

Federal Budget Policy with an Aging Population and Persistently Low Interest Rates

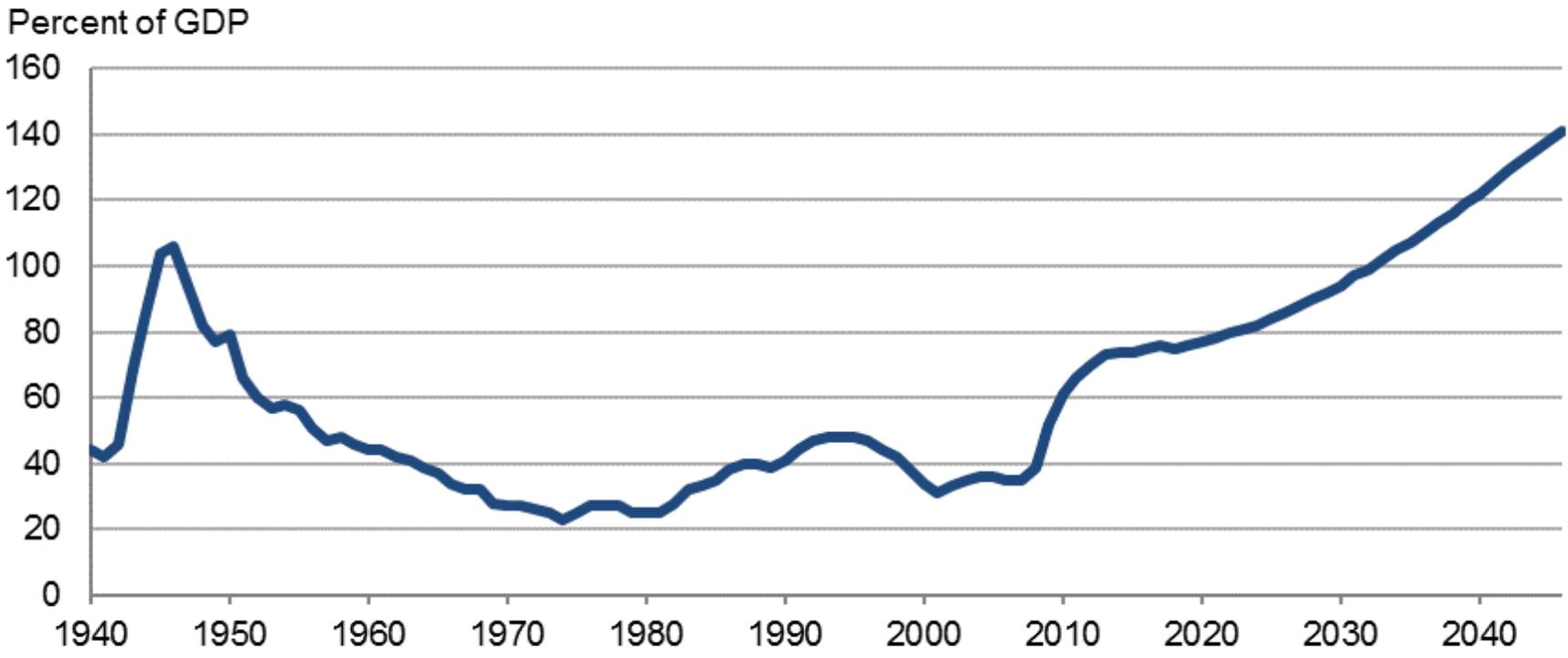
Douglas Elmendorf and Louise Sheiner

Key considerations

- Recent surge in debt
- Debt/GDP projected to rise indefinitely
- Sharp increase in % of population in retirement
- Very low Treasury borrowing rates

Debt expected to increase indefinitely

Figure 1: Federal Debt Held by the Public (Extended Baseline)



Source: CBO 2016 Long-Term Budget Outlook.

Our goals

- How should budget policy respond to population aging and high level of debt?
- How should it respond to persistently low interest rates?
 - Does response depend on why interest rates have declined?

Conclusions

- Some of our conclusions are consistent with conventional wisdom:
 - Federal budget on unsustainable trajectory , so reduced spending and increased taxes eventually will be needed.
 - Desire to smooth consumption and need for fiscal space argues for making those changes sooner rather than later.
- But persistently low interest rates mean that
 - Changes should be deferred and reduced in size.
 - And, especially, that increasing government investment should be important current priority.

Aging from a macroeconomic perspective

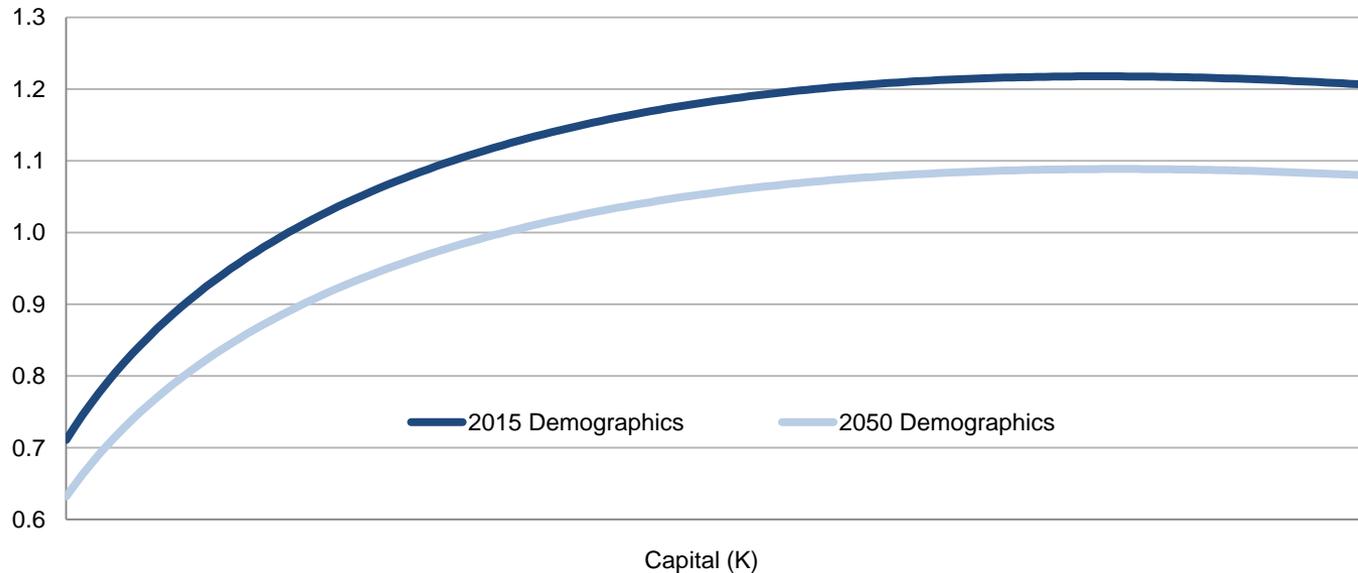
- In 1990, Cutler, Poterba, Sheiner, and Summers (BPEA): optimal response to demographic transition is lower saving
- 2000: Elmendorf and Sheiner revisit: optimal response is still to lower saving
- Same model today: Finally time to increase saving

Closed economy model with a social planner

- Higher dependency ratio because of aging – lower “support” ratio, α
- At any given level of capital per worker, lower sustainable consumption $c = \alpha(f(k) - (n + g + \delta)k)$

Sustainable Consumption Frontiers

Consumption index (C = 1 where K = 1000)



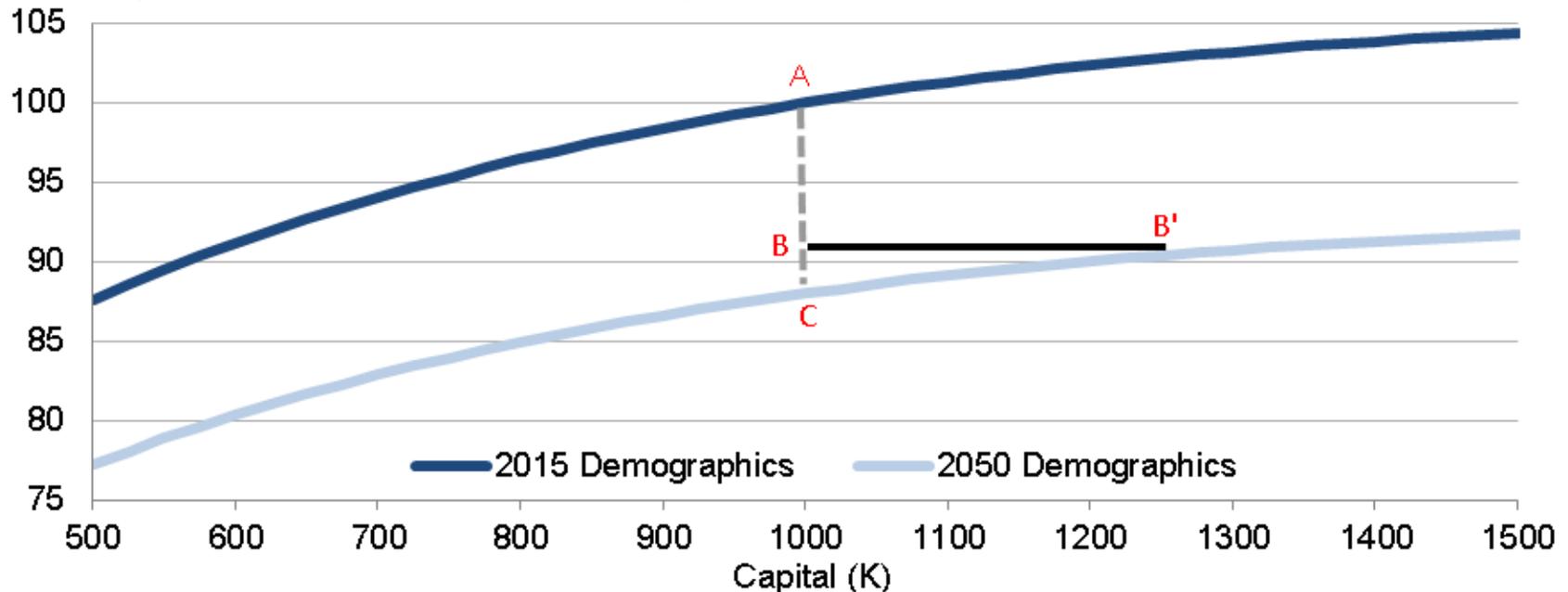
Social planner can respond in many ways

- One response: complete consumption smoothing
 - Reduce consumption today to new steady state
 - Large increase in capital labor ratio
 - Big reduction in return to capital
- Other extreme: no consumption smoothing
 - Adjust consumption each year so as to maintain capital labor ratio
 - Rate of return to saving unchanged
- Optimal response:
 - Standard Ramsey model
 - Considers benefits of consumption smoothing and effects of lower rates of return
 - Somewhere in between the two extremes

Two “extreme” responses

Figure 4: Sustainable Consumption Frontiers

Consumption index ($C = 100$ where $K = 1000$)

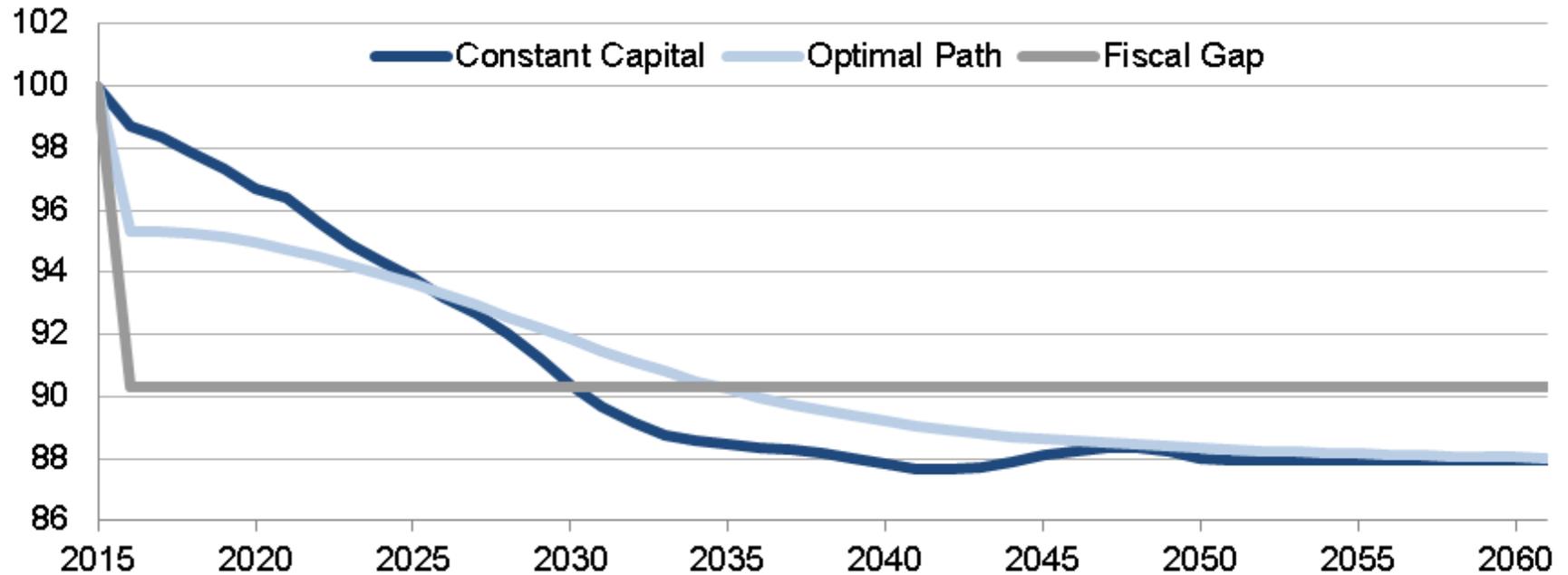


Source: World Bank (demographic inputs); National Transfer Accounts and Census (consumption weights for support ratios); authors' calculations.

Optimal consumption in between two extremes

Figure 6: Closed-Economy Sustainable Consumption Paths

Consumption index (2015 = 100)



Source: World Bank (demographic inputs); National Transfer Accounts and Census (consumption weights for support ratios); authors' calculations.

- Optimal Response is now to lower consumption = increase saving

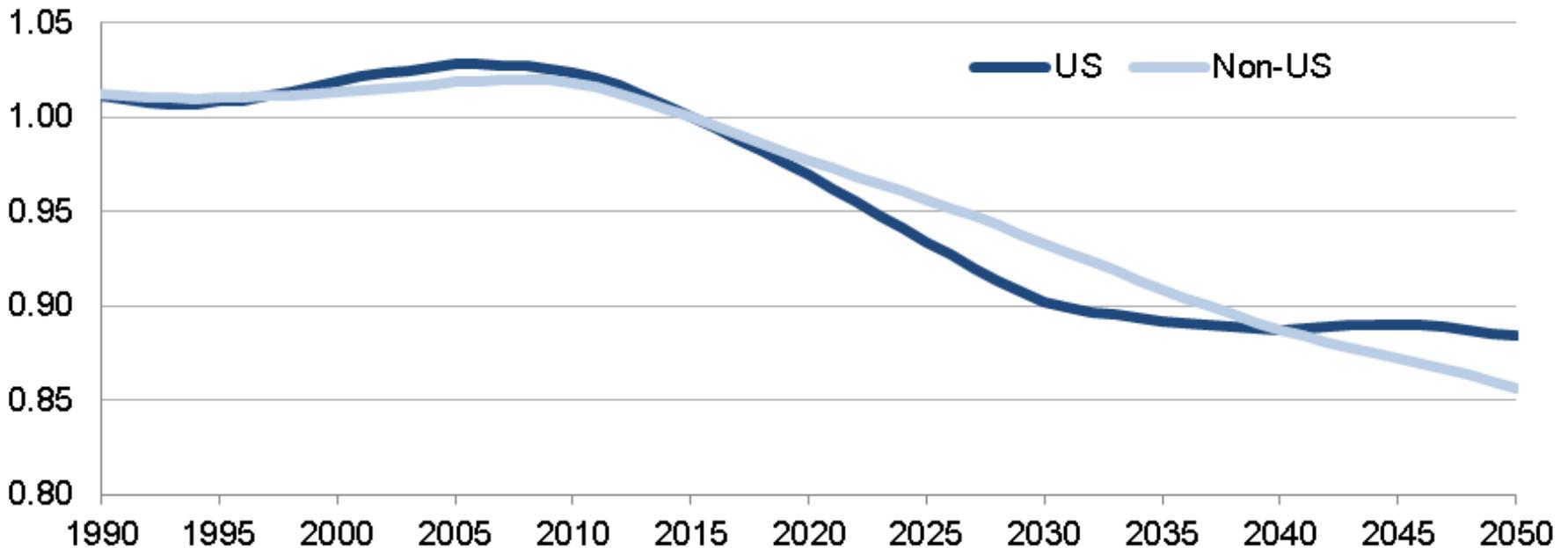
Open economy considerations

- Small open economy with unchanging interest rates:
 - No effect of consumption on interest rates
 - Only consumption smoothing matters
- But world is aging, and we are not a small economy
 - Using the same type of model, but allowing for two countries (US and Rest of World), we get very similar optimal consumption
 - Why? Because world aging is very similar to US aging

US and Rest-of-World support ratios (workers/population)

Figure 8: US and Non-US Support Ratios

Ratio of those 15-64 to total population, indexed (2015 = 1)

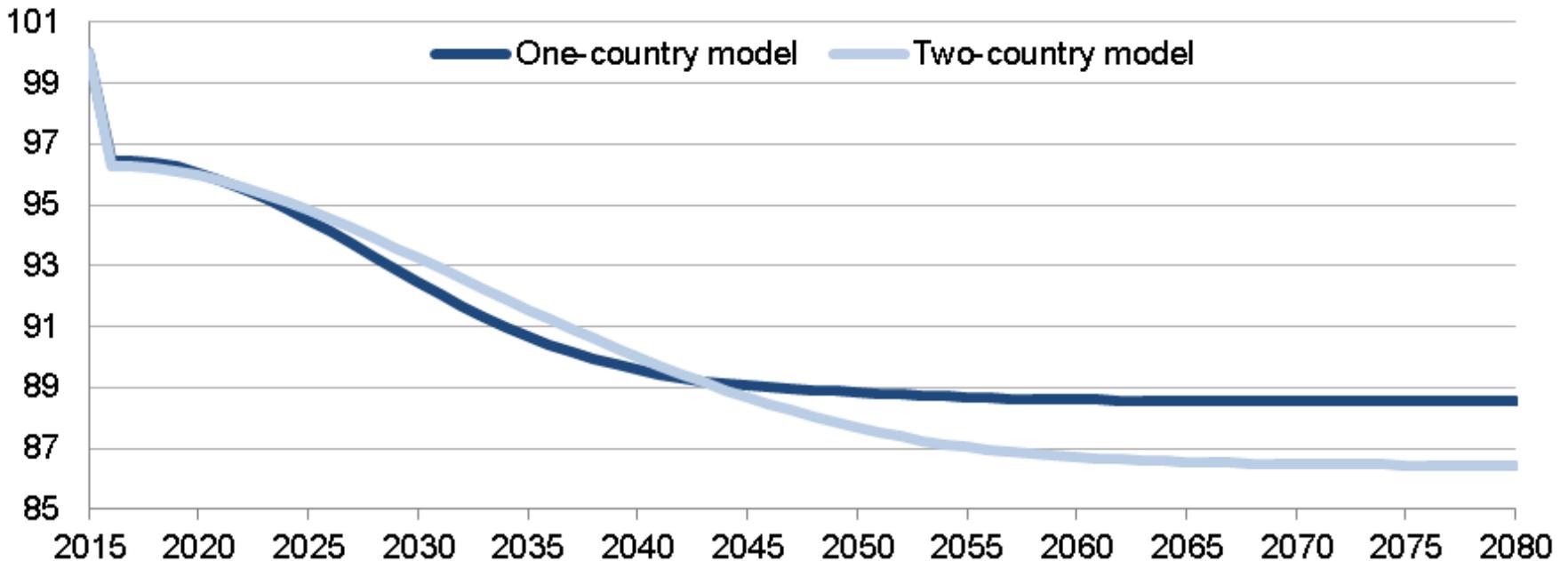


Source: World Bank (demographic inputs); National Transfer Accounts and Census (consumption weights for support ratios); authors' calculations. Note: Non-US support ratios calculated using 2013 GDP-per-worker weights.

Optimal consumption in closed economy and two-country model

Figure 11: US Optimal Consumption Paths

Consumption index (2015 = 100)



Source: World Bank (demographic inputs); National Transfer Accounts and Census (consumption weights for support ratios); authors' calculations.

Optimal budget policy

- Aging leads to unsustainable pay-as-you-go entitlement programs.
- Also, much higher debt to GDP ratio now.
- Why care about deficits and debt?
 - Crowding out of investment: high debt leads to lower capital per worker. Logic of consumption model applies.
 - Fiscal Space: High debt could raise borrowing costs if lenders fear default. Not in model.

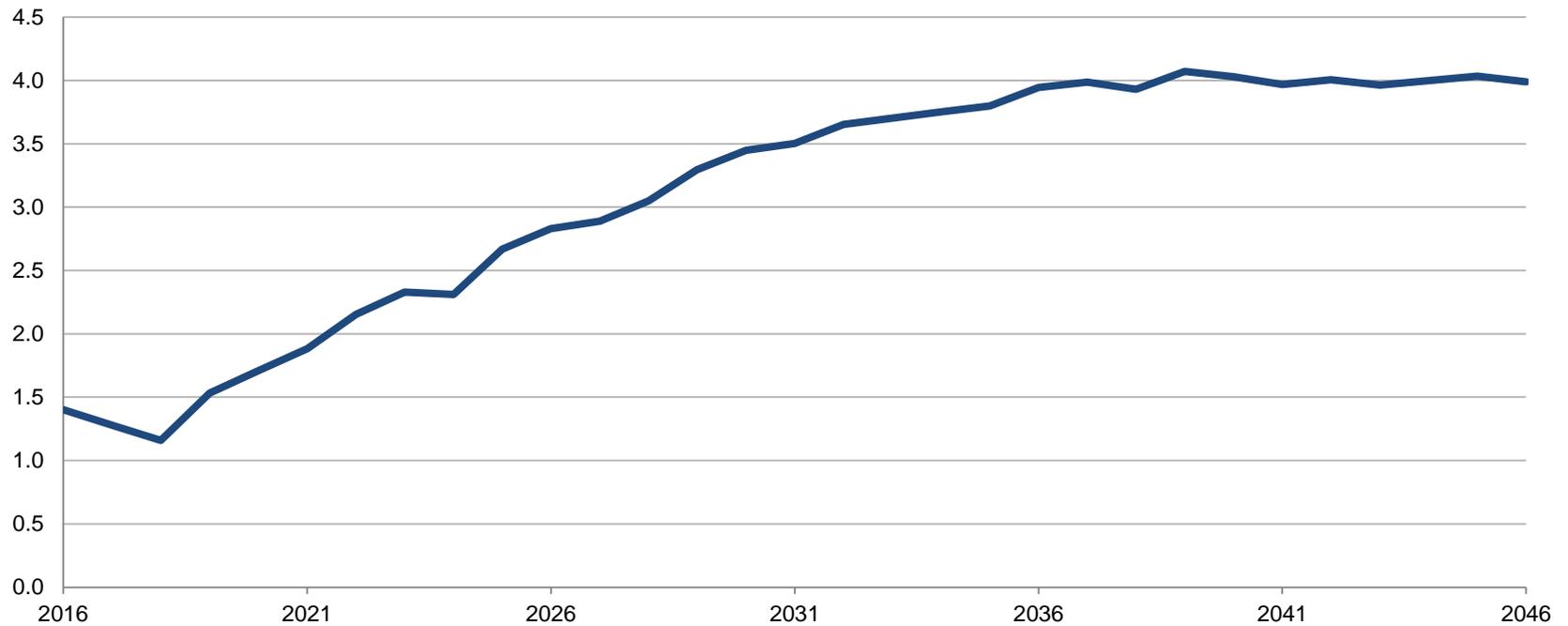
Projected budget deficits not good measure of costs of aging

- CBO fiscal outlook driven by assumptions about non-entitlement spending, health costs, and revenues as well as aging
- We look at “aging only” budget projections
- Assume other spending and revenues constant as a share of GDP
- Assume no excess cost growth in health care

Primary Deficit Projections with Aging Only

Figure 12: Aging-Only Projection of Primary Deficits

Percent of GDP



Source: CBO 2016 Long-Term Budget Outlook; authors' calculations. Note: Assumes all revenues and spending (other than Social Security and Medicare) remain constant at 2016 levels as shares of GDP.

Look at two possible responses

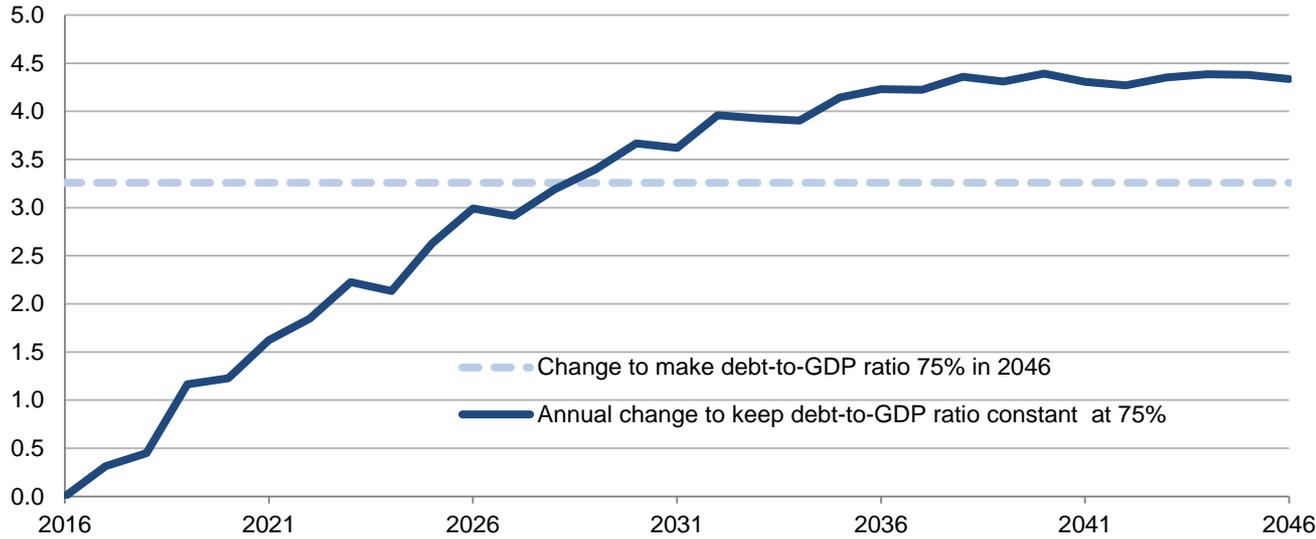
(1) “fiscal gap” approach: lower deficits each year by fixed % of GDP so debt to GDP ratio is 75% in 2046 – smoothing

(2) Keep debt to GDP ratio each year at 75% -- no smoothing

Optimal Approach Likely In Between These Two

Figure 13: Required Change in GDP Share of Taxes/Spending

Percent of GDP

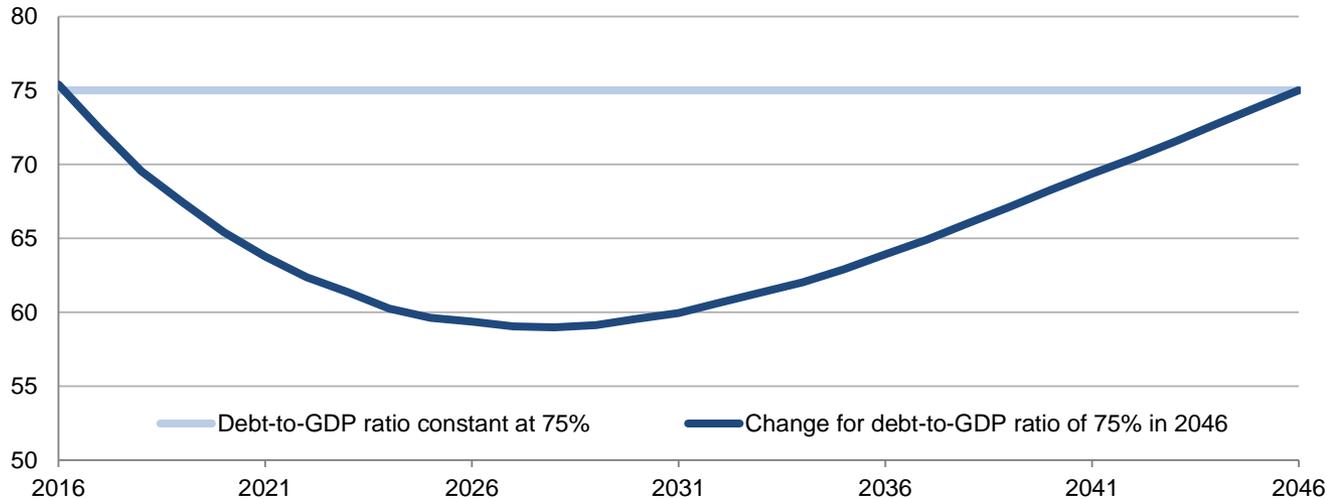


Source: CBO; authors' calculations.

Changes in
Deficits and
Debt for
Two
Approaches

Figure 14: Debt to GDP

Percent of GDP



Source: CBO; authors' calculations.

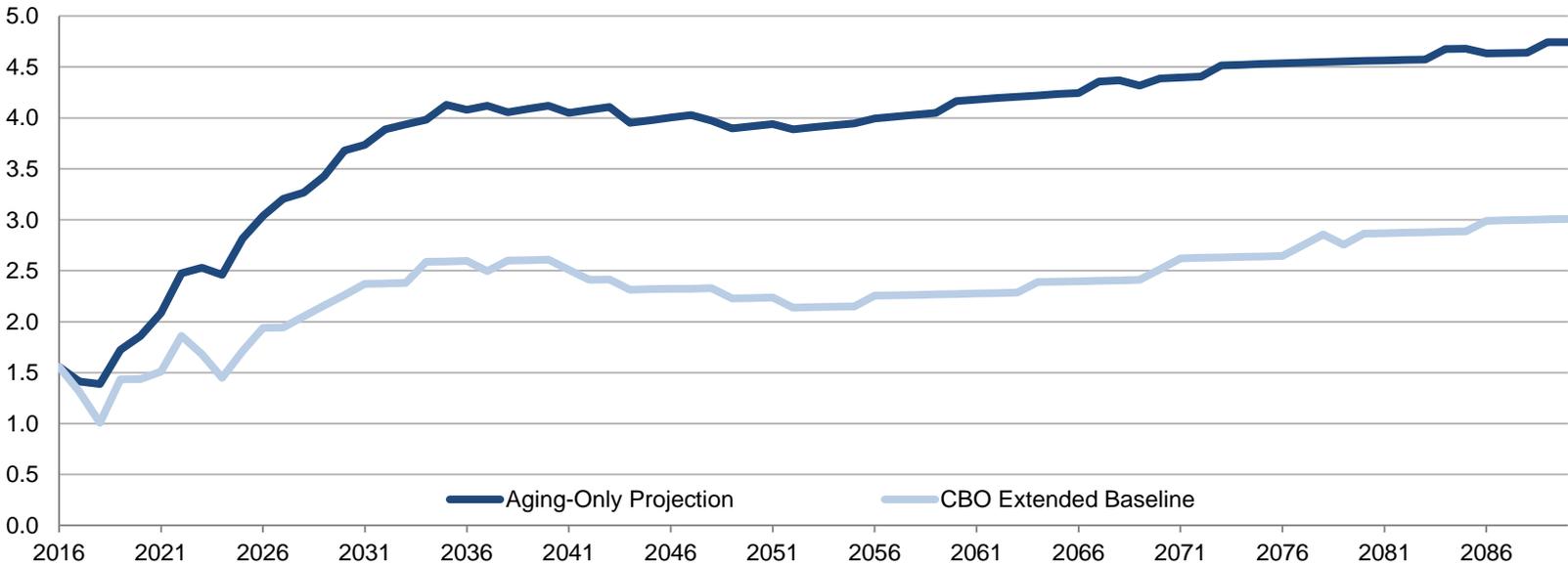
Aging-only deficits higher than CBO extended baseline projected deficits

- Why? In CBO extended baseline:
 - Real bracket creep boosts revenues.
 - Non-entitlement spending declines.
 - Partially offset by higher health costs in CBO baseline.
- If CBO baseline represents only scoring conventions
 - Projected long-run fiscal imbalance understates fiscal policy challenges.

Aging only deficits much higher than CBO extended baseline projected deficits

Figure 15: Primary Deficits

Percent of GDP



Source: CBO; authors' calculations. Note that "CBO Extended Baseline" reflects the 2015 Long-Term Budget Outlook projection, updated to reflect CBO's most recent 10-year budget projection, as described in the note to Figure 1.

CBO vs aging-only baseline

- Assuming baseline includes likely policy changes, then:
 - If optimal response to aging is one-time permanent reduction in consumption,
 - Deficit needs to be cut more now
 - Because baseline already assumes significant cuts in later years.
 - If want to simply adjust annually to population aging
 - Then only small policy changes over next few years and larger changes later.

Part II: Considering the effects of low interest rates

Figure 19: Yield on 10-Year Treasury Notes



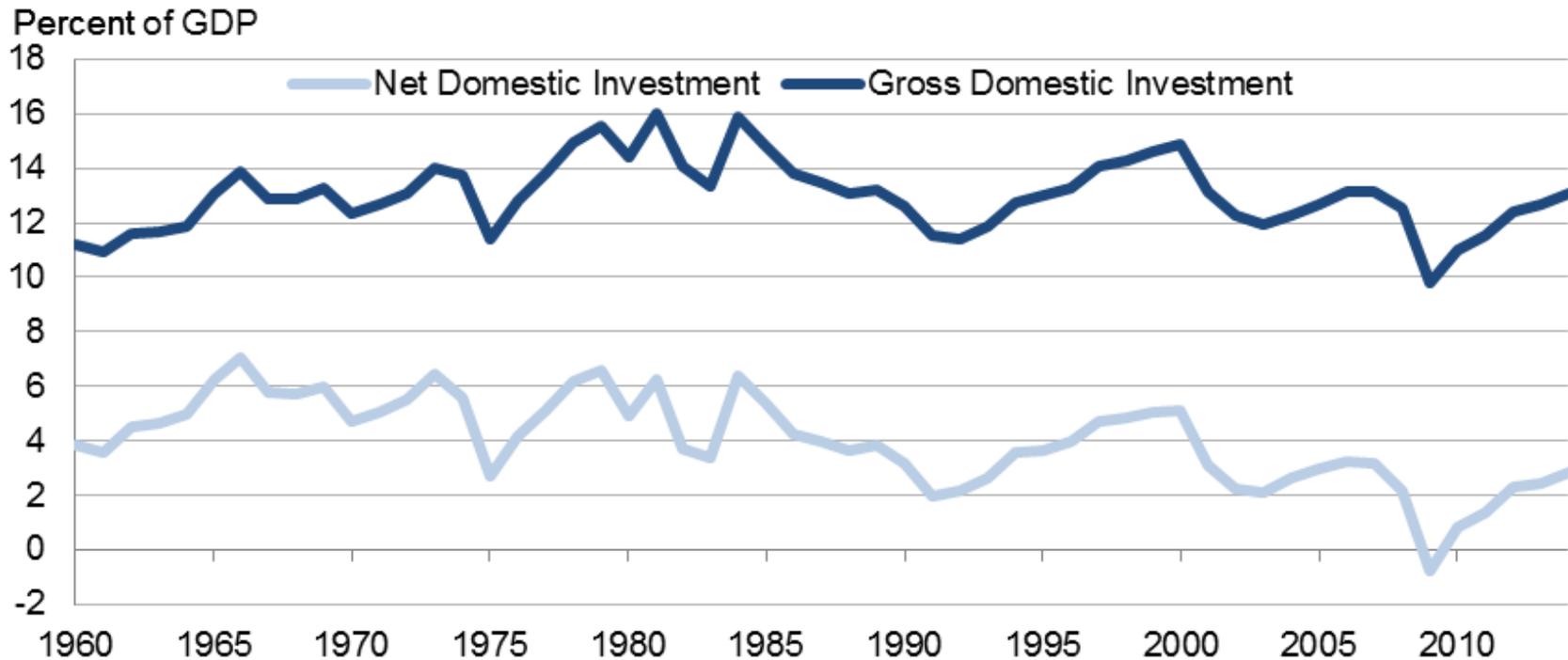
- Government borrowing costs have been declining for decades and are now at historic lows
- Widespread consensus that interest rates *will remain very low* (even as Fed raises the federal funds rate)
- What do low interest rates imply for optimal policy?
- Does it depend on why interest rates are so low?

Why might Treasury borrowing costs stay very low?

- Hypotheses:
 - Marginal product of capital will be low:
 - a. because increased saving pushing up capital/labor ratio
 - 1. Domestic preferences have changed
 - 2. Foreign preferences have changed
 - b. because productivity growth will be low
 - Risk premium will be high
 - High institutional demand for Treasuries
 - Savings glut with inelastic investment demand

Has the marginal product of capital declined? No surge in nominal investment

Figure 21: Business Investment as Share of GDP



Source: BEA via Fred.

Even though private borrowing costs have also declined

Figure 26: AA Corporate Bond Yields
Percentage points

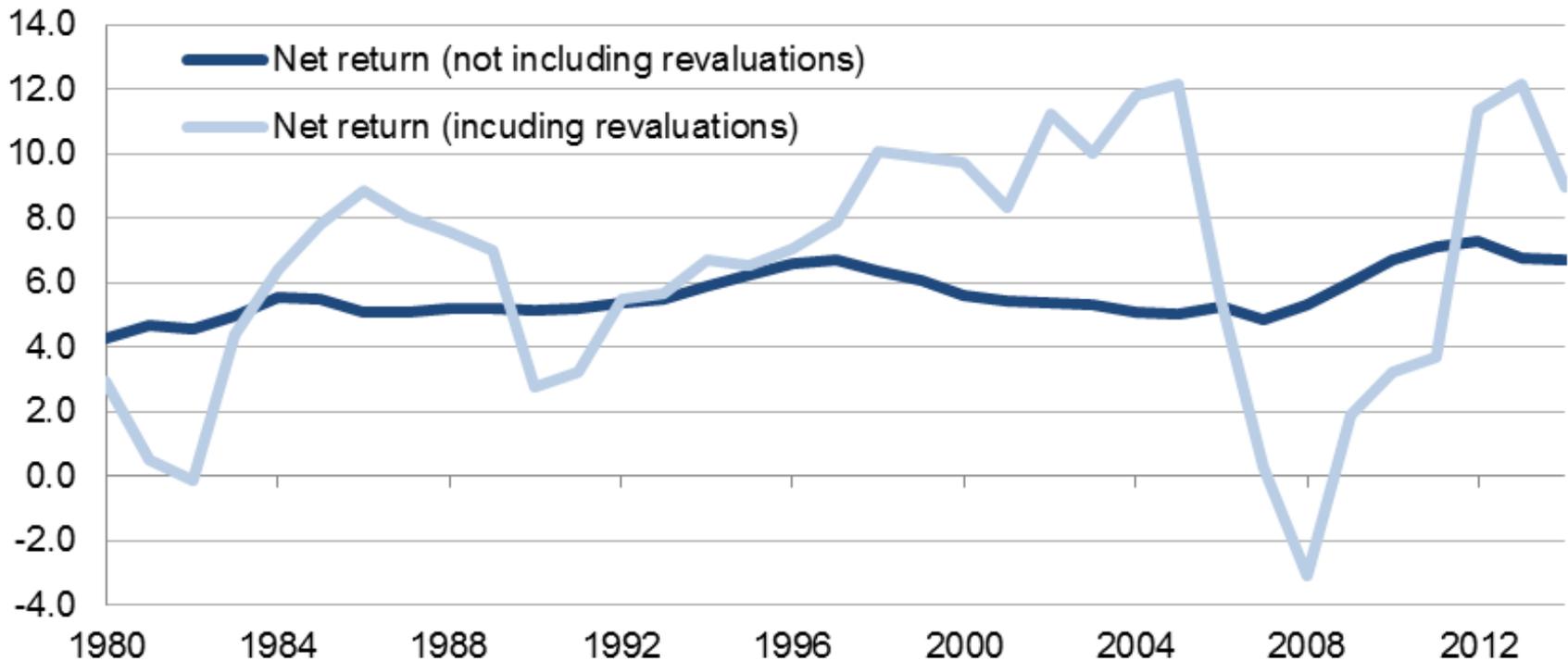


Source: Bloomberg; Federal Reserve.

Average Return to Capital

Figure 23: Average Return to Capital

Percent

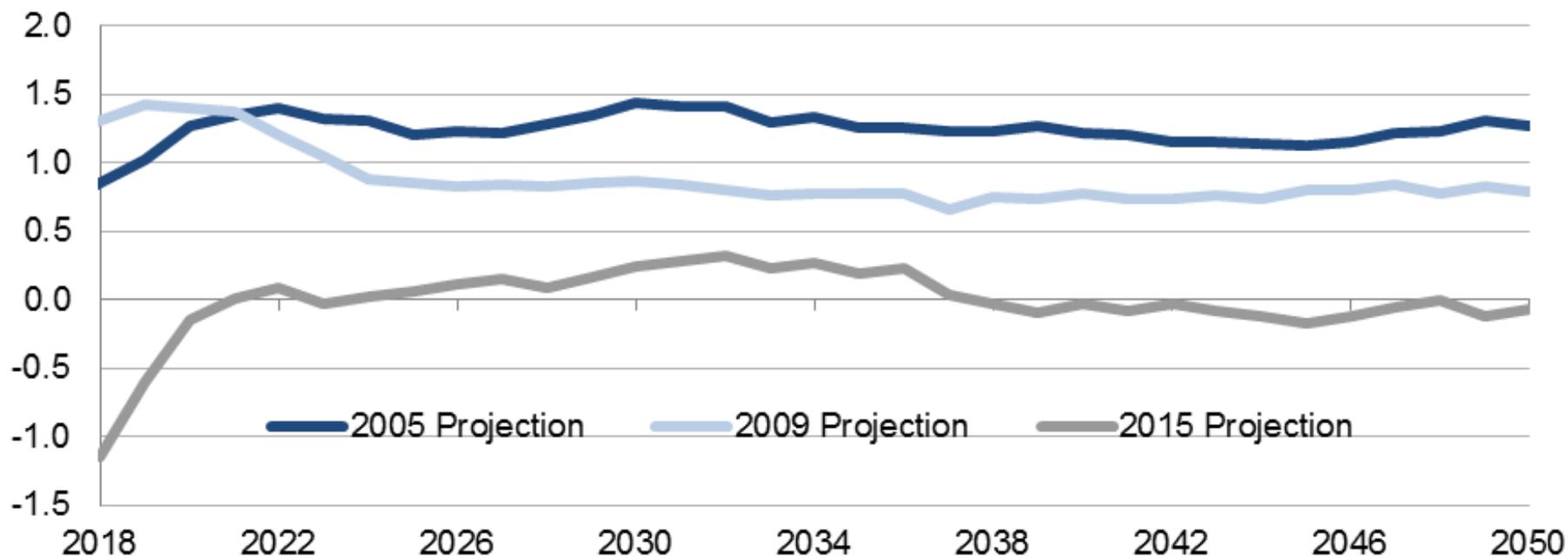


Source: BEA; Flow of Funds; Lincoln Institute (Morris and Heathcoate, 2007). See footnote 39 for details.

Is low projected productivity the reason? CBO has lowered projected interest rates relative to projected GDP growth

Figure 20: Real Interest Rate and Growth Rate Differentials

Three-year moving averages of real 10-Year Treasury rates minus real GDP growth



Source: CBO Long-Term Budget Projections (Dec. 2005, Jun. 2009, Jun. 2015).

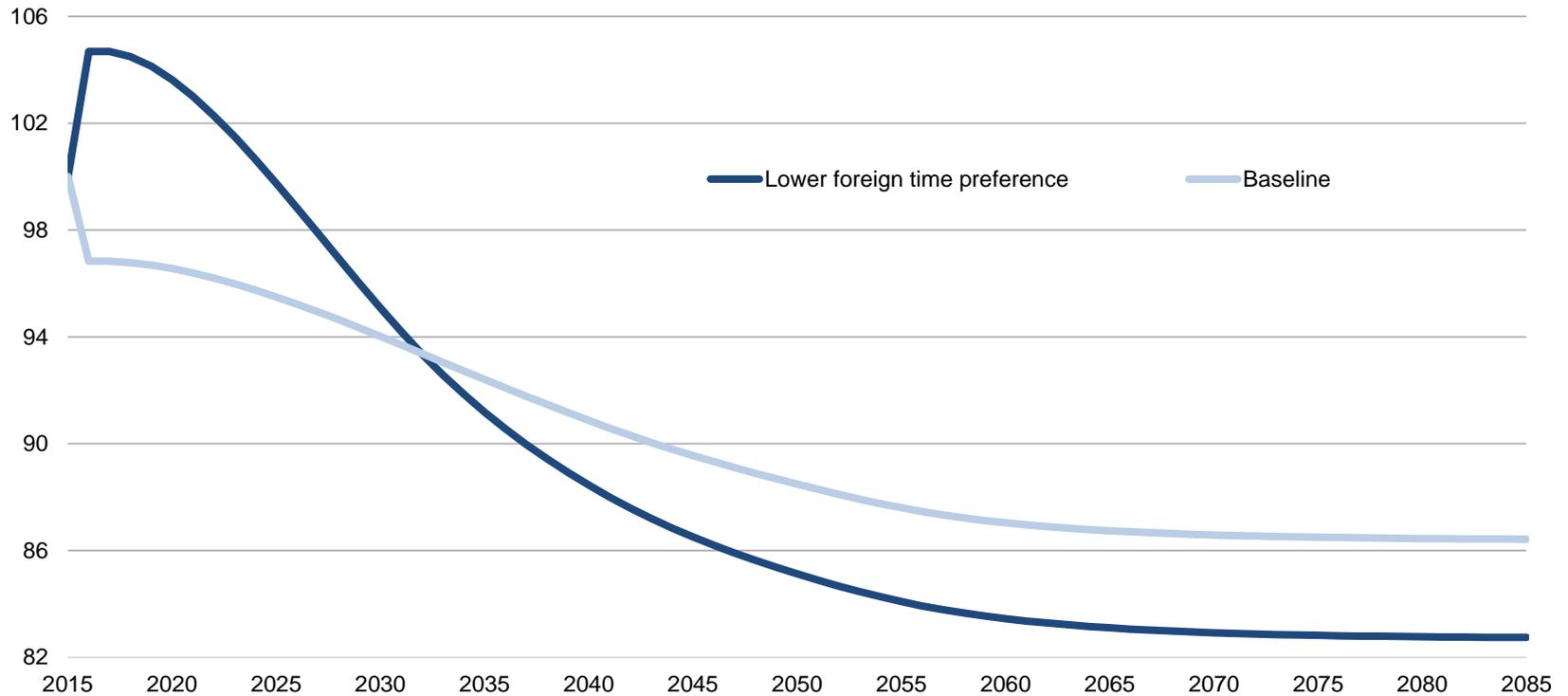
Implications of lower marginal product of capital stemming from change in time preference leading to savings glut

- If *American* required return on savings has declined as much as actual return, then
 - government should not “undo” increased savings by borrowing more, and perhaps should also increase savings
 - Unless capital beyond golden rule. Then increase consumption and increase debt.
- But, if *foreign* required return has fallen because of changes in foreign preferences (e.g. global savings glut), then optimal response is ambiguous:
 - Lower mpk means price of future consumption has increased. We will want to do less consumption smoothing.
 - But, any given level of consumption smoothing requires lower consumption now.

Model suggests “foreign savings glut” should lead to less saving

Figure 28: U.S. Consumption with Aging and Low Foreign Time Preference

Consumption index (2015 = 100)



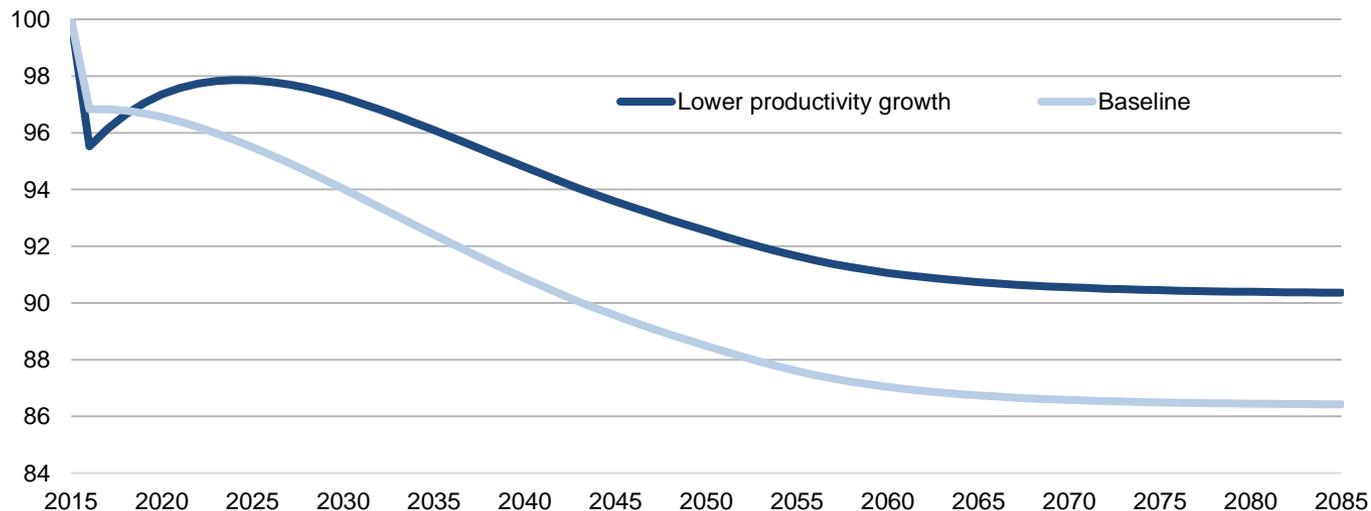
Source: World Bank (demographic inputs); National Transfer Accounts and Census (consumption weights for support ratios); authors' calculations.

What if lower rate of return reflects lower productivity growth?

- Again, theoretically ambiguous. On the one hand, we are poorer, and should lower consumption.
- On the other hand, saving is less valuable.
- With basic model, effect is to lower consumption and increase saving.
- But result does depend on model parameters.

Figure 27: U.S. Consumption with Aging and Low MFP Growth

Consumption index (2015 = 100)



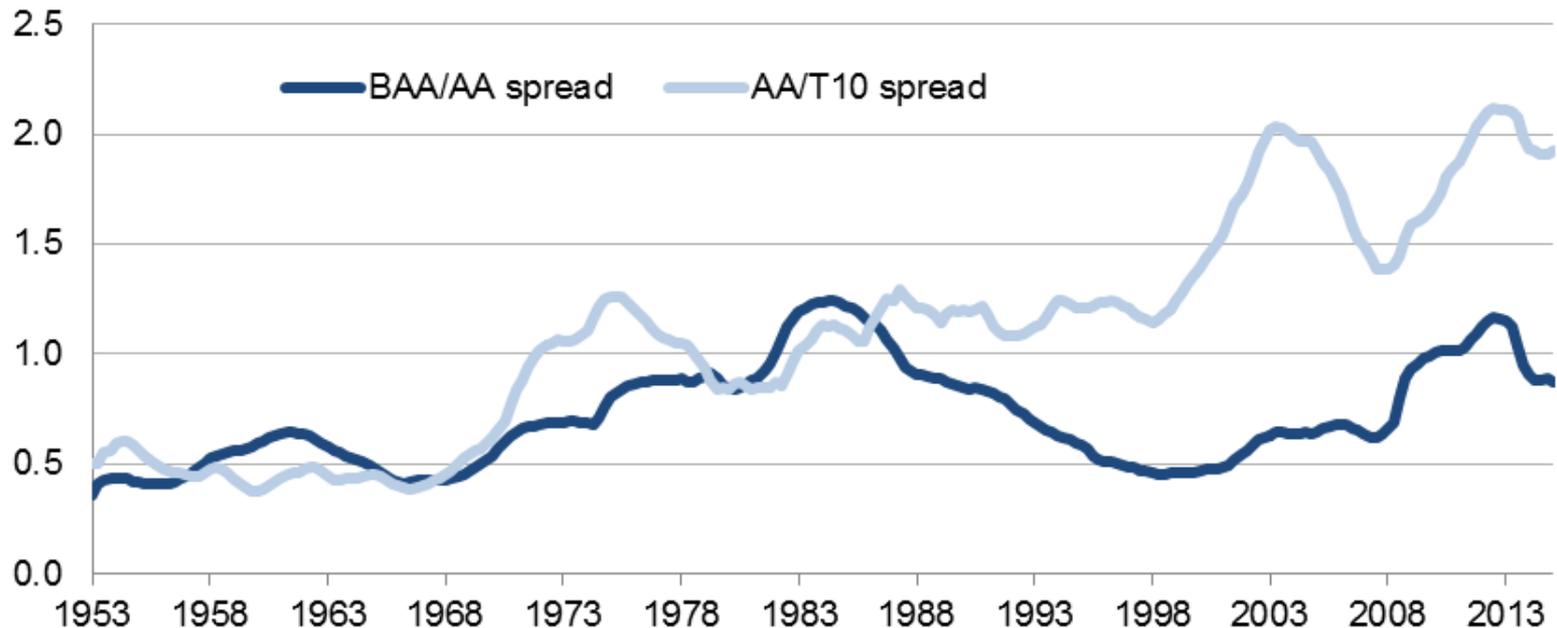
Source: World Bank (demographic inputs); National Transfer Accounts and Census (consumption weights for support ratios); authors' calculations.

What about risk premium?

- Spreads between corporate bonds of different risks don't show increasing risk premium, on average.
- Spreads between AA bonds and Treasuries up sharply, suggesting increased demand for Treasuries in particular.

Figure 24: BAA to AA and AA to 10-year spreads (5-year MA)

Percentage points



Source: Bloomberg; Federal Reserve.

Implications of higher risk premium

- Borrowing costs lower because perceived risks are higher/tolerance for risk is lower.
- Unless federal government's relative ability to bear risk has increased:
 - On a risk-adjusted basis, no change in price of present consumption relative to future consumption.
 - Wedge between return to private financial assets relative to federal borrowing costs is higher. But, higher wedge offset by higher perceived risk of private assets.
 - Government should not borrow to purchase private financial assets or increase investment.

Implications of increased institutional demand for Treasuries

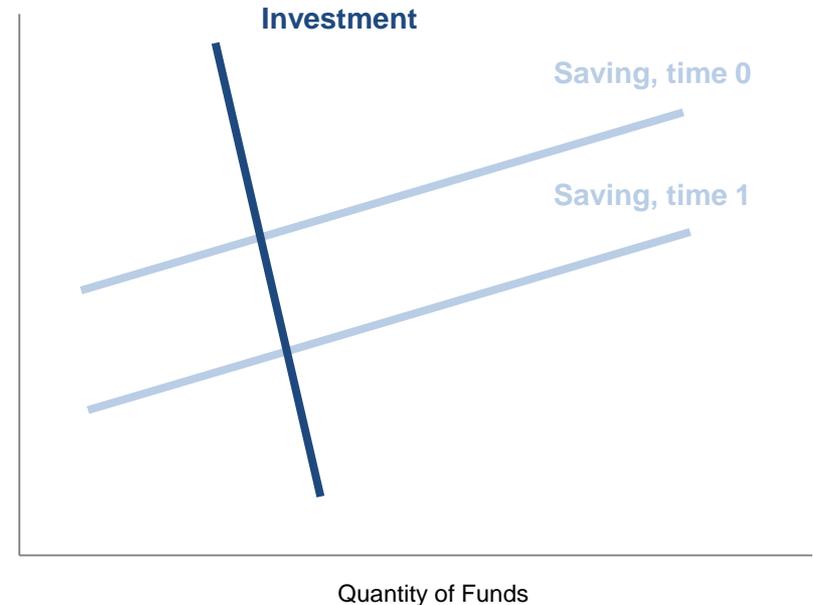
- Increased demand lowers government borrowing rate.
 - Implicit tax on investors who have to hold Treasuries.
- Happy to tax foreigners this way; less happy to tax domestic savers.
 - About $\frac{1}{2}$ of debt now foreign owned.
 - Government should supply additional debt but not enough to eliminate implicit tax.
- Debt should be used to purchase private assets and/or invest in public investment projects.
- Debt should also be used to raise current consumption, because income effect from foreigners makes us richer.

Global savings glut with inelastic investment demand

- Investment not much affected by interest rates – so mpk little changed
- ⇒ Lower interest rates, not much increase in investment or saving
- ⇒ Business profits high: low borrowing costs, high marginal return to capital (seems to fit)
- Potential for Secular Stagnation: Increased savings desire without increased investment demand leads to lower output

Inelastic Investment, Elastic Savings

Interest rate



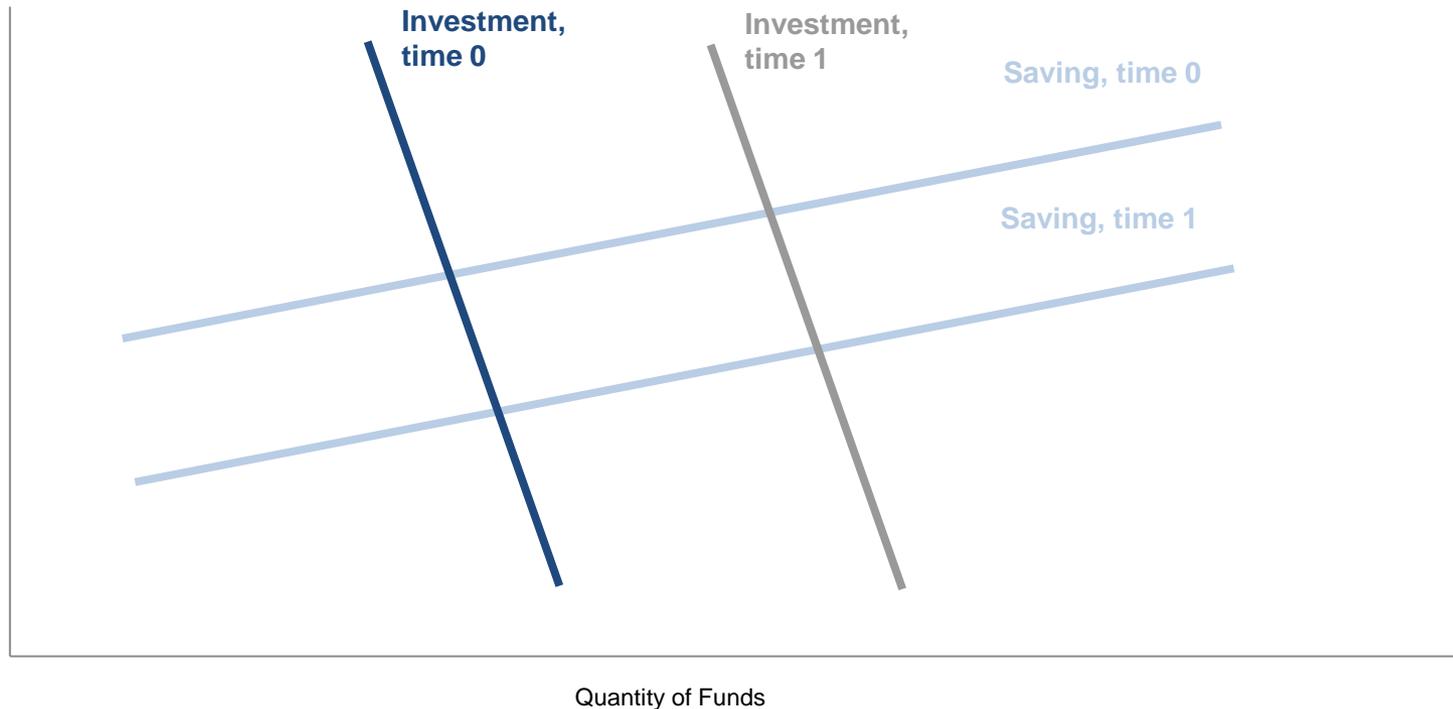
Implications of global savings glut with inelastic investment demand

- Marginal product of capital little changed, so little change in price of future consumption relative to current consumption.
- But if secular stagnation story, government needs to boost consumption
- Government should also increase public investment.
- This will allow saving to increase.

Increase in public debt and public investment boost return to saving and increase national investment

Figure 29: Inelastic Investment, Elastic Savings (cont.)

Interest rate



Considering the zero-lower bound

- Persistently low interest rates increase possibility of hitting effective lower bound.
- Unless other measures taken (e.g., raising inflation), this calls for higher debt to boost the level of interest rates.
- In addition, automatic stabilizers should be increased.

Public Investment

- Low interest rates make clear case for increased public investment, which includes anything that increases future output.
- Public investment includes physical infrastructure, R&D, education, health spending, even income transfers to poor households.
- Federal investment that yields a social return (including any costs of DWL from financing) $>$ borrowing cost on risk-adjusted basis should be undertaken.
- Investment generally should be debt financed. Either investment doesn't yield a high-enough-return to cover borrowing costs, in which case it shouldn't be done, or it does, in which case current consumption need not fall.

Federal Budget Perspective

- Analysis on effects of low interest rates on optimal consumption so far from macro perspective
- Nation is at most a small net debtor so not better off or worse off from low interest rates
- But federal government is a net debtor, so better off
- Private sector then net saver, so worse off
- Federal government perhaps should increase consumption in order to offset reductions in consumption by savers in order to keep consumption from falling more than is optimal

Conclusions

- Population aging means we will eventually need to lower spending, increase taxes and increase labor force participation.
- If interest rates were higher, those actions should begin to be taken now.
- CBO's projected deficits already assume significant future deficit reduction, making the case for somewhat greater amount of deficit reduction in the near term.
- Effect of low interest rates on optimal consumption depend on why interest rates are low, but most reasons suggest current consumption decline should be smaller than if interest rates were higher.
- Low interest rates should induce increased debt-financed public investment.