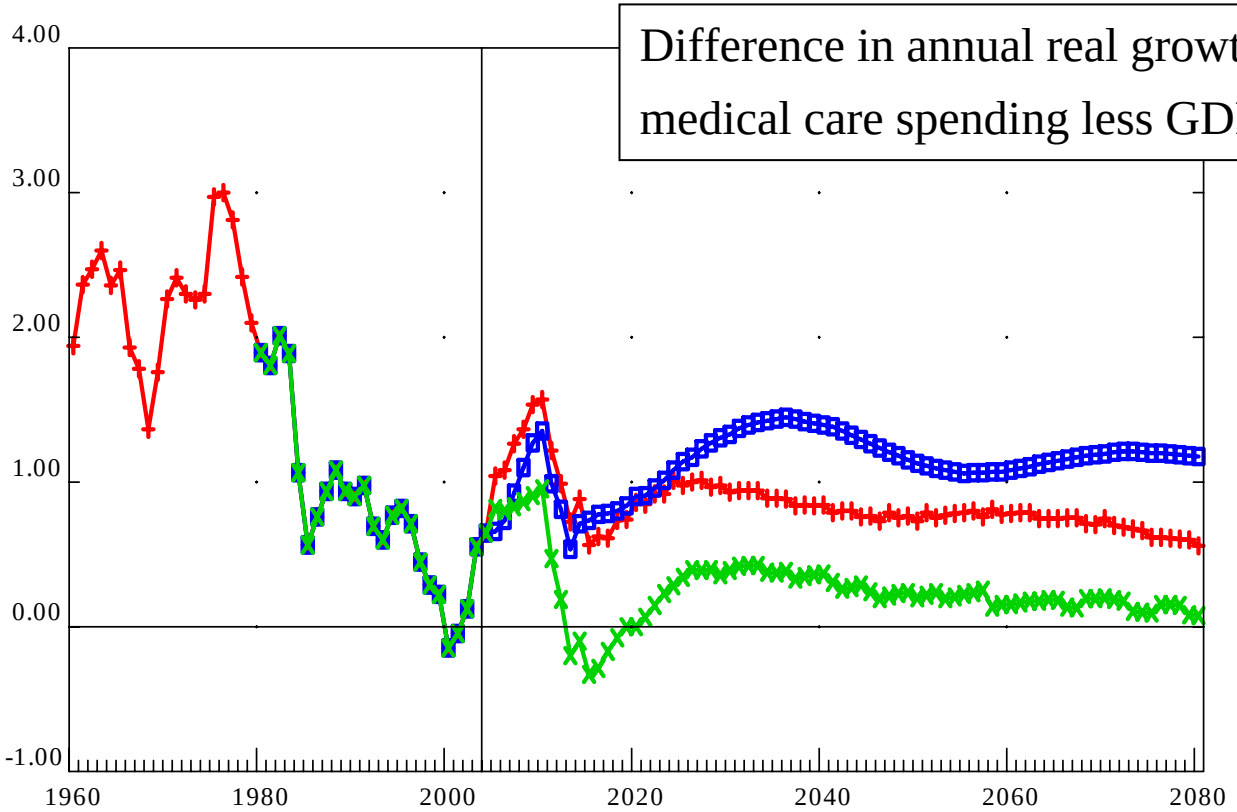
Medical labor productivity growth rates increase and reach the average growth rate of non-medical industries by 2060.



Medical: red, Non-medical: blue

Outline:
Background
CMS Model
LIFT Simulations
Conclusions

LIFT SIMULATION: REAL GDP AND MEDICAL



GDP+1 blue, CGE77-03 red, CGE9203 green

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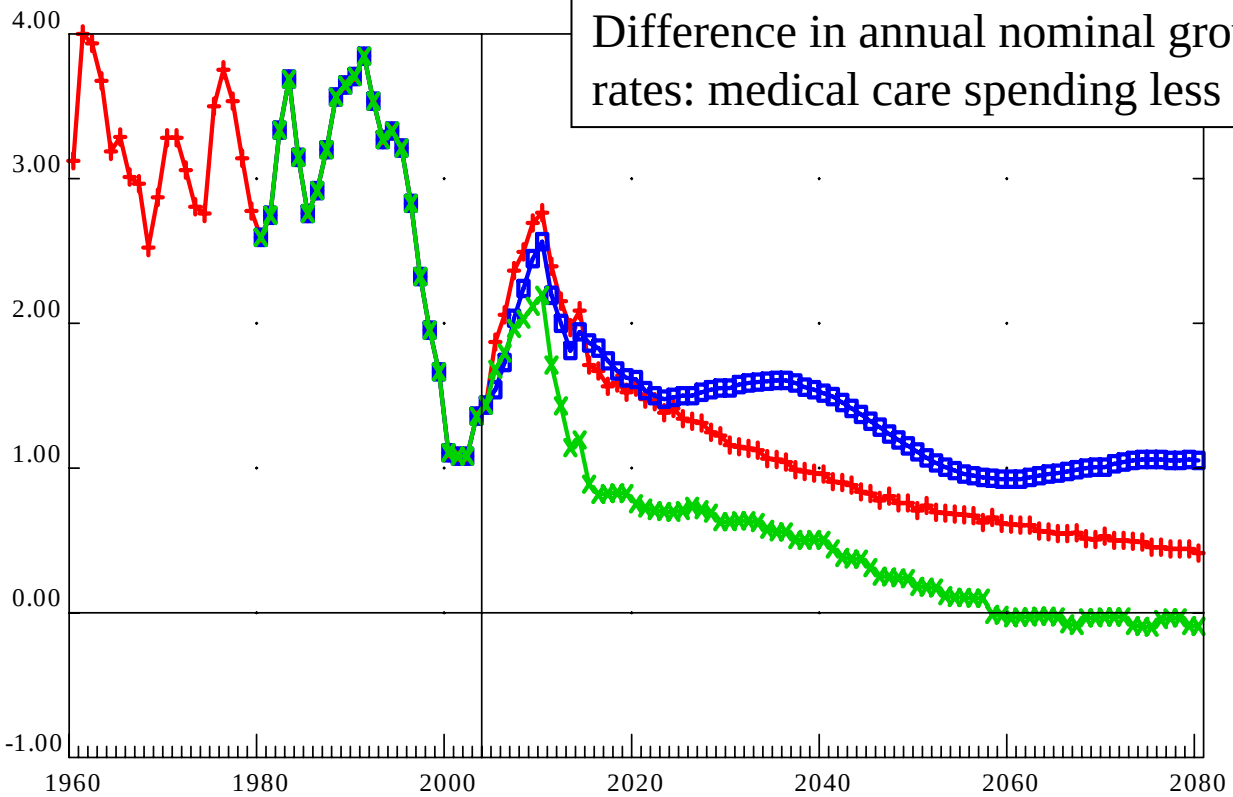
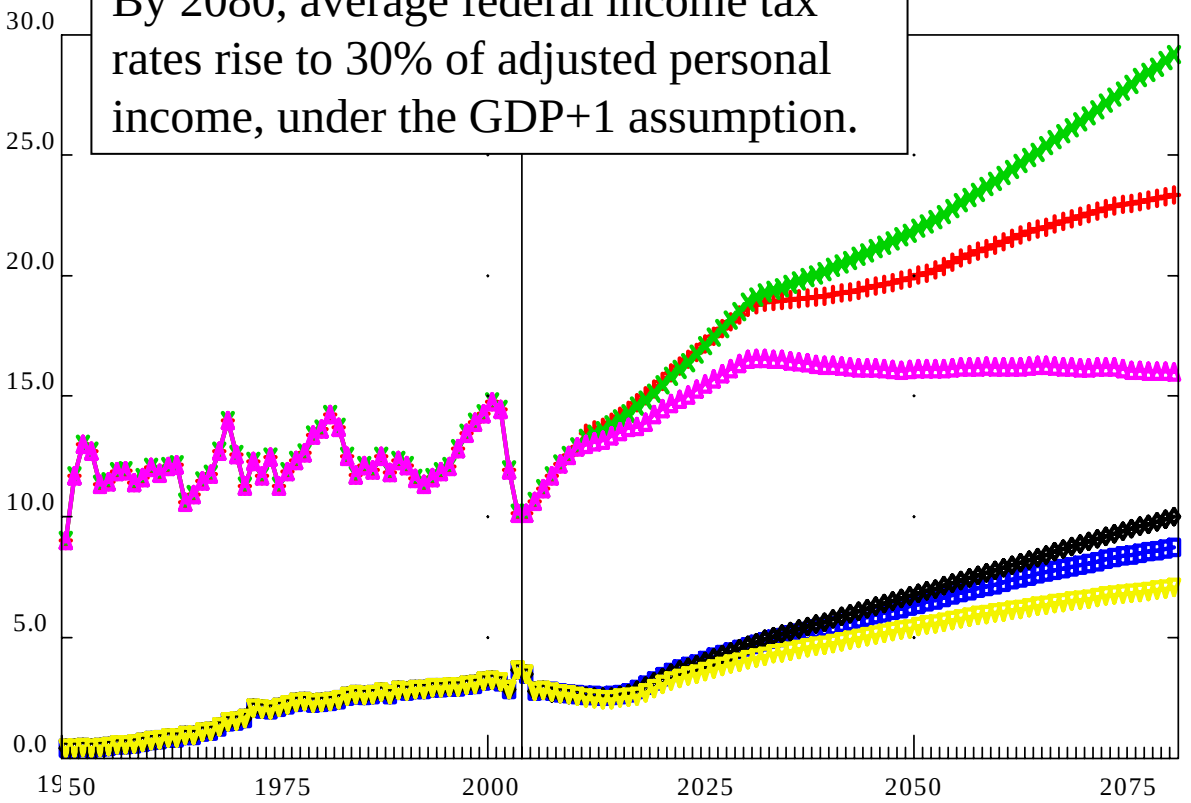
LIFT SIMULATION: NOMINAL GDP AND MEDICAL



GDP+1 blue, CGE77-03 red, CGE9203 green

LIFT SIMULATION: IMPLIED TAX RATES

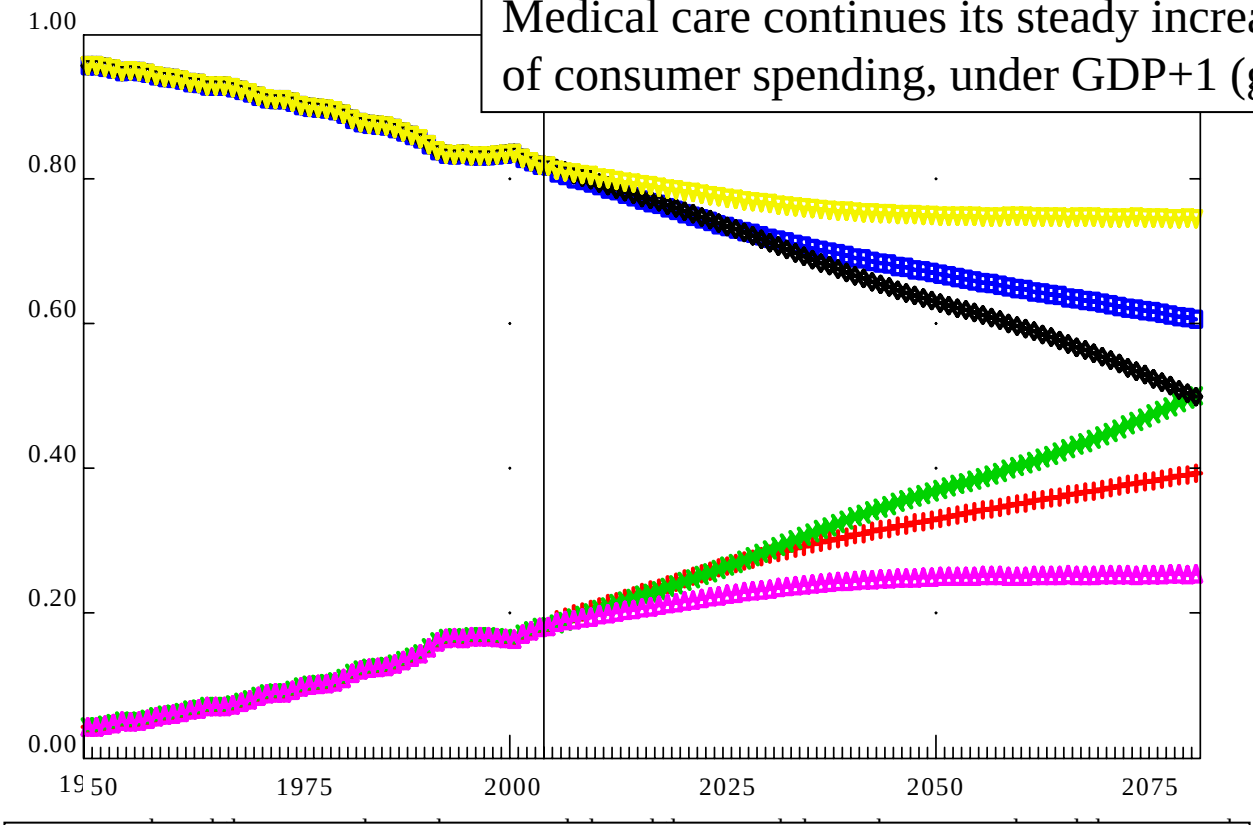
By 2080, average federal income tax rates rise to 30% of adjusted personal income, under the GDP+1 assumption.



Fed. Income: GDP+1 green, CGE77-03 red, CGE9203 purple
S&L Income: GDP+1 black, CGE77-03 blue, CGE9203 yellow

LIFT: MEDICAL AND NON-MEDICAL SHARES OF PCE

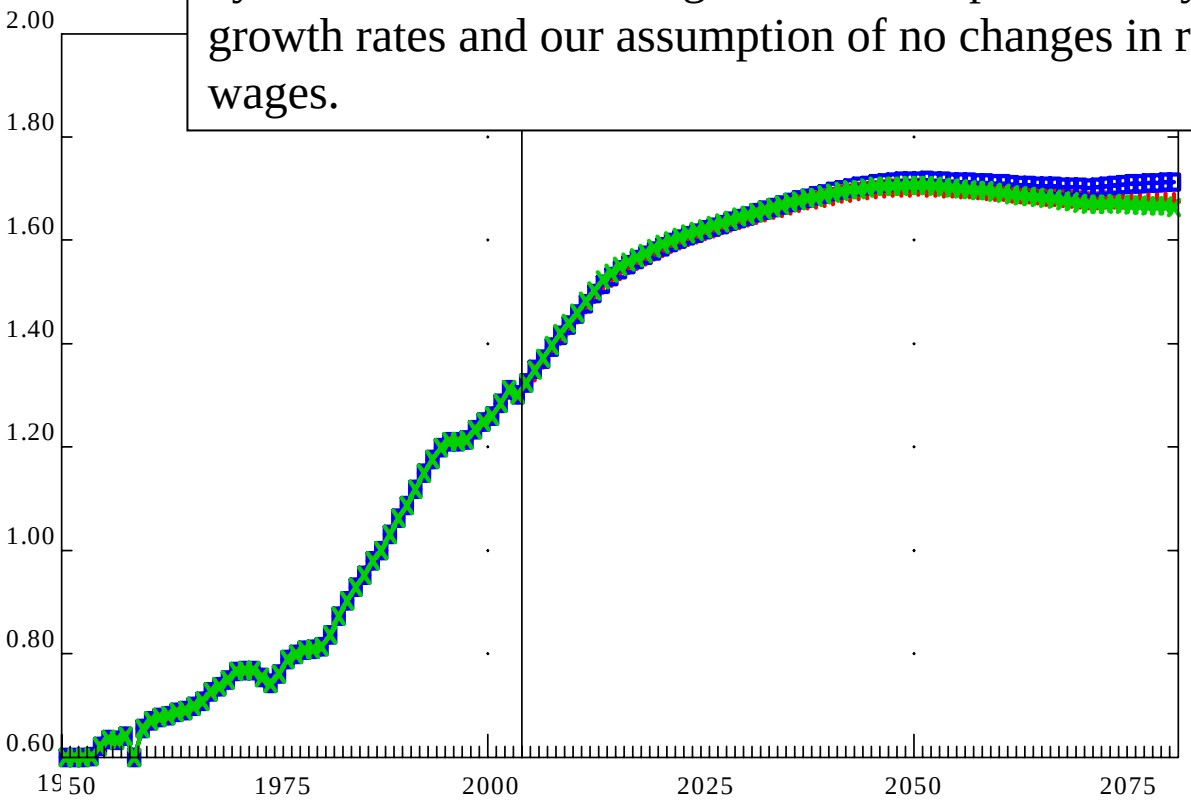
Medical care continues its steady increase as a share of consumer spending, under GDP+1 (green).



Medical: GDP+1 green, CGE77-03 red, CGE9203 purple
Non-medical: GDP+1 black, CGE77-03 blue, CGE9203 yellow

LIFT: RELATIVE PRICES

Relative consumer prices (medical/non-medical) level out by 2050 from the convergence of labor productivity growth rates and our assumption of no changes in relative wages.



GDP+1 blue, CGE77-03 red, CGE9203 green

CONCLUSIONS

- CMS model provides a structured framework that explains interactions among major factors related to medical spending growth: preferences, demographics, income, productivity, technological innovation.
- Facilitates sensitivity analysis (e.g., model parameters, alternative calibration periods).
- Consistent with health economics literature.
- CMS assistance is not limited to the CMS model. We also want to help the Technical Panel develop and investigate its own ideas.

APPENDIX A: SLOWER MEDICAL LABOR PRODUCTIVITY

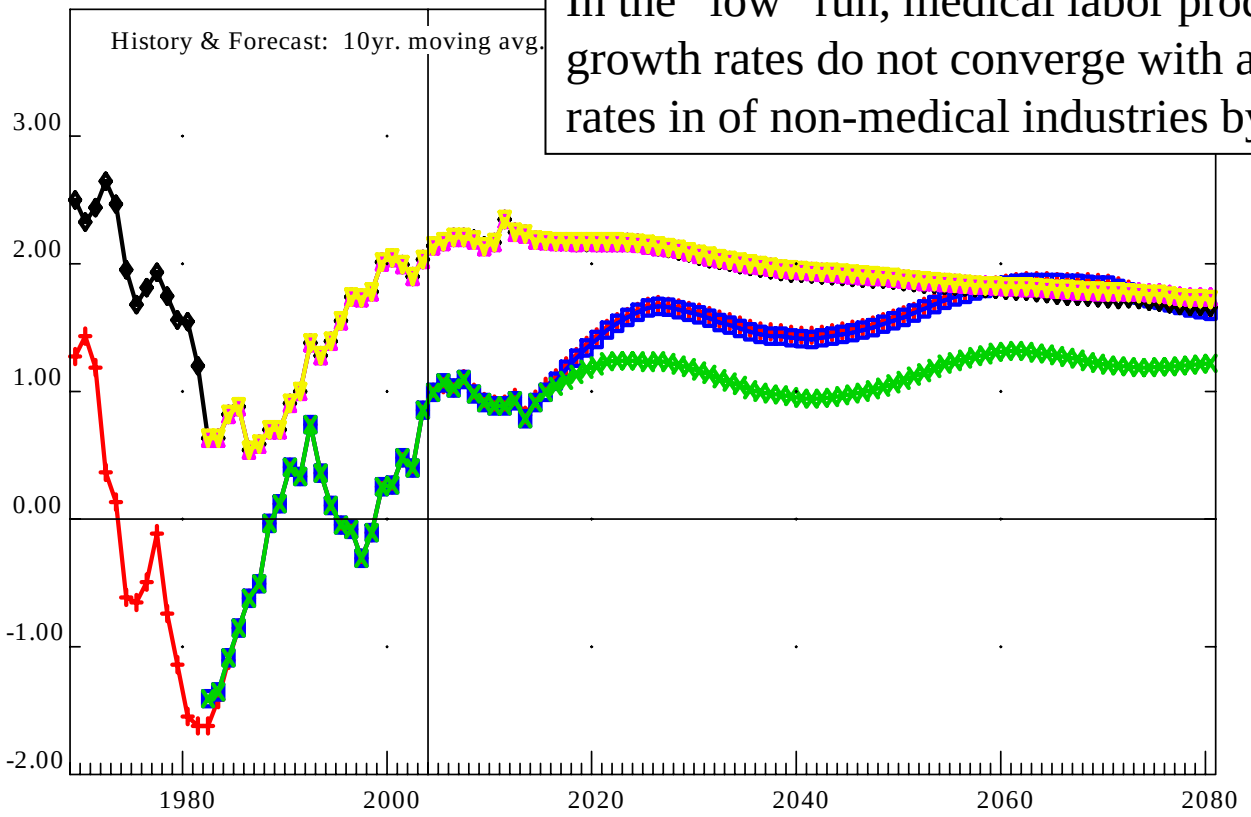
What if growth of labor productivity in the health sectors did not increase to match the growth of labor productivity in non-health industries?

The next slides compare:

- CGE 77-03
- GDP+1, with labor productivity growth convergence
- GDP+1, w/o convergence

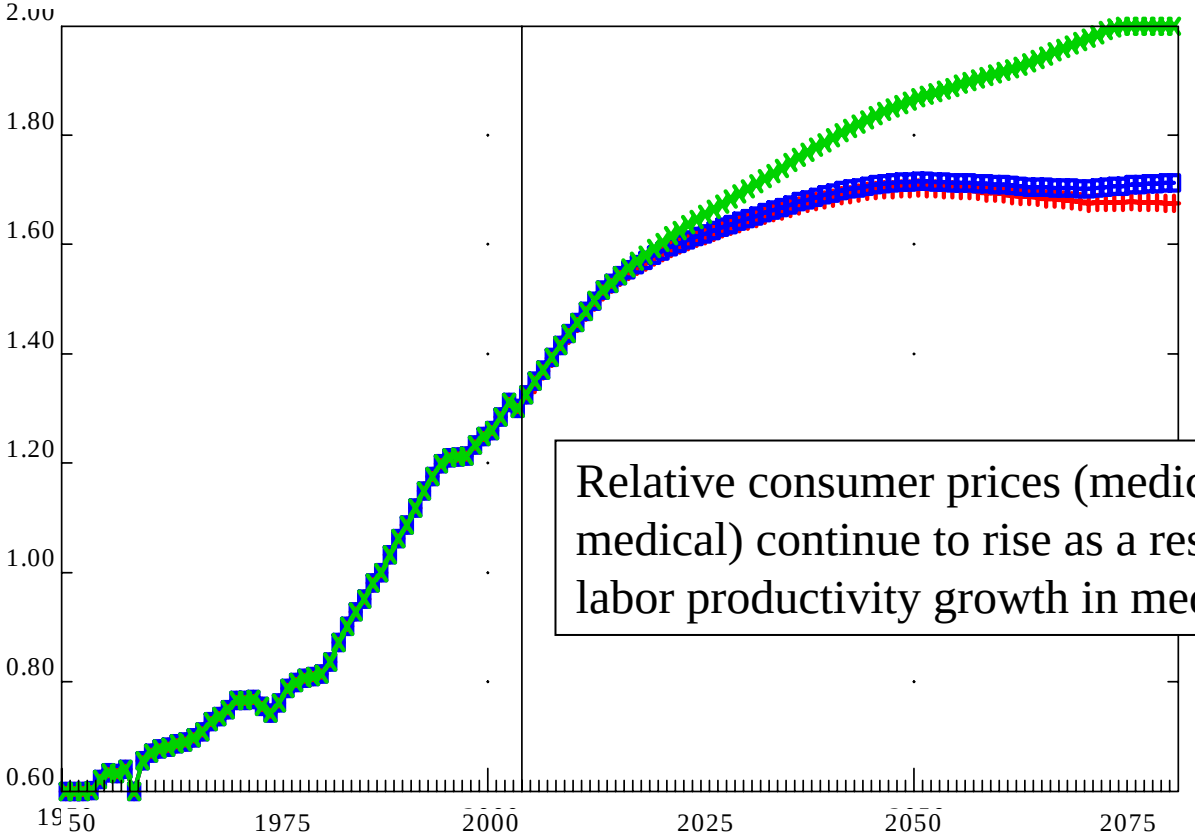
LIFT: LABOR PRODUCTIVITY GROWTH RATES

In the "low" run, medical labor productivity growth rates do not converge with average growth rates in of non-medical industries by 2080.



Health: GDP+1 blue, CGE77-03 red, GDP+1 Low green
Non-health: black, purple, yellow

LIFT SIMULATION: RELATIVE PRICES



Relative consumer prices (medical/non-medical) continue to rise as a result of "low" labor productivity growth in medical.

GDP+1 blue, CGE77-03 red, GDP+1 Low green

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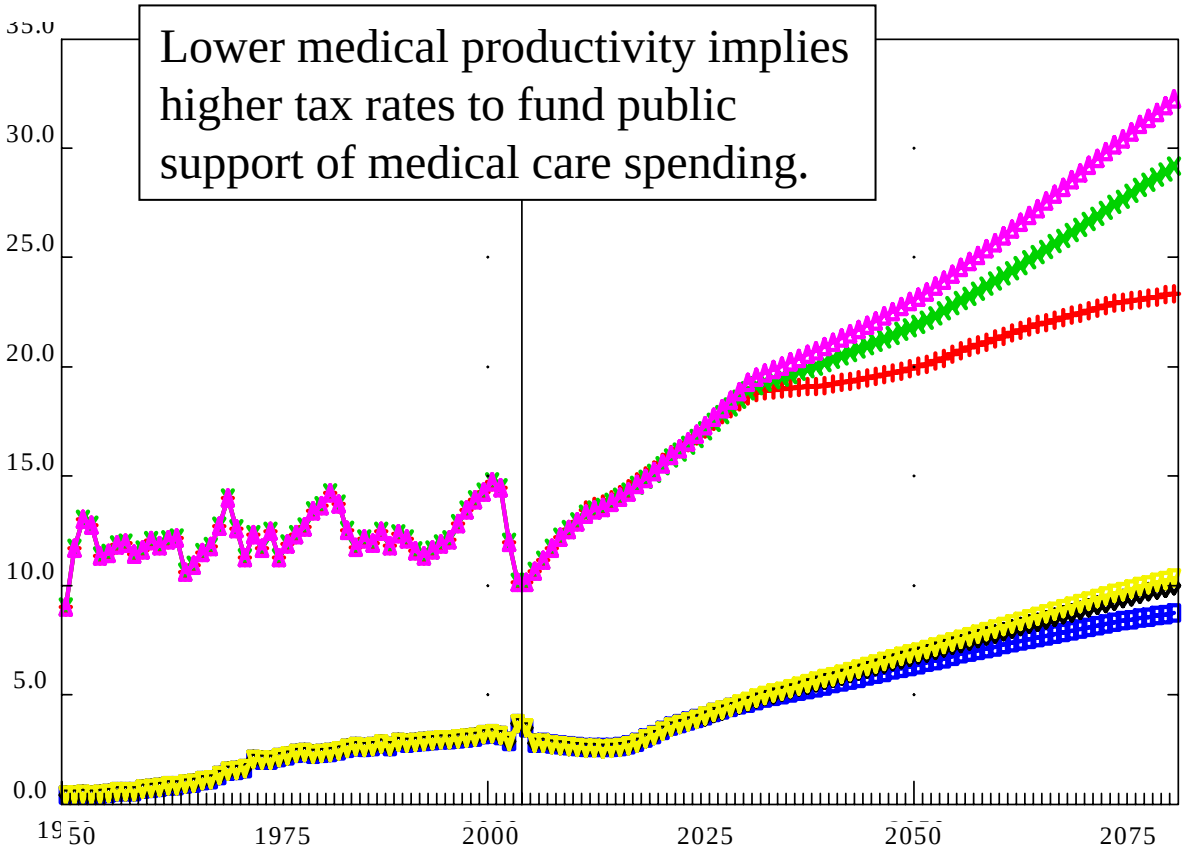
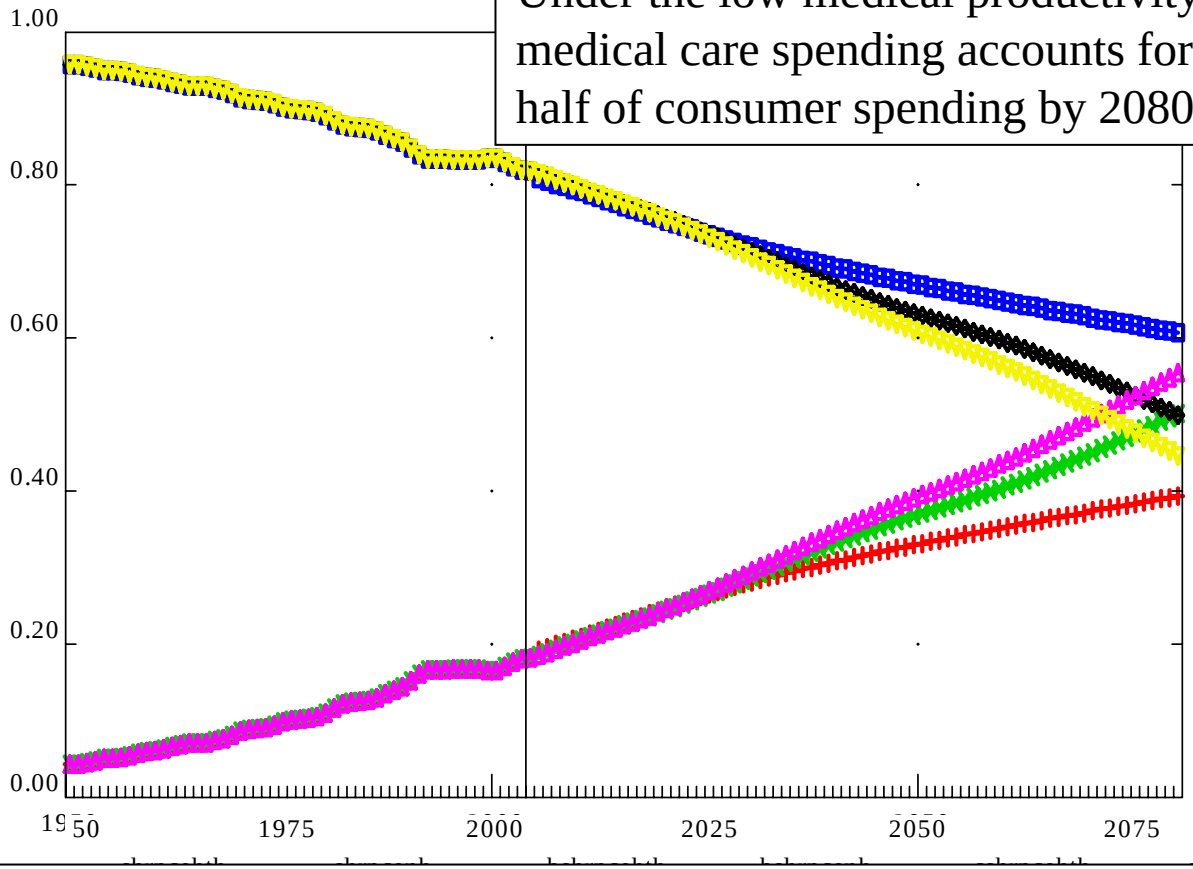
LIFT SIMULATION: IMPLIED TAX RATES



Fed. Income: GDP+1 green, CGE77-03 red, GDP+1 Low purple
S&L Income: GDP+1 black, CGE77-03 blue, GDP+1 Low yellow

LIFT: MEDICAL SHARE OF NOMINAL PCE

Under the low medical productivity assumption, medical care spending accounts for more than half of consumer spending by 2080.



Medical: GDP+1 green, CGE77-03 red, GDP+1 Low purple
Non-Medical: GDP+1 black, CGE77-03 blue, GDP+1 Low yellow

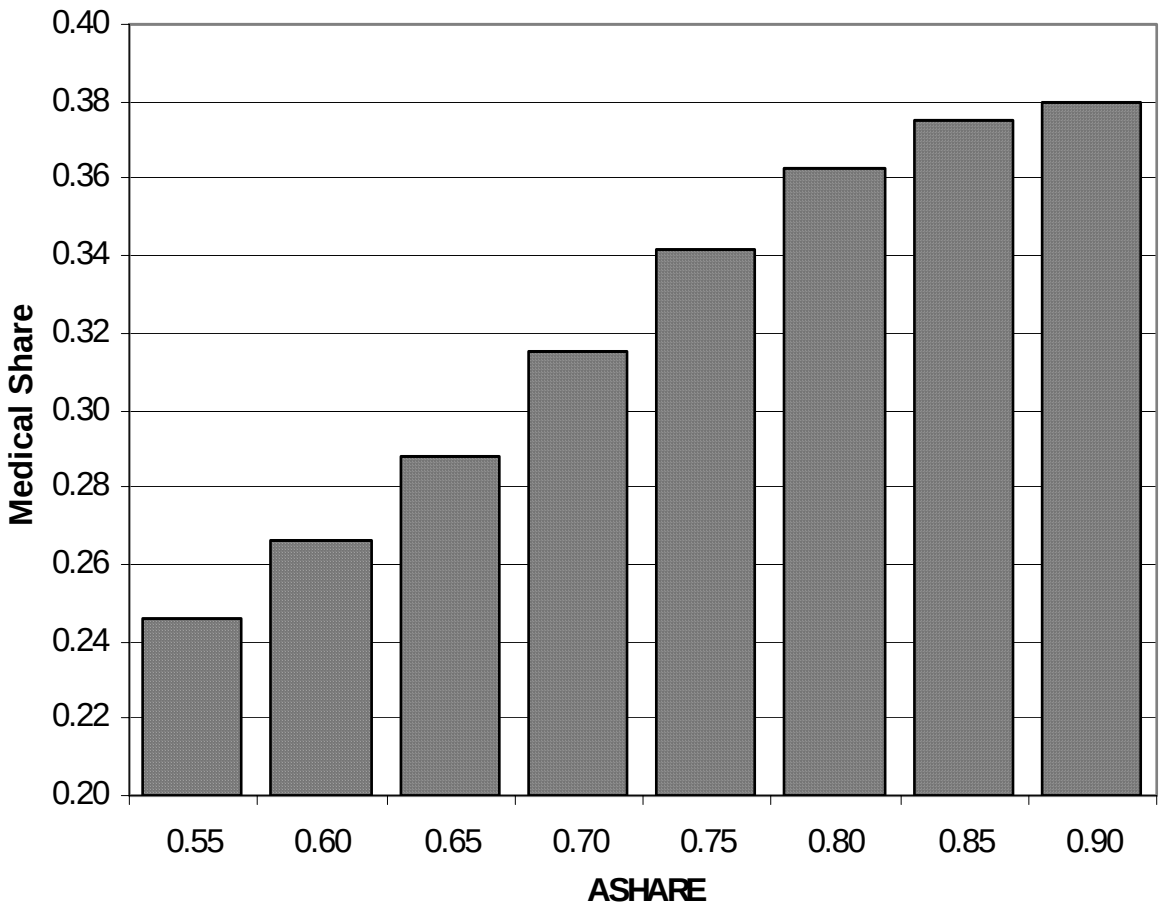
APPENDIX B: ULTIMATE MEDICAL SHARE IN CMS MODEL

- Consistency with SSA assumptions
- Government consumption
- Preferences

WHAT DETERMINES HOW FAST WE GET THERE?

- Cost-increasing medical innovation

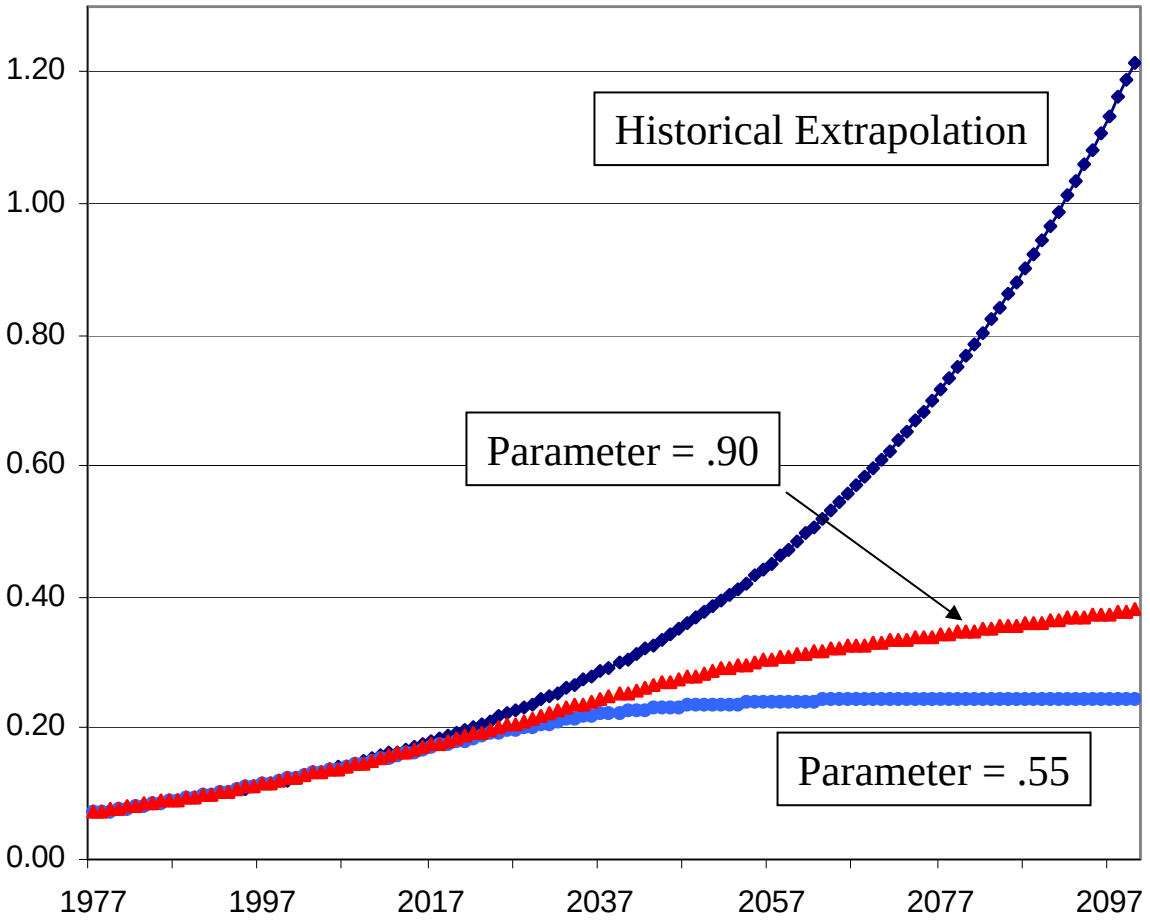
CMS MODEL: EXAMPLE SIMULATIONS



This chart shows the effect of changing the preference parameter, holding other parameters fixed. The vertical axis is the model's simulated medical share in 2100. Note that the OASDI assumptions constrain the max. share.

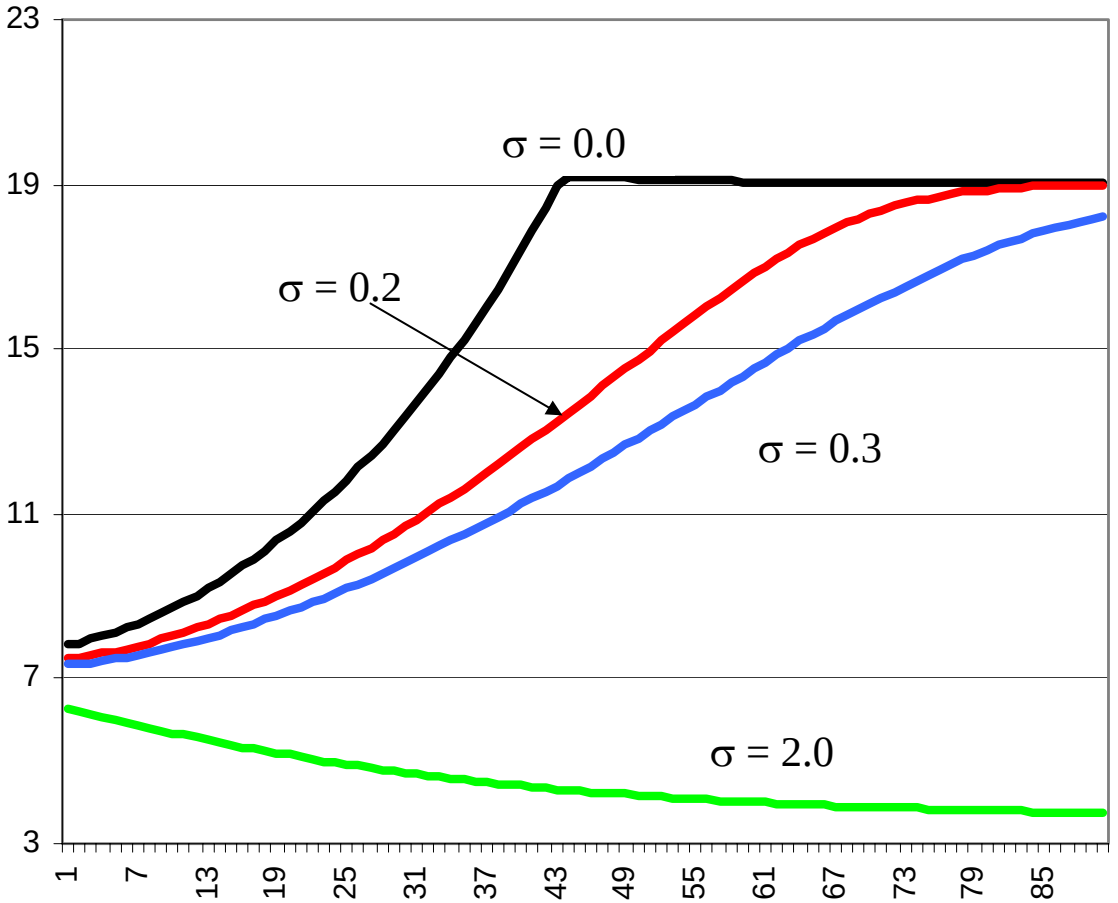
Model cannot reproduce the 1977-2003 reference period for values below ~0.5.

CMS MODEL: EXAMPLE SIMULATIONS



This chart compares a simplistic extrapolation of the historical growth rate (note that the medical share equals 1.0 by about 2090) with 2 CGE model simulations with different health-consumption preferences.

CMS MODEL: EXAMPLE SIMULATIONS



The path to a particular steady-state share of GDP is determined by the nature of technological innovation.

If technology is purely expansive, share growth abruptly levels off. If technology is substitutive, model cannot replicate reference period.

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