Government Subsidized Individual Retirement System

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Motivation

- Savings rate is very low in Turkey and it is following a declining trend.
- Downward movement of the savings rate: Due to declining private savings. figure1
- A new policy tool designed to remedy this problem: Individual retirement system
- The system started to operate in 2003 and modified in 2013
- The incentive mechanism in the new system are the 25% government contributions made to the individual retirement accounts.

Objective

- A quantitative evaluation of the impacts of the new private pension scheme on
  - Net savings rate
  - Capital stock
  - Welfare (through implied changes in taxes and factor returns)

Related Literature

- The literature mainly focuses on the impact of individual retirement accounts on savings
- Imrohoroglu et al. (1998)
  - Analyze the impacts of tax-favored retirement accounts on net saving rate and capital stock for the U.S.
  - A general equilibrium OLG setting
  - Findings: With a modest IRA (Individual Retirement Accounts) contribution limit
    1. The capital stock increases by nearly 6%.
    2. 9 % of the IRA contributions are incremental savings
    3. Net national saving rate increases from 5.1 to 5.4 %

Related Literature

- Ozel and Yalcin (2013)
  - Cross country analysis of the private pension schemes and saving relation
  - Savings rate increase by 1.5 % points 7 years after the implementation of the private pension system

A Brief Look at the Individual Retirement System

- Retirement: 10 years of contribution and 56 years of age
- Supplementary direct contribution by government: 25% of the individual contributions
- Individuals have the right to collect a certain fraction ($\kappa(t_j, j)$) of government contributions depending on their age and the no. of years of contribution

$$\kappa(t_j, j) = \begin{cases} 0\% & \textit{if} \quad t_j < 3 \\ 15\% & \textit{if} \quad 3 \leq t_j < 6 \\ 35\% & \textit{if} \quad 6 \leq t_j < 10 \\ 60\% & \textit{if} \quad t_j \geq 10 \quad \textit{and} \quad j < 36 \\ 100\% & \textit{if} \quad t_j \geq 10 \quad \textit{and} \quad j \geq 36 \end{cases} \tag{1}$$

j= age and t_j= number of years of contribution

- Tax deductions: Capital taxes on assets in individual retirement accounts upon exit

$$\tau_b(t_j, j) = \begin{cases} 5\% & \textit{if} \quad t_j \geq 10 \quad \textit{and} \quad j \geq 36 \\ 10\% & \textit{if} \quad t_j \geq 10 \quad \textit{and} \quad j < 36 \\ 15\% & \textit{if} \quad t_j < 10 \end{cases}$$

- Insurance firms charge fees
  - Management fee ω on periodic contributions (determined by retirement institutions) $\leq 2\%$
  - Operation fee ϕ(applied daily to net total assets in private pension accounts)$\leq$ 1.9% annual
- Maximum amount of annual government contribution: 25% of annual gross minimum wage

Statistics about the Individual Retirement System

	2013	**2014**
No. of participants(million)	4.15	4.97
Total Assets(billion TL)	25.14	33.94
Total Individual Contributions(billion TL)	21.9	27.49

Model

- J period OLG model $ex - ante$ identical individuals
- Probability of survival from age j to age j+1 is ψ_{j+1}
- Retire at $j^* = 50$ and die at the age of $J = 85$ with certainty
- No unemployment in the model
- Invest in two different assets
  - Ordinary assets a_j and the IRA balance at the end of age j b_j
  - Liquidity constraint i.e. $a_j \geq 0$. Not allowed to borrow against their IRA balances $b_j \geq 0$
  - x_j are the periodic (yearly) contributions made to the individual retirement accounts

Households

$$\max_{\{c_j, a_{j+1}, x_j\}} \sum_{j=1}^{\bar{J}} \beta^{j-1} \frac{c_j^{1-\sigma}}{1-\sigma}$$

s.t. budget constraints

Budget Constraint

The budget equation of an individual who decided to stay in the system is given by

$$
\begin{aligned}
c_j(1+\tau_c) + a_{j+1} + x_j &= R_k(a_j+\gamma) + y_j + \pi && (2)\\
b_{j+1} &= x_j(1-\omega) + R(1-\phi)b_j && (3)\\
x_j &\geq 0 \;\; ; a_{j+1} \geq 0 && (4)
\end{aligned}
$$

γ: accidental bequests,
$R_k = 1 + (1-\tau_k)r$: After-tax gross return

Budget Constraints

For an individual who is withdrawing from the system, the budget equation is

$$
\begin{aligned}
c_j(1+\tau_c) + a_{j+1} + x_j &= R_k(a_j+\gamma) + R(1-\phi)b_j - t_b \qquad (5)\\
&\quad + Rb_j^g \kappa(t_j, j) - t_g + y_j + \pi \\
b_{j+1} &= x_j(1-\omega) \qquad (6)\\
x_j &\geq 0 \;\; ; a_{j+1} \geq 0 \qquad (7)
\end{aligned}
$$

τ_{sh}: Social security taxes paid by the household
t_b, t_g: Capital taxes on returns from private and government IRA assets

Income of Individuals

$$y_j = \begin{cases} (1-\tau_{sh})(1-\tau_l)w_j & \text{if } j < j^* \\ q_j = \theta \frac{\sum_{j=1}^{j^*-1} w_j}{j^*-1} & \text{if } j \geq j^*. \end{cases} \tag{8}$$

Law of Motion for Assets in Government Accounts

$$b^g_{j+1} = \begin{cases} (1+r)b^g_j + \lambda x_j & \text{if } x_j \leq \bar{x} \\ (1+r)b^g_j + \lambda \bar{x} & \text{if } x_j > \bar{x} \end{cases} \tag{9}$$

Goods Producing

$$Y = f(K,N) = AK^{\alpha}N^{1-\alpha}$$
$$r = (1-\alpha)A(K/N)^{-\alpha} - \delta$$
$$w(1+\tau_{sf}) = \alpha A(K/N)^{1-\alpha}$$

Financial Firms

$$Y_I = \omega\tilde{X} + R\phi\tilde{B}$$

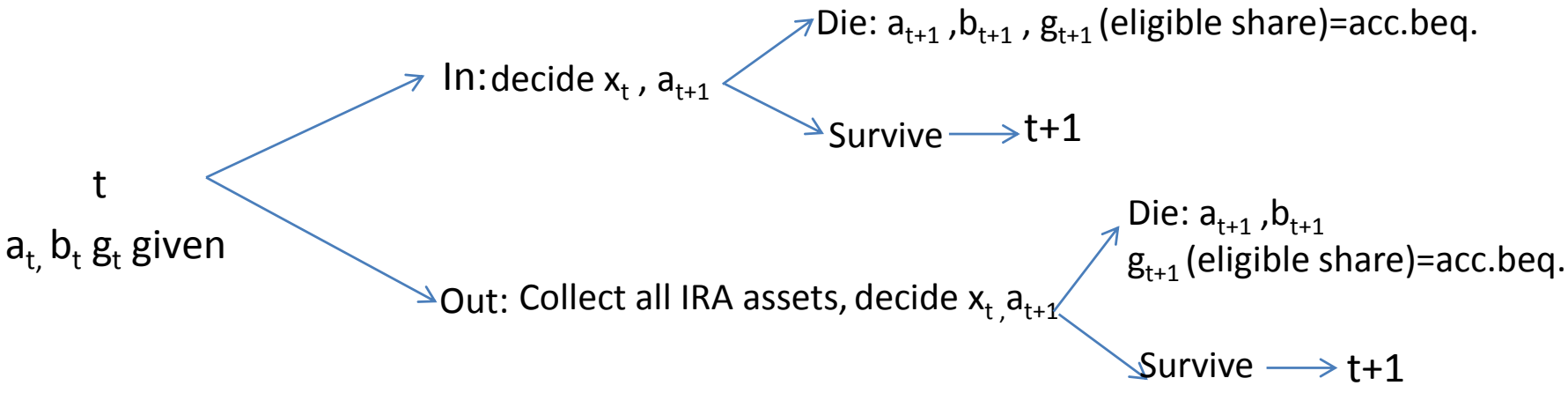
$\tilde{X}$= total periodic contributions
$\tilde{B}$= total IRA assets accumulated
ϕ= management fees ω= operation fees.

Government

- Balanced budget at the steady state.
- Expenditures: Government consumption (G) and IRA contributions X_{IRA}
- Tax Revenues: Capital tax revenues (IRA and Non-IRA assets), labor tax revenue, consumption tax revenue
- Other Revenues: Gross return on assets collected from early exiters and deceased individual's government contribution accounts ($G_{IRA} + G^D_{IRA}$)

$$G + X_{IRA} = R\, G_{IRA} + R\, G^D_{IRA} + T_b + \tau_c C + \tau_l (1 - \tau_{sh}) w N + \tau_k (R-1) K$$

Timing of the model



Value Functions

$$V_j^*(a_j, b_j, g_j, t_j) = \max_{\{c,n\}} \left\{ V_j^c(a_j, b_j, b_j^g, t_j), V_j^n(a_j, b_j, b_j^g, t_j) \right\}$$

where V^c and V^n are the value functions of a contributor and a non-contributor respectively.

$$V_j^{c,n}(a_j, b_j, b_j^g, t_j) = \max_{a_{j+1}, x_j, c_j} U(c_j) + \beta \psi_{j+1} V_{j+1}^*(a_{j+1}, b_{j+1}, b_{j+1}^g, t_{j+1})$$

s.t. budget equations

Quantitative Analysis

The quantitative analysis is conducted in the following steps:

- The benchmark economy with no IRA is calibrated to Turkish data
- A steady state IRA economy financed with consumption and labor income taxes are simulated
- The impact of fees is evaluated by simulating a no-fee IRA economy
- We compare savings rate, total assets and capital stock in these economies
- Also evaluate the long-run welfare impact of the system by computing compensating differentials (Δ's)

$$\sum_{j=1}^{\bar{J}} \{\Pi_{z=1}^{j} \psi_z\} \beta^{j-1} u(c_{o,j}) = \sum_{j=1}^{\bar{J}} \{\Pi_{z=1}^{j} \psi_z\} \beta^{j-1} u((1+\Delta) c_{IRA,j})$$

Parameters

ρ	α	β	δ	σ	g	d	τ_l
0.0139	0.50	0.936	0.055	1.5	0.15	0.40	0.17

τ_{sf}	τ_{sh}	τ_k	θ	λ	ϕ	ω
0.204	0.167	0.15	0.60	0.25	0.0183	0.02

Simulation Results

		% change with respect to no IRA model		
	No IRA	IRA (consumption tax)	IRA (labor tax)	IRA (no fees)
Capital Stock	6.73	15.62	10.71	28.75
Consumption	1.72	5.35	3.74	9.35
Capital-Output Ratio	2.61	7.52	5.22	13.47
Net Saving Rate	3.63%	0.27(ppt)	0.19(ppt)	0.49(ppt)
Interest Rate	13.62%	-1.34(ppt)	-0.95(ppt)	-2.27(ppt)
Wage Rate	1.08	7.52	5.22	13.46
Cons. Comp.		-6.90	-0.65	-7.25
Consumption tax	11.85%	6.97(ppt)	2.15(ppt)	7.62(ppt)
Labor tax	17.00%	0.00(ppt)	8.98(ppt)	0.00(ppt)

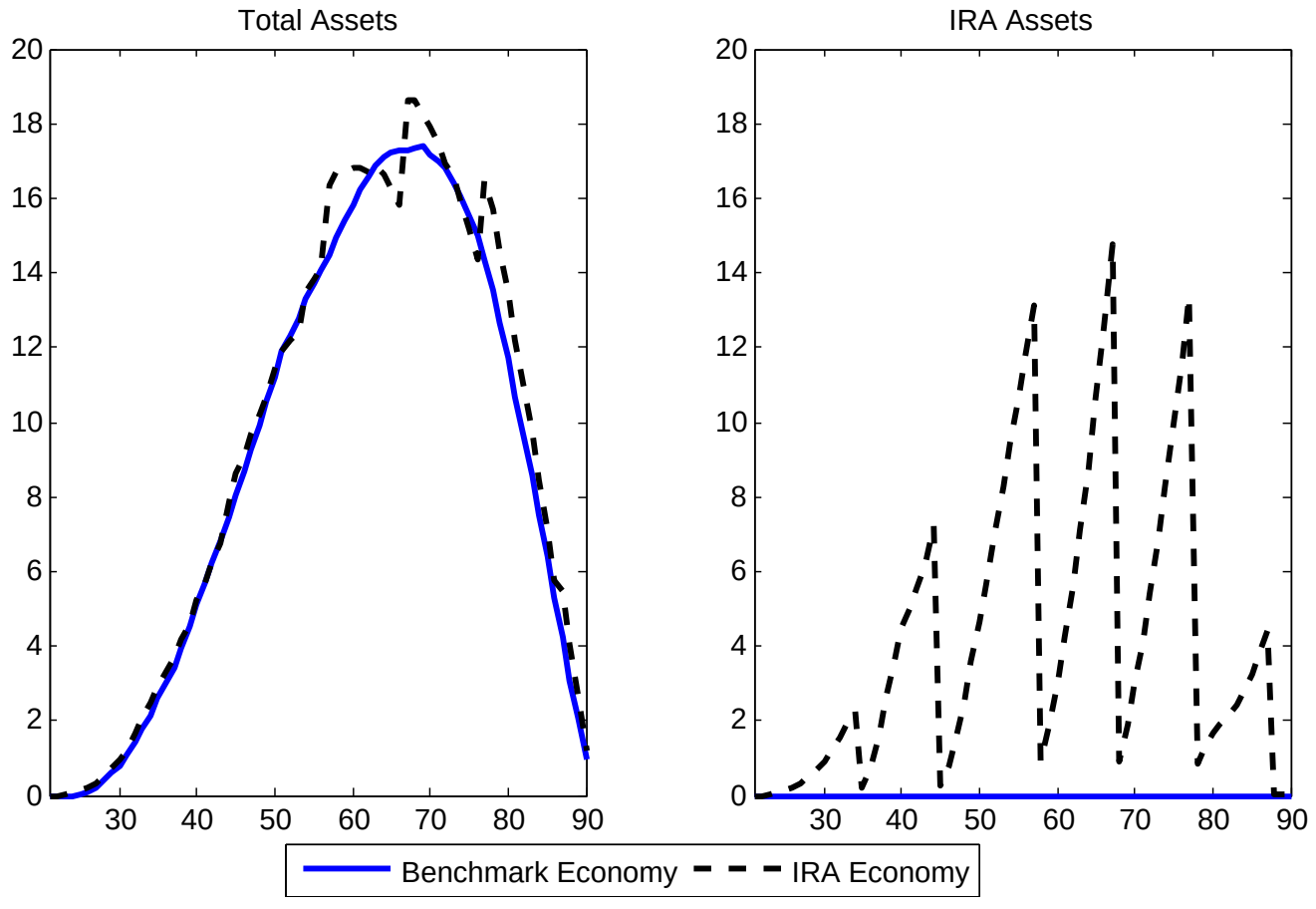
Simulation Results

Share in total assets	IRA (consumption tax)	IRA (labor tax)	IRA (no fees)
Ordinary accounts	46.85	45.94	43.11
Individual retirement accounts	41.70	42.35	45.61
Government contribution accounts	11.45	11.72	11.29

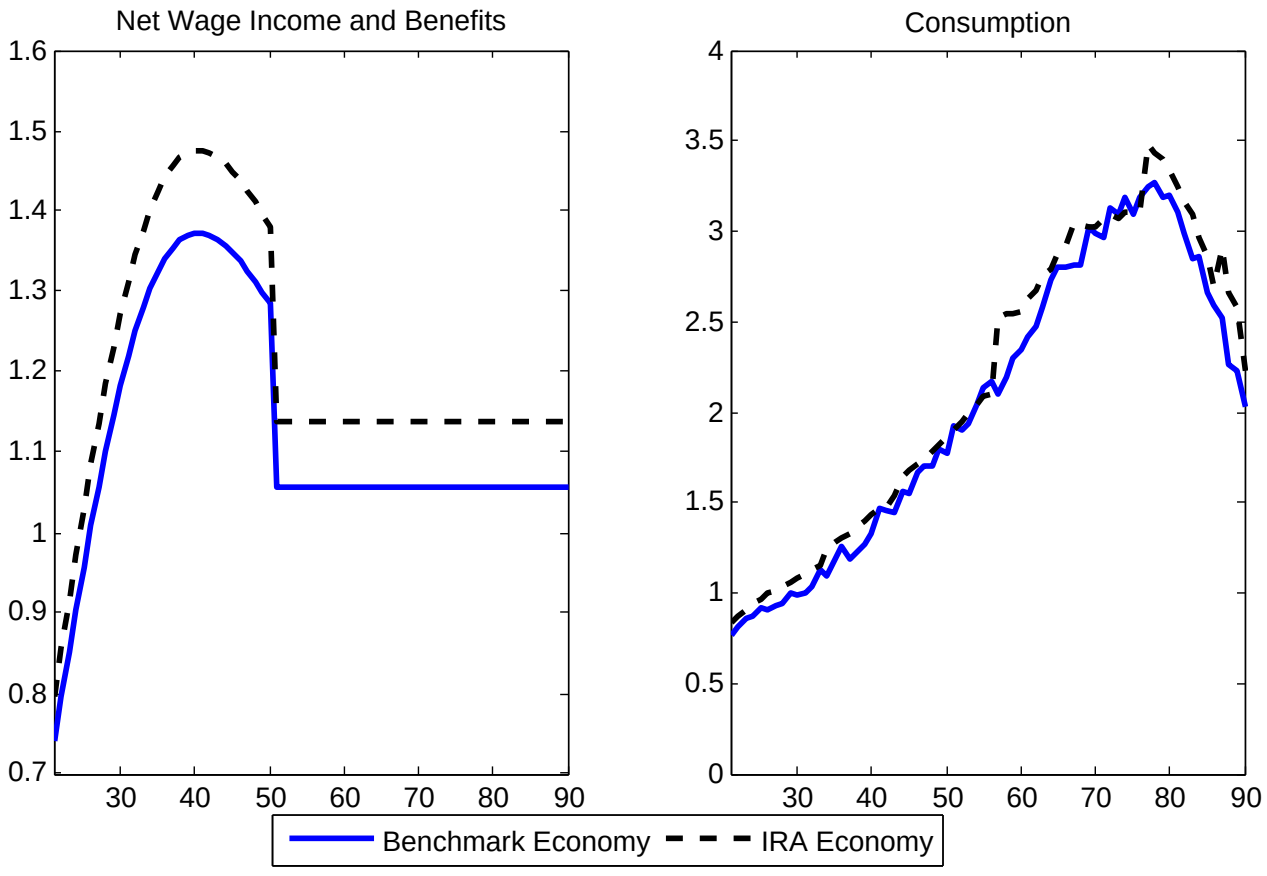
Discussion of the Results

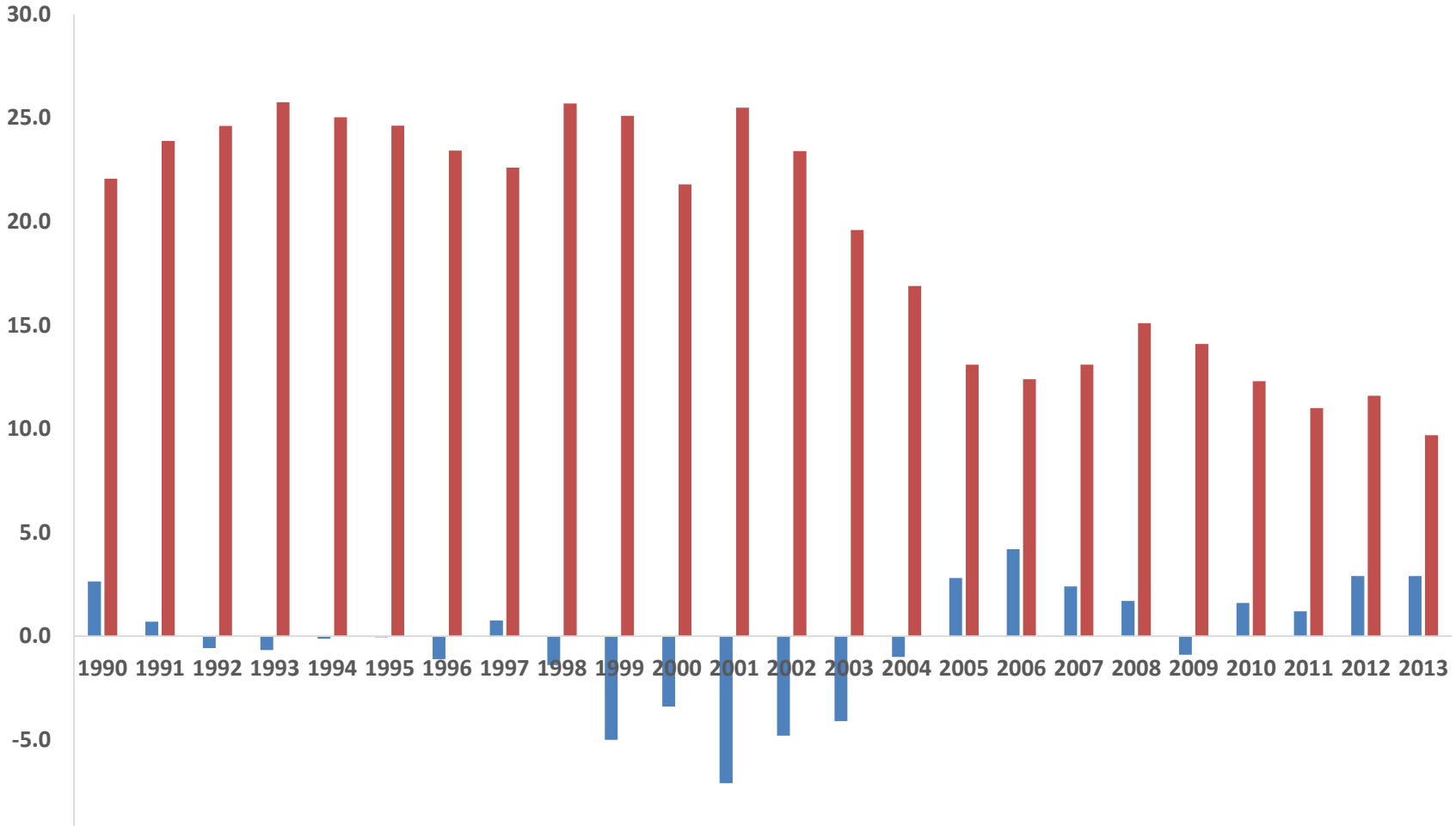
- A new private pension system with direct government subsidy has been effective in Turkey since 2013
- This paper evaluates the long-run impacts of the policy on the economy in a general equilibrium setting
- Results from baseline simulation yield that
  - Capital stock increases by 15 percent
  - Net savings rate is 0.3 percentage points higher
  - Welfare benefits: 7 percent permanent increase in consumption levels due to higher wages
- Using labor income taxes to balance the government budget mitigate the positive impacts of the new policy
- The fees charged by insurance firms create significant disincentives to hold assets in IRAs

Life-Cycle Asset Profiles



Life-Cycle Contributions to IRAs




30.0
25.0
20.0
15.0
10.0
5.0
0.0
-5.0
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return