

For Whom the Bill Tolls: Distributing the Costs of Maintaining Social Security Solvency

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The views expressed in this paper are those of the author and should not be
interpreted as those of the Congressional Budget Office.

Problem How can we evaluate the distributional consequences of various resolutions to Social Security insolvency when they have different risk characteristics?

Example How to treat equity premium in reform analysis?

Solution Use Monte Carlo analysis so scenarios with different risk characteristics are comparable

Risks Include economic (wages, inflation, asset returns) and policy (benefit cuts/tax increases when system becomes insolvent)

Model

- SSA actuaries' aggregate trust fund budget model
- Time-series equations for economic and demographic inputs
- Example worker micro model

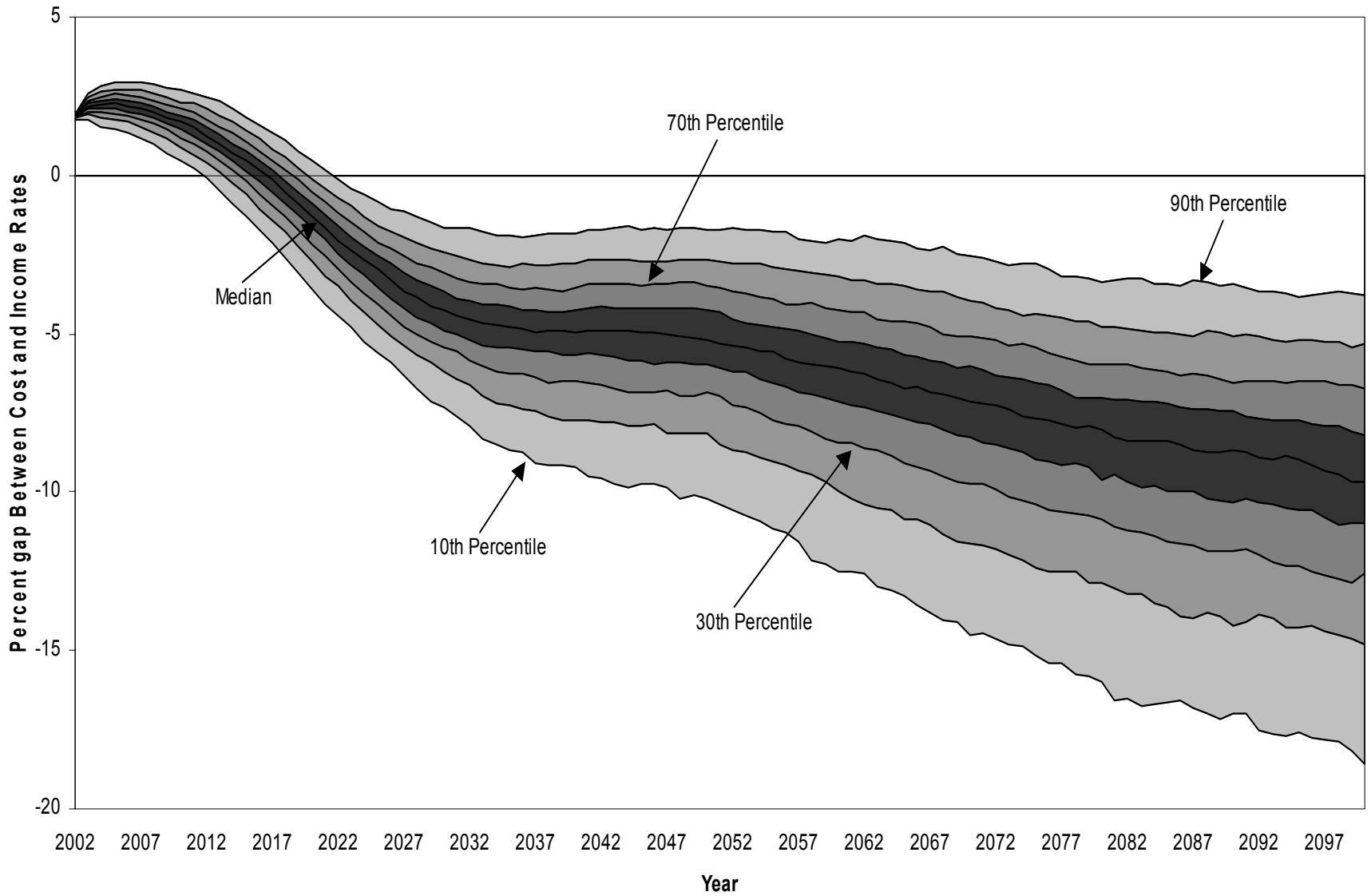
Trust Fund Budget Model

- Predicts how aggregate Social Security finances will change as economic and demographic inputs and/or policy rules change
- Tested against actuaries' results

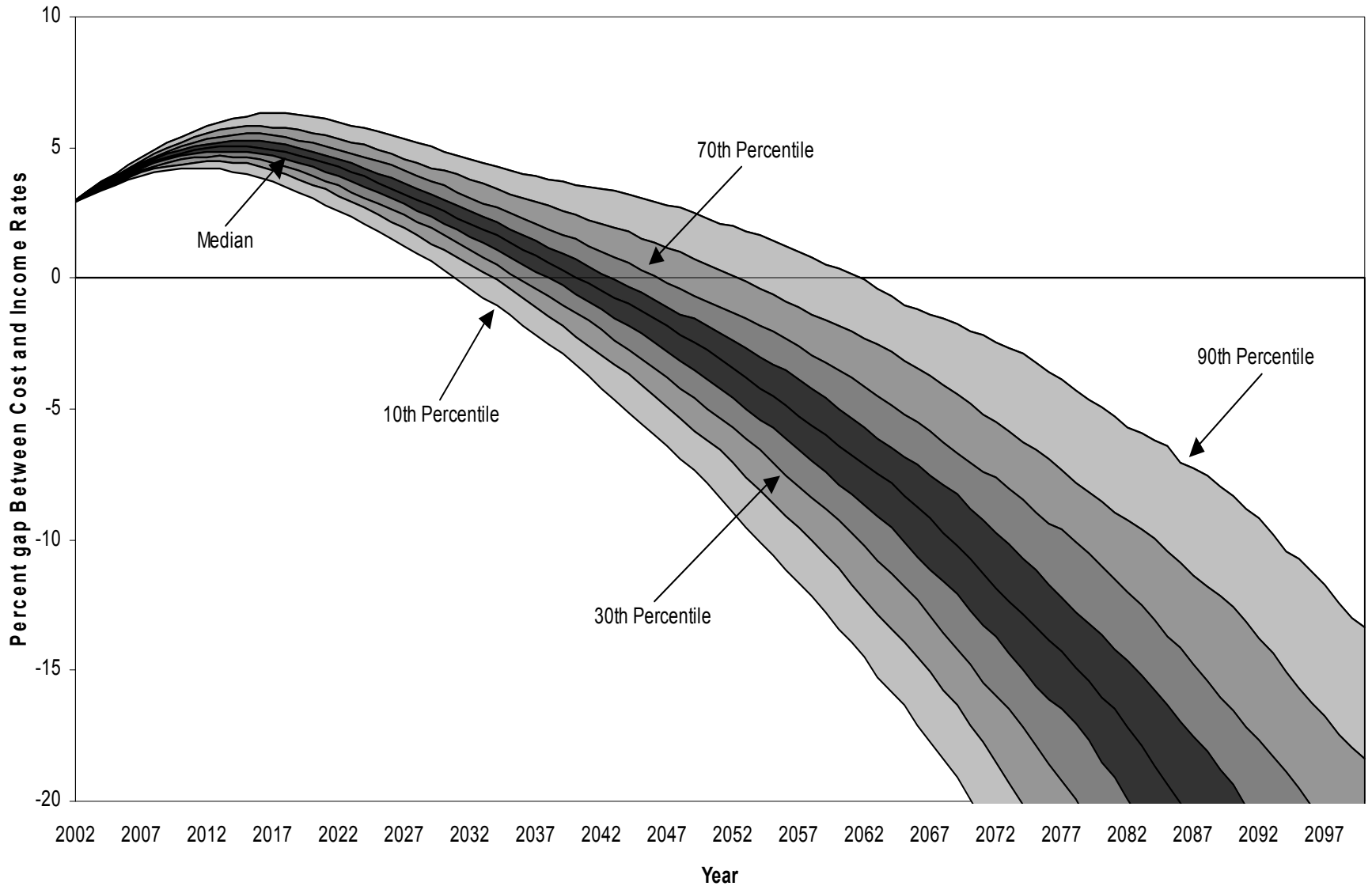
Time Series Equations

- Mortality, fertility, immigration
- Unemployment, inflation, wage growth, interest rates, DI incidence
- Corporate equities and bonds

**Figure 3: Distribution of Gap Between Cost and Income Rates
Current Law, No Fail-Safe (Insolvent System)**



**Figure 4: Distribution of Trust Fund Ratios
Current Law, No Fail-Safe (Insolvent System)**



Representative Worker Model

-Model tracks outcomes for low, medium, high “scaled” earners

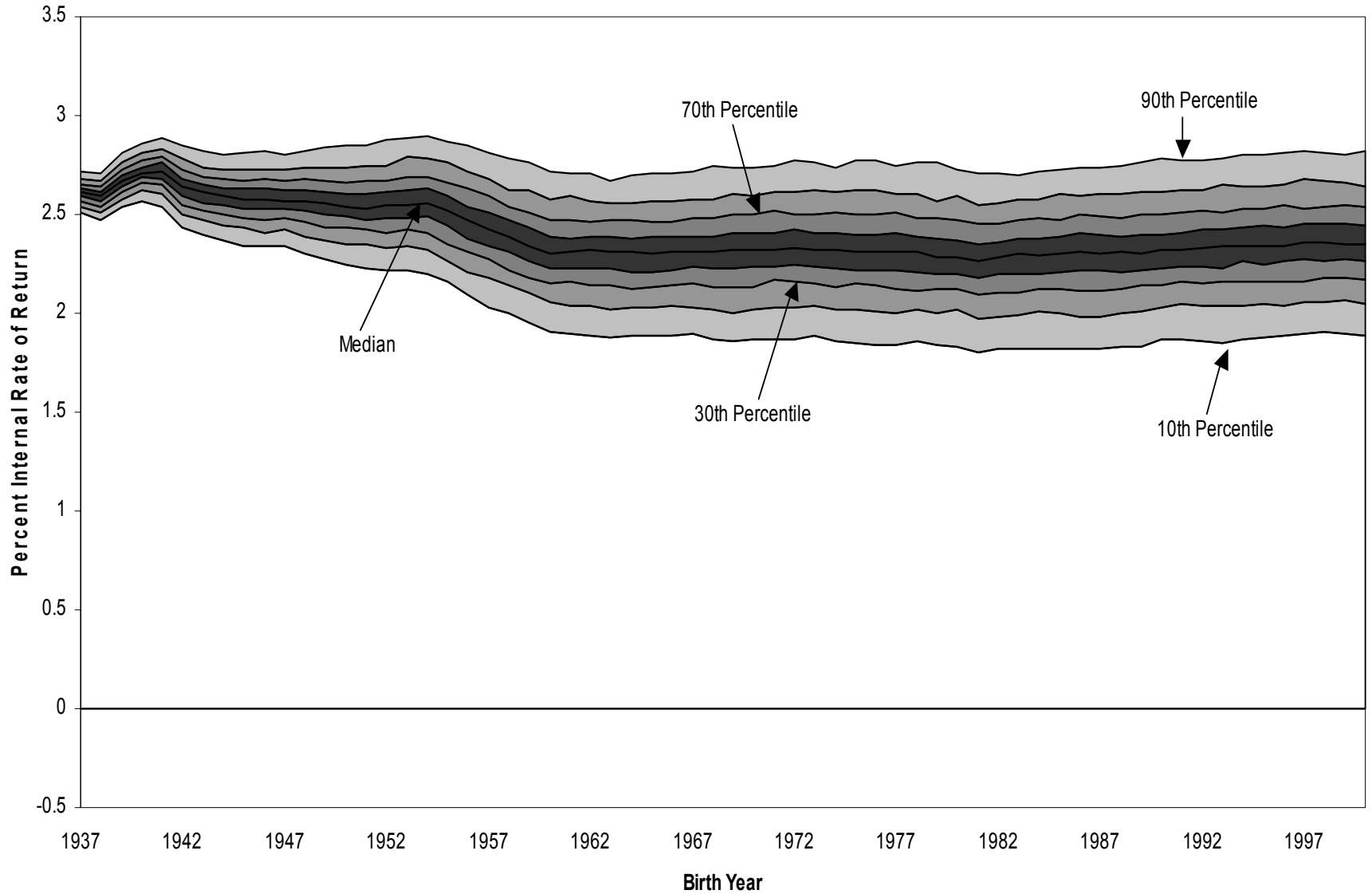
-Earnings profiles from historical SSA data, actual outcomes vary with stochastic realizations for wages, inflation, mortality

Risks and Return

-Measure returns using IRR;
integrates taxes, benefits, and life
expectancy

-Even under the current law
(insolvent) system there is
uncertainty about IRR outcomes

**Figure 1: Distribution of Internal Rates of Return
Current Law, No Fail-Safe (Insolvent System)**

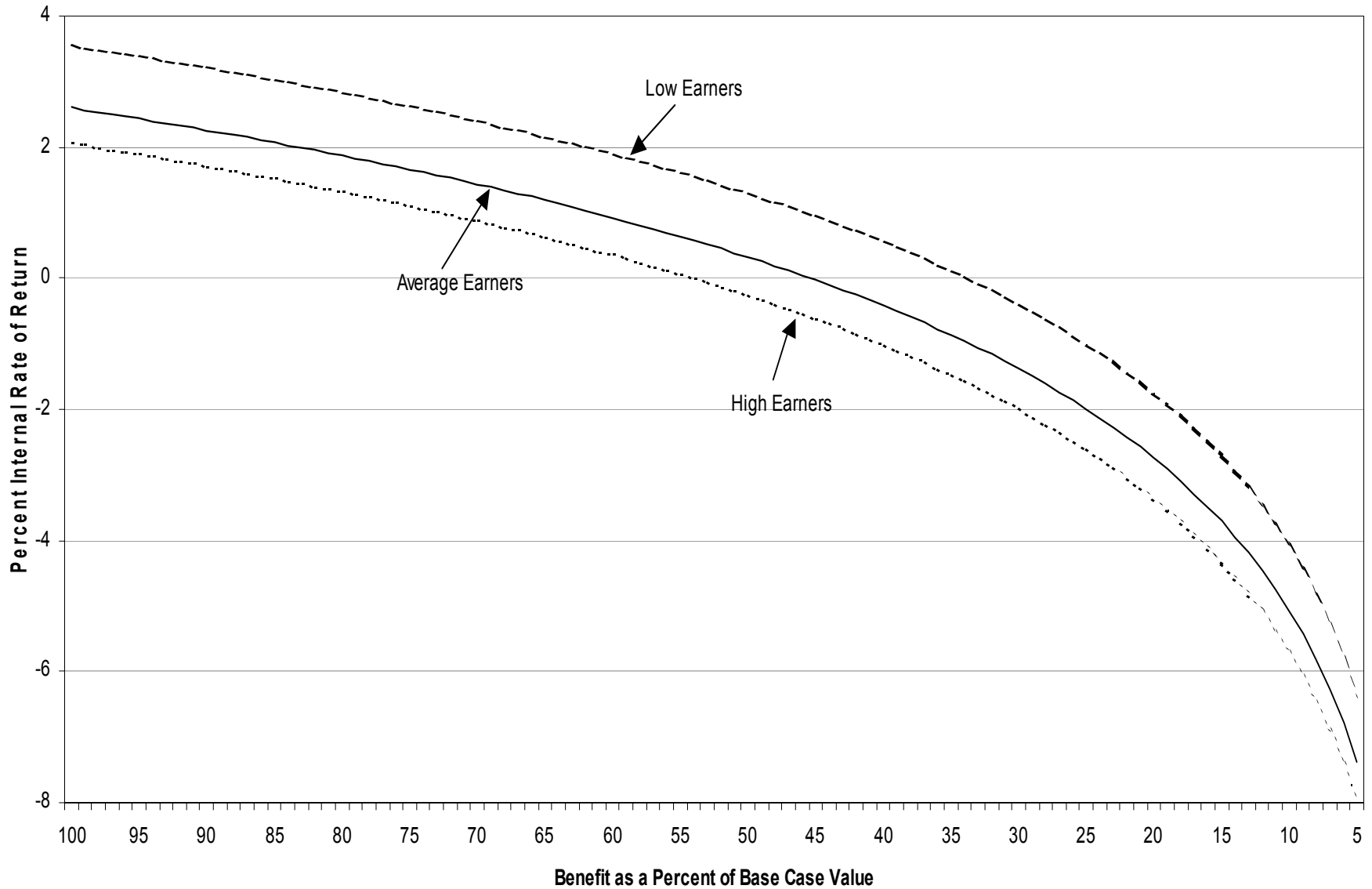


Range of Outcomes

-Median IRR for 2000 birth cohort is 2.32%, 10th percentile is 1.89%, 90th percentile is 2.82%

-10th percentile is equivalent to a benefit 20% below median

**Figure 2: Benchmark Relationship Between IRRs and Benefit Cuts
(1937 Birth Cohort)**

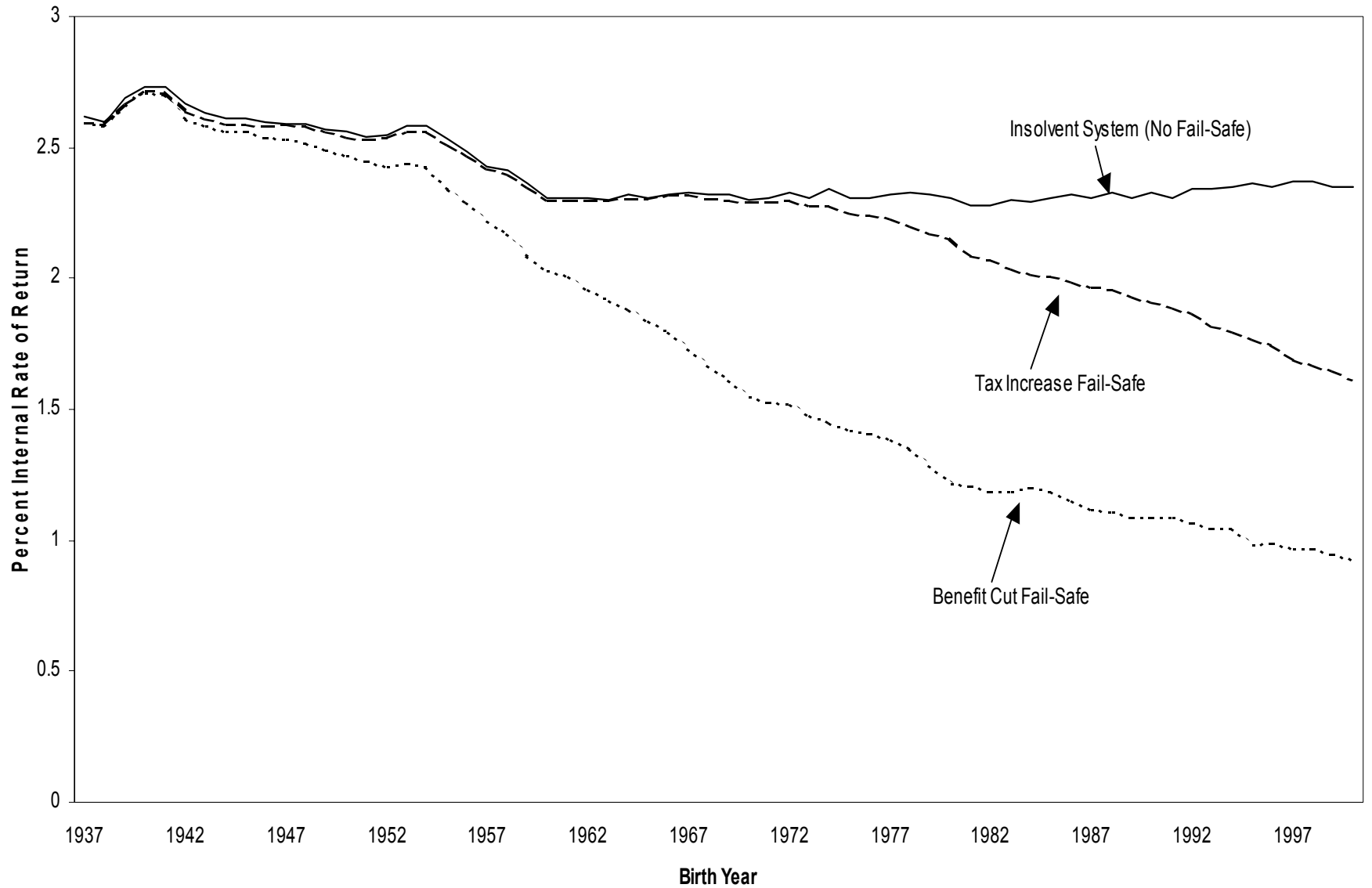


Fail-Safes

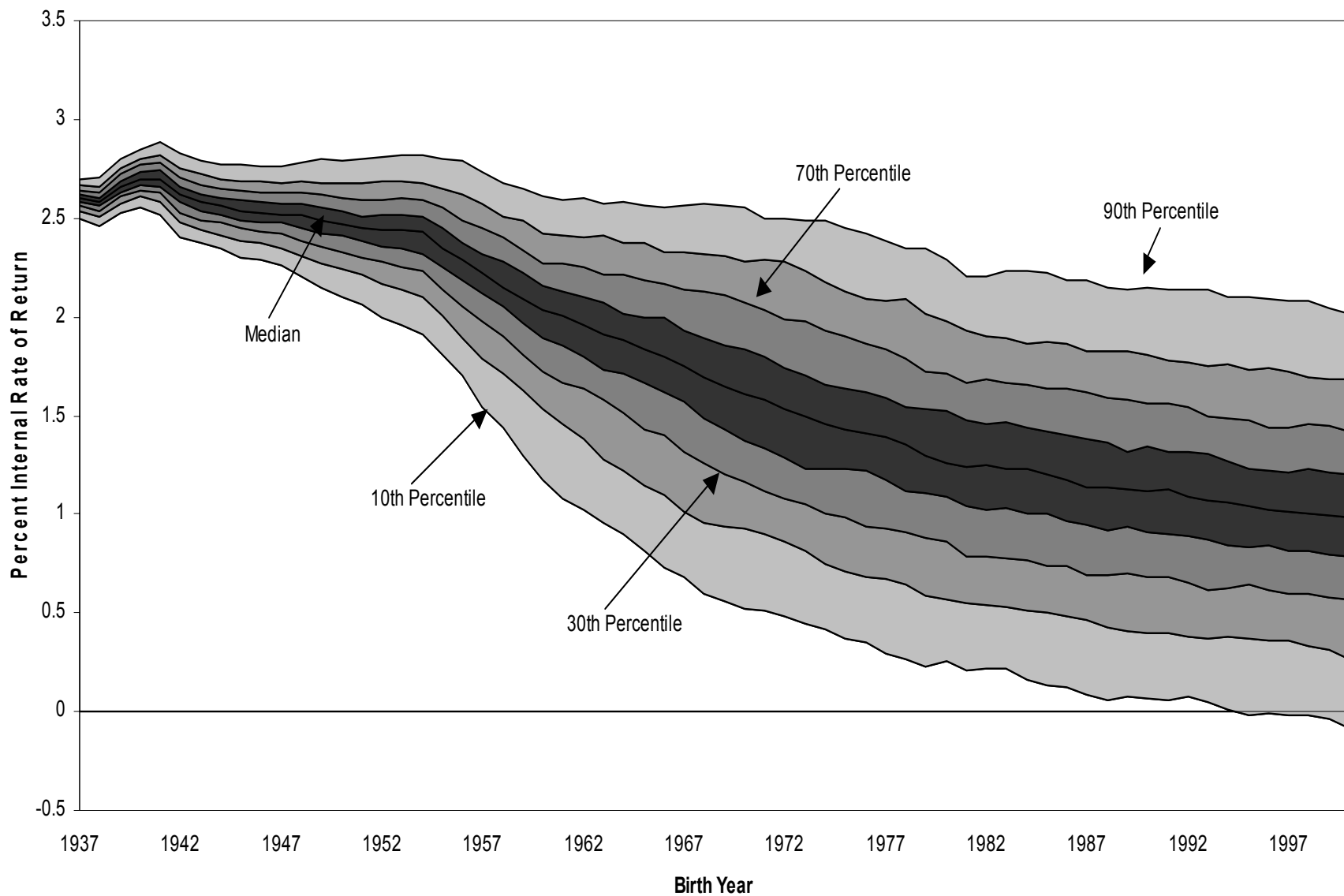
-IRRs under insolvent system not informative wrt reform options

-Two potential baselines with “fail-safe” provisions; benefits-payable (PCSSS) or tax-increase

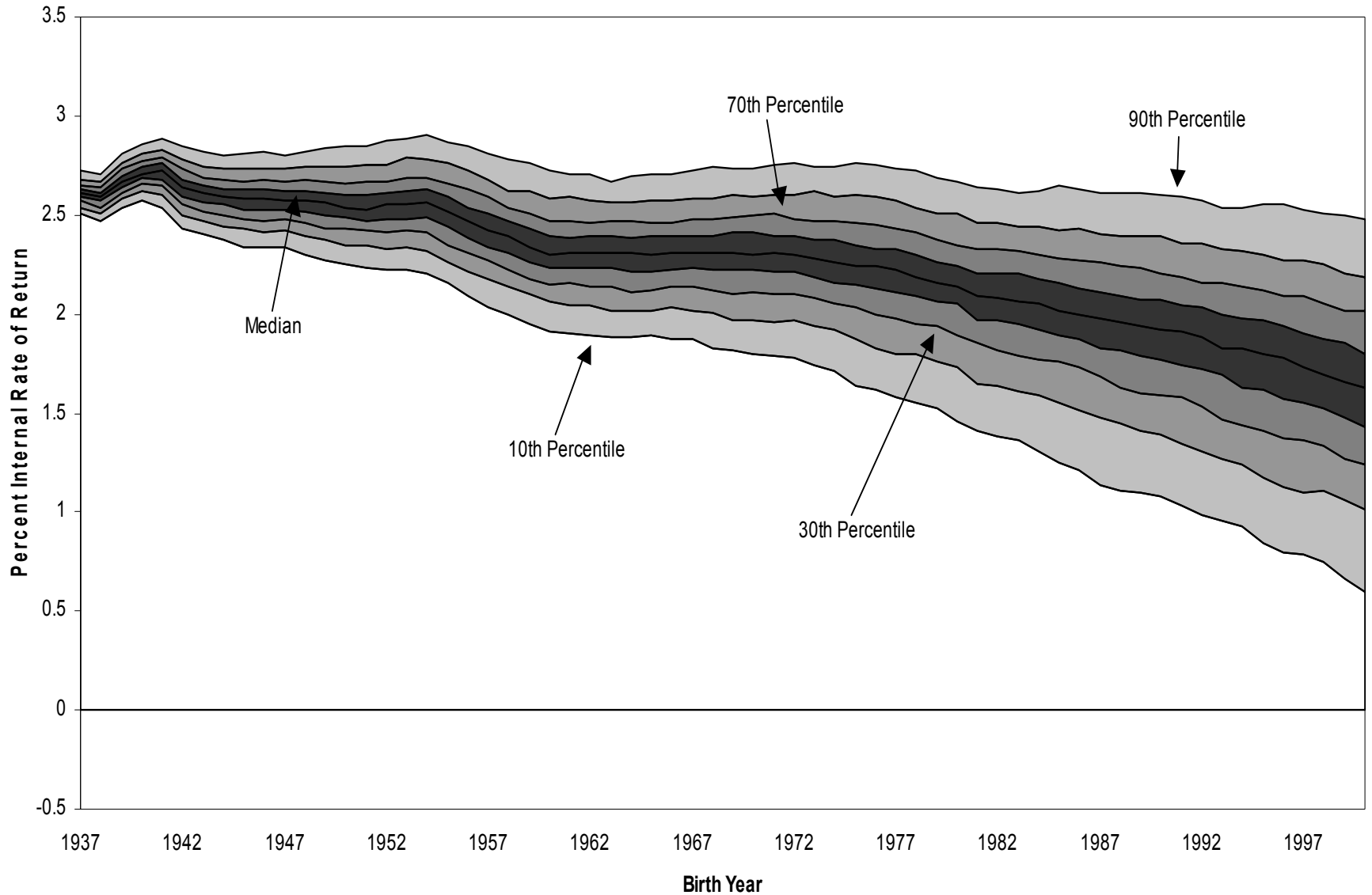
**Figure 5: Median Internal Rates of Return by Birth Cohort
(Average Workers Under Current Law)**



**Figure 6: Probability Distribution of Internal Rates of Return for Average Workers
Current Law with Benefit Cut Fail-Safe**



**Figure 8: Probability Distribution of Internal Rates of Return for Average Workers
Current Law with Tax Increase Fail-Safe**



Reforms

- Compare to benefits payable
- Consider
 1. NRA increase to 70
 2. (1)+12.5% Benefit Cut 2007
 3. (1)+50% Trust Fund Equity
 4. (1)+2% PCSSS-style IA
 5. (2)+2% PCSSS-style IA

Figure 13: Median Internal Rates of Return by Birth Cohort
(Average Workers Under Current Law and Increased Normal Retirement Age to 70)

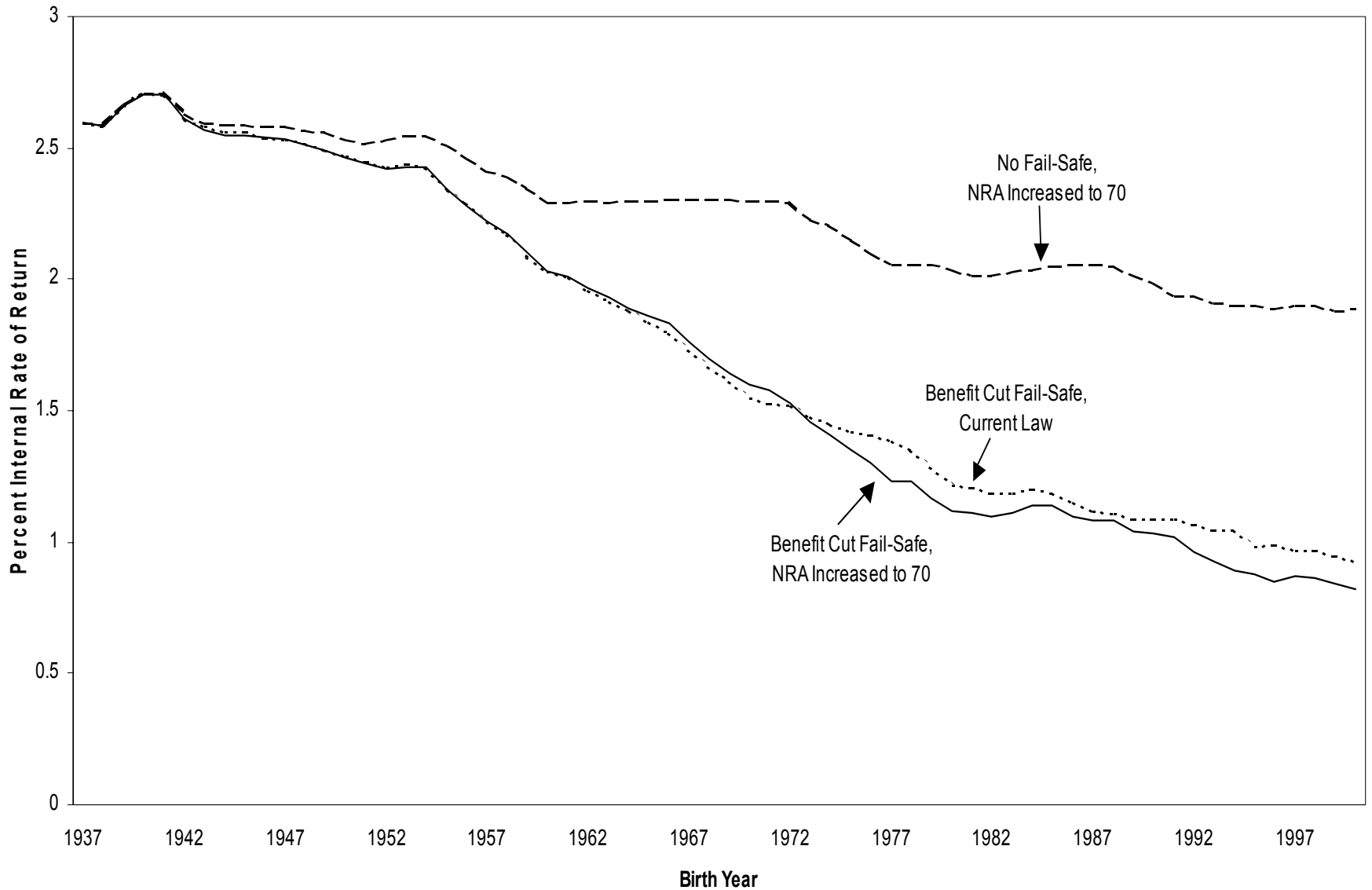


Figure 14: Median Internal Rates of Return by Birth Cohort
(Average Workers, Increased NRA and Benefit Cut Fail-Safe, Various Reforms)

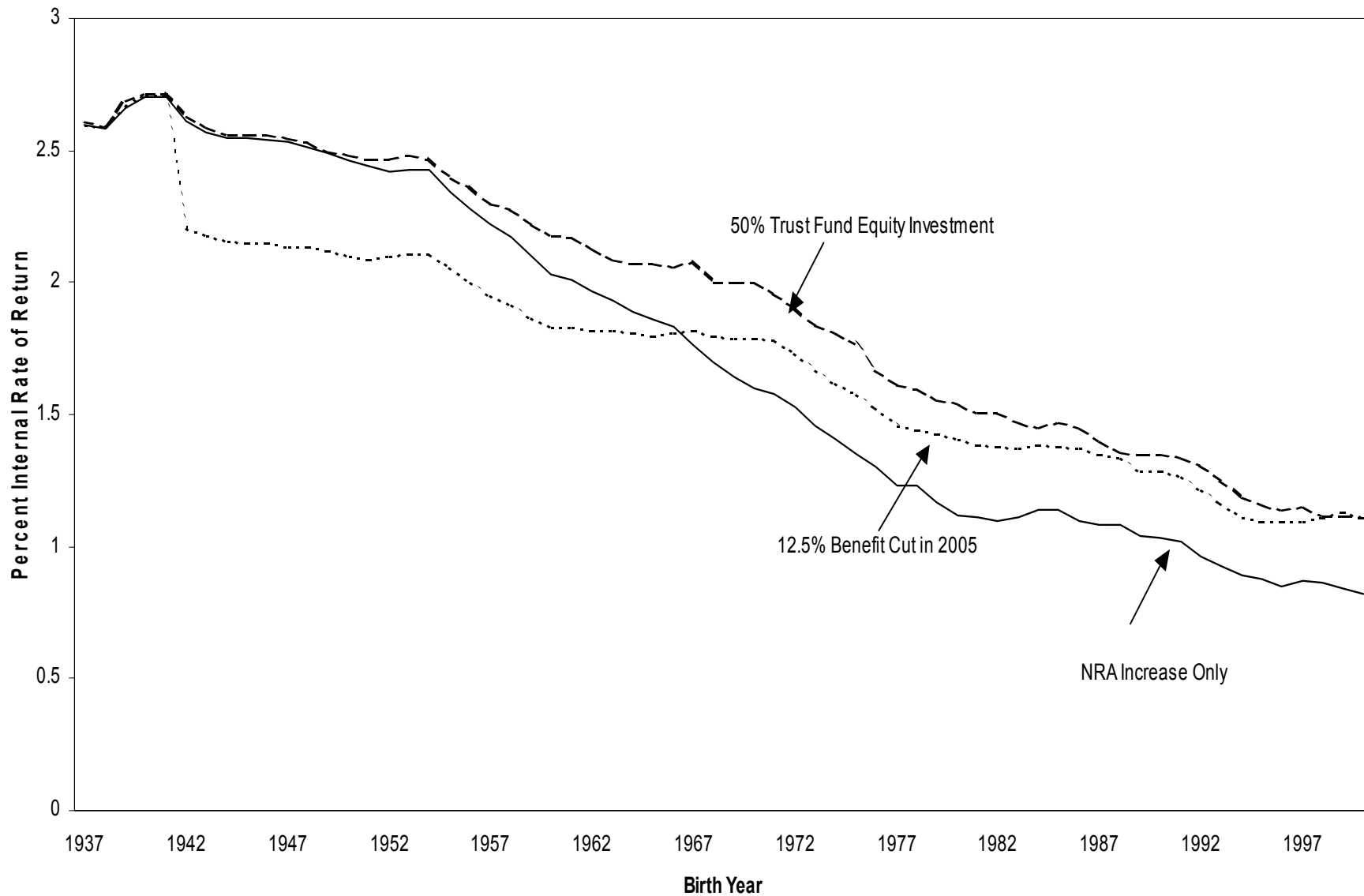


Figure 15: Median Internal Rates of Return by Birth Cohort
(Average Workers, Increased NRA and Benefit Cut Fail-Safe, Various Reforms)

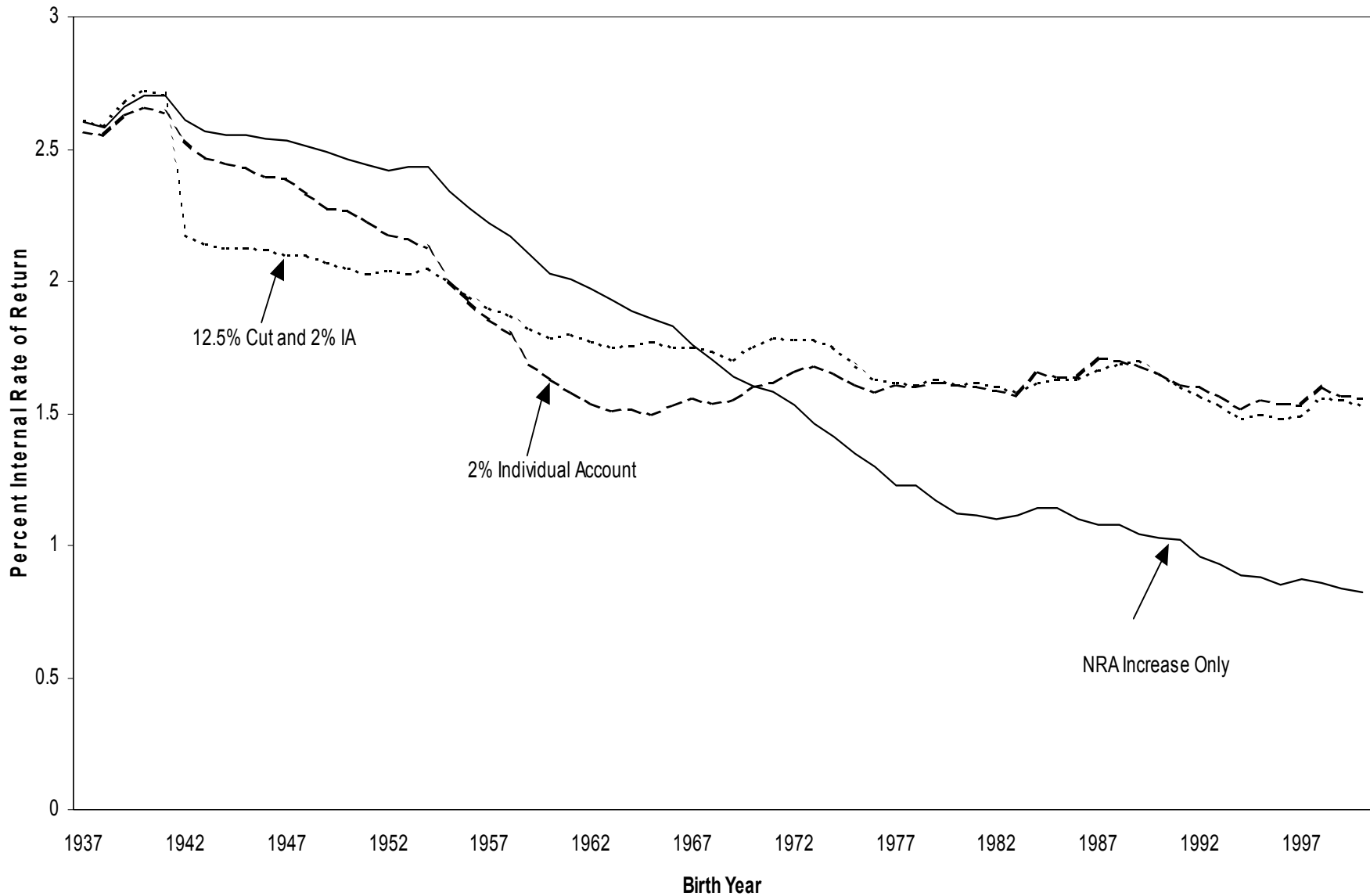


Table 3**IRR Deciles for Average Earners by Birth Cohort Under Various Reform Scenarios****(All Simulations Start with NRA Increase to Age 70 and Benefit Cut Fail-Safe)**

| | Percentile of IRR Probability Distribution | | | | |
|--|---|-------------|---------------|-------------|-------------|
| | 10th | 30th | Median | 70th | 90th |
| 1940 Birth Cohort | | | | | |
| <i>Base Reform (NRA Change Only)</i> | 2.54 | 2.63 | 2.70 | 2.76 | 2.86 |
| <i>12.5% New Award Reduction Starting 2007</i> | 2.56 | 2.65 | 2.71 | 2.77 | 2.85 |
| <i>50% Trust Fund Equity Investment</i> | 2.56 | 2.66 | 2.72 | 2.77 | 2.86 |
| <i>2% Individual Account Carve Out</i> | 2.45 | 2.58 | 2.66 | 2.73 | 2.80 |
| <i>12.5% Award Reduction and 2% Individual Account</i> | 2.54 | 2.65 | 2.72 | 2.76 | 2.85 |

Table 3

IRR Deciles for Average Earners by Birth Cohort Under Various Reform Scenarios

(All Simulations Start with NRA Increase to Age 70 and Benefit Cut Fail-Safe)

| | Percentile of IRR Probability Distribution | | | | |
|--|--|------|--------|------|------|
| | 10th | 30th | Median | 70th | 90th |
| 1955 Birth Cohort | | | | | |
| <i>Base Reform (NRA Change Only)</i> | 1.78 | 2.11 | 2.34 | 2.54 | 2.79 |
| <i>12.5% New Award Reduction Starting 2007</i> | 1.64 | 1.88 | 2.06 | 2.22 | 2.42 |
| <i>50% Trust Fund Equity Investment</i> | 1.83 | 2.22 | 2.40 | 2.60 | 2.81 |
| <i>2% Individual Account Carve Out</i> | 1.24 | 1.69 | 2.00 | 2.31 | 2.72 |
| <i>12.5% Award Reduction and 2% Individual Account</i> | 1.33 | 1.75 | 2.00 | 2.22 | 2.46 |

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| | Percentile of IRR Probability Distribution | | | | |
|--|--|------|--------|------|------|
| | 10th | 30th | Median | 70th | 90th |
| 1970 Birth Cohort | | | | | |
| <i>Base Reform (NRA Change Only)</i> | 0.55 | 1.19 | 1.60 | 2.10 | 2.54 |
| <i>12.5% New Award Reduction Starting 2007</i> | 0.83 | 1.48 | 1.79 | 2.02 | 2.28 |
| <i>50% Trust Fund Equity Investment</i> | 0.75 | 1.47 | 2.00 | 2.31 | 2.58 |
| <i>2% Individual Account Carve Out</i> | 0.50 | 1.22 | 1.60 | 2.05 | 2.55 |
| <i>12.5% Award Reduction and 2% Individual Account</i> | 0.58 | 1.30 | 1.75 | 2.13 | 2.53 |

Table 3**IRR Deciles for Average Earners by Birth Cohort Under Various Reform Scenarios****(All Simulations Start with NRA Increase to Age 70 and Benefit Cut Fail-Safe)**

| | Percentile of IRR Probability Distribution | | | | |
|--|---|-------------|---------------|-------------|-------------|
| | 10th | 30th | Median | 70th | 90th |
| 1985 Birth Cohort | | | | | |
| <i>Base Reform (NRA Change Only)</i> | -0.03 | 0.66 | 1.14 | 1.58 | 2.06 |
| <i>12.5% New Award Reduction Starting 2007</i> | 0.09 | 0.89 | 1.38 | 1.66 | 2.00 |
| <i>50% Trust Fund Equity Investment</i> | 0.20 | 0.90 | 1.47 | 1.88 | 2.28 |
| <i>2% Individual Account Carve Out</i> | 0.37 | 1.07 | 1.56 | 1.97 | 2.55 |
| <i>12.5% Award Reduction and 2% Individual Account</i> | 0.41 | 1.18 | 1.63 | 2.04 | 2.62 |

Table 3**IRR Deciles for Average Earners by Birth Cohort Under Various Reform Scenarios****(All Simulations Start with NRA Increase to Age 70 and Benefit Cut Fail-Safe)**

| | Percentile of IRR Probability Distribution | | | | |
|--|---|-------------|---------------|-------------|-------------|
| | 10th | 30th | Median | 70th | 90th |
| 2000 Birth Cohort | | | | | |
| <i>Base Reform (NRA Change Only)</i> | -0.32 | 0.38 | 0.82 | 1.28 | 1.80 |
| <i>12.5% New Award Reduction Starting 2007</i> | -0.25 | 0.53 | 1.11 | 1.45 | 1.83 |
| <i>50% Trust Fund Equity Investment</i> | -0.17 | 0.57 | 1.11 | 1.65 | 2.08 |
| <i>2% Individual Account Carve Out</i> | 0.13 | 1.07 | 1.56 | 1.97 | 2.55 |
| <i>12.5% Award Reduction and 2% Individual Account</i> | 0.13 | 1.02 | 1.53 | 1.89 | 2.50 |

Conclusions

- Can compare reforms with different risk characteristics
- Distributional outcomes could vary significantly
- Who should support reforms?