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# On the Design of a Default Pension Fund

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Preliminary. Please do not quote.

# Background and motivation

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- There has been a worldwide shift from defined benefit (DB) to defined contribution (DC) plans in the last decades.
- This shift means that one set of risks (for example, the risk of job loss before the late-career years) has been replaced with another set of risks (including participation decision risk, financial market risk, and annuitization risk).
- This shift also puts a greater responsibility for retirement security for individuals; at the same time, many individuals tend to be in default alternatives, motivating a careful design of these default alternatives.

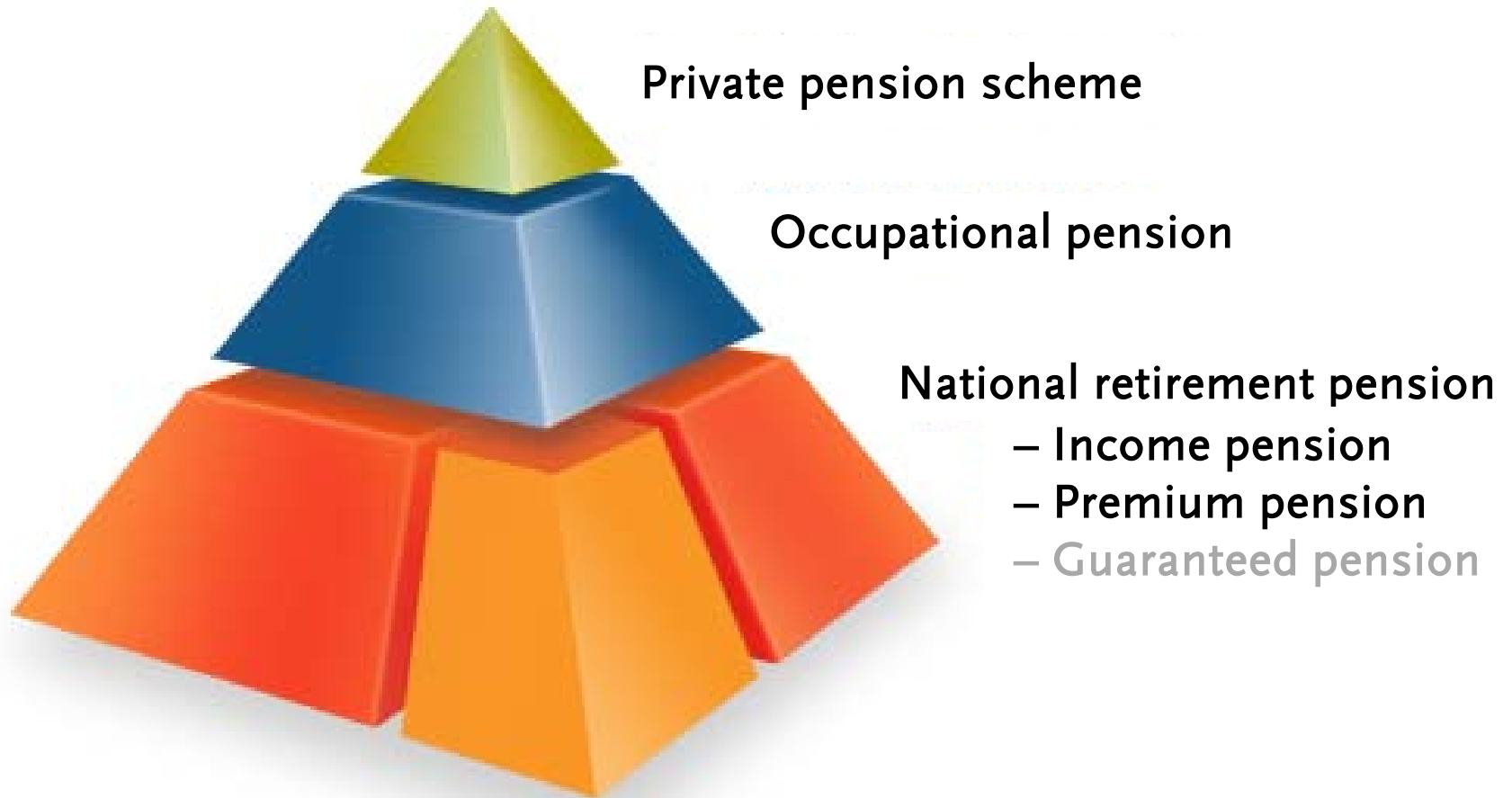
# What we do and what we find

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- We consider about 340,000 individuals' financial portfolios inside and outside the pension system from 2000 to 2007.
  - We characterize differences between passive (default) and active investors, and document a strong relation between default investing inside the pension system and limited stock market participation outside the pension system.
  - We build a life-cycle portfolio choice model and investigate the effect of different designs of the default fund; we find economically significant welfare effects and inequalities for default designs suggested in the ongoing policy debate.
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# Components of your pension

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Adapted from the Swedish Pensions Agency

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# Sweden's public pension system

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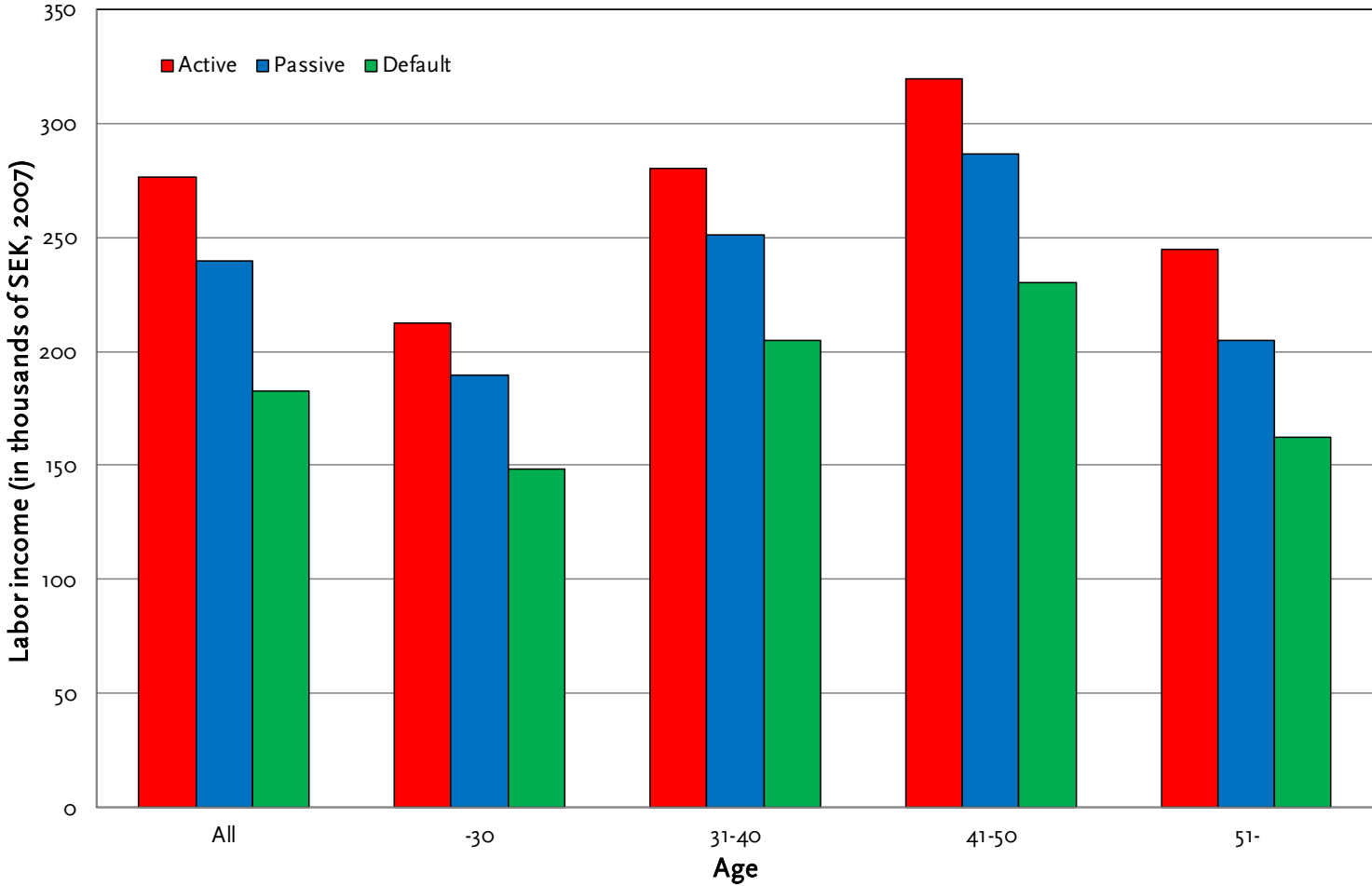
- **Income pension:**
  - Notional DC plan, financed on a pay-as-you-go basis.
  - 16% contribution.
  - Return like average wage growth.
- **Premium pension:**
  - Fully funded DC plan.
  - 2.5% contribution.
  - Return depending on fund choices.
- Expected relative balance: 65–75% versus 25–35%.

# Data and three investor types

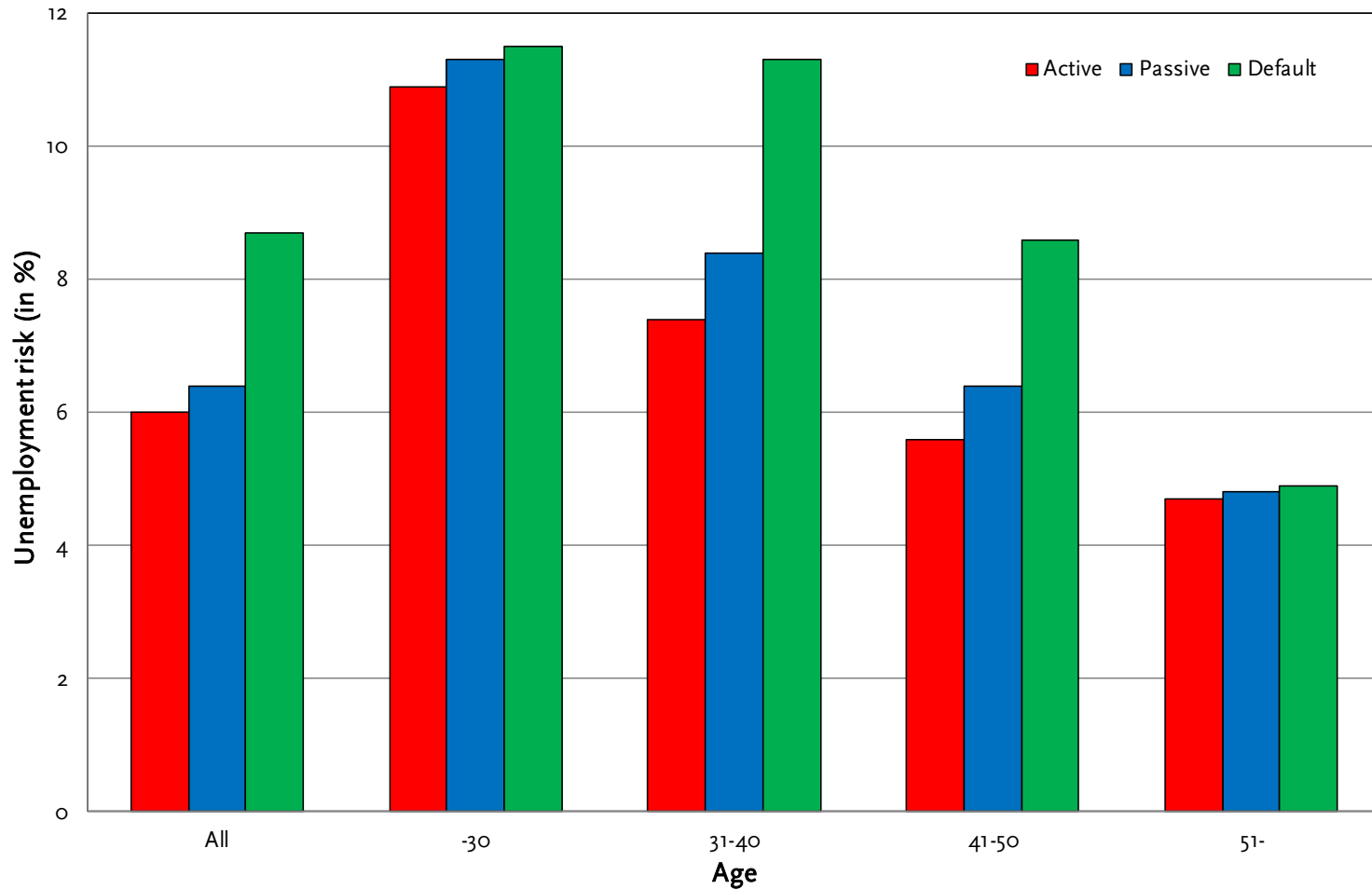
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- We have data on:
  - individuals' socio-demographics,
  - fund holdings in the premium pension plan, and
  - holdings outside the pension system.
- We consider three investor types:
  - Active (37%).
  - Passive (28%).
  - Default (35%).

# Labor income

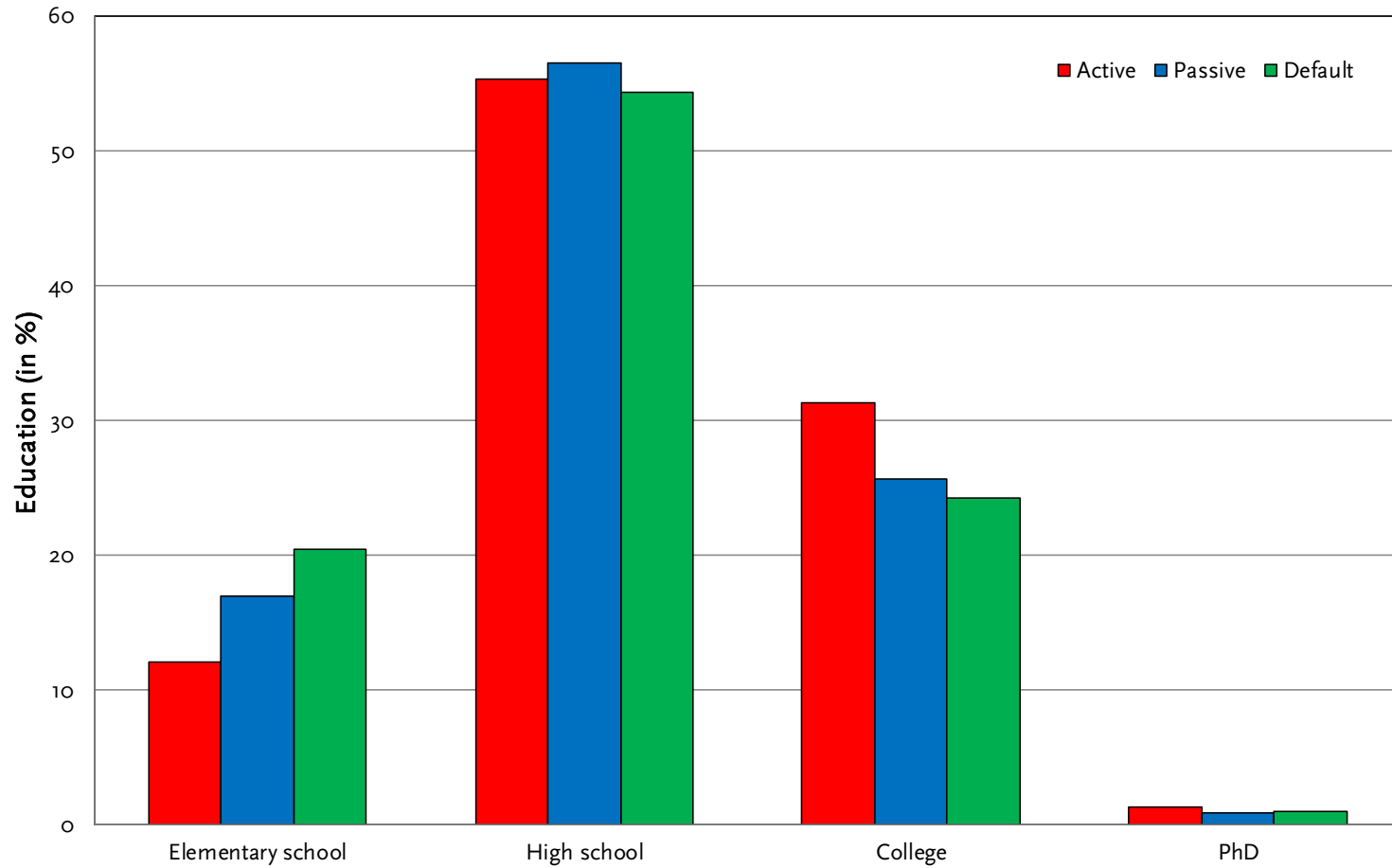


# Unemployment risk

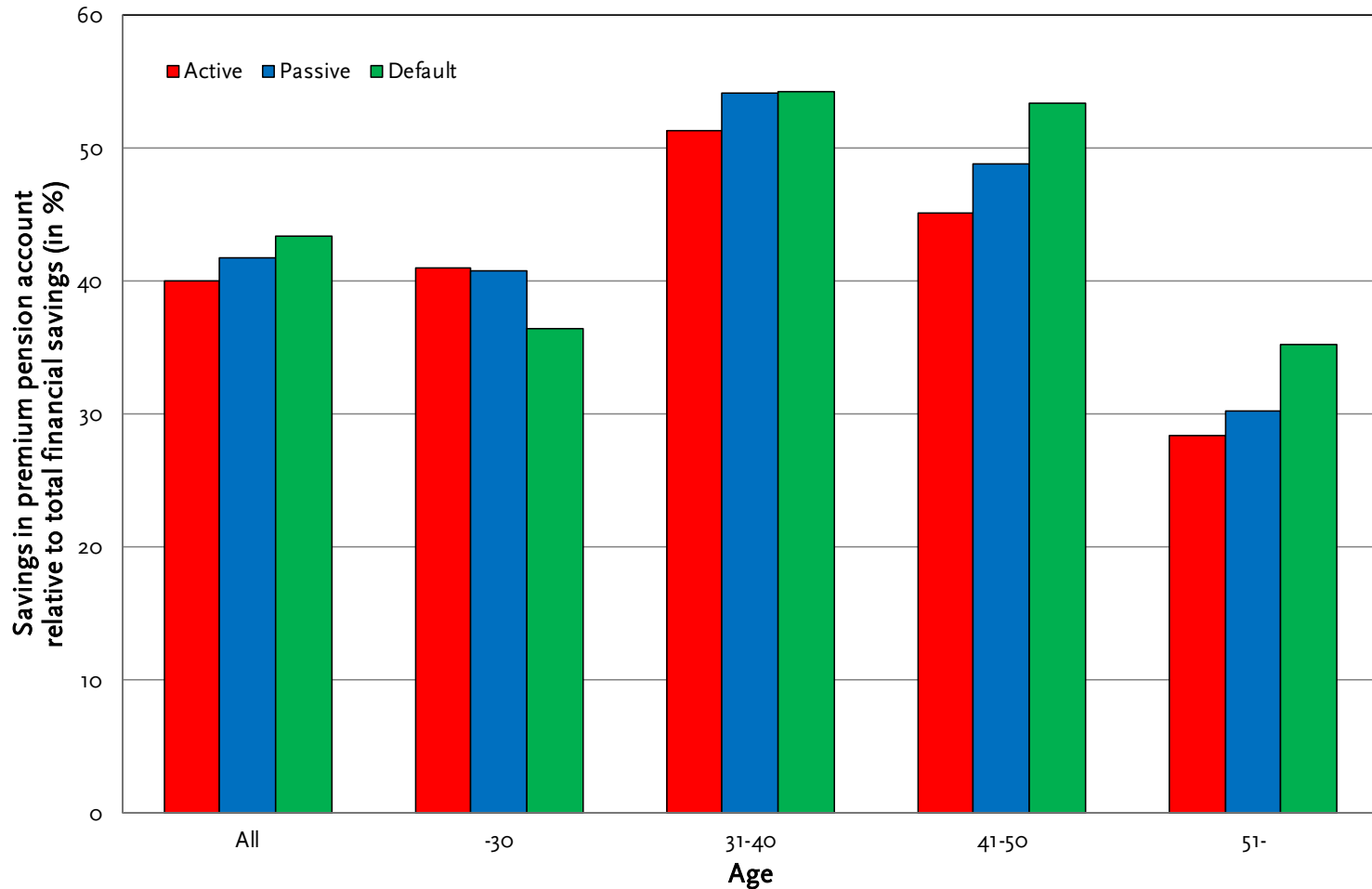




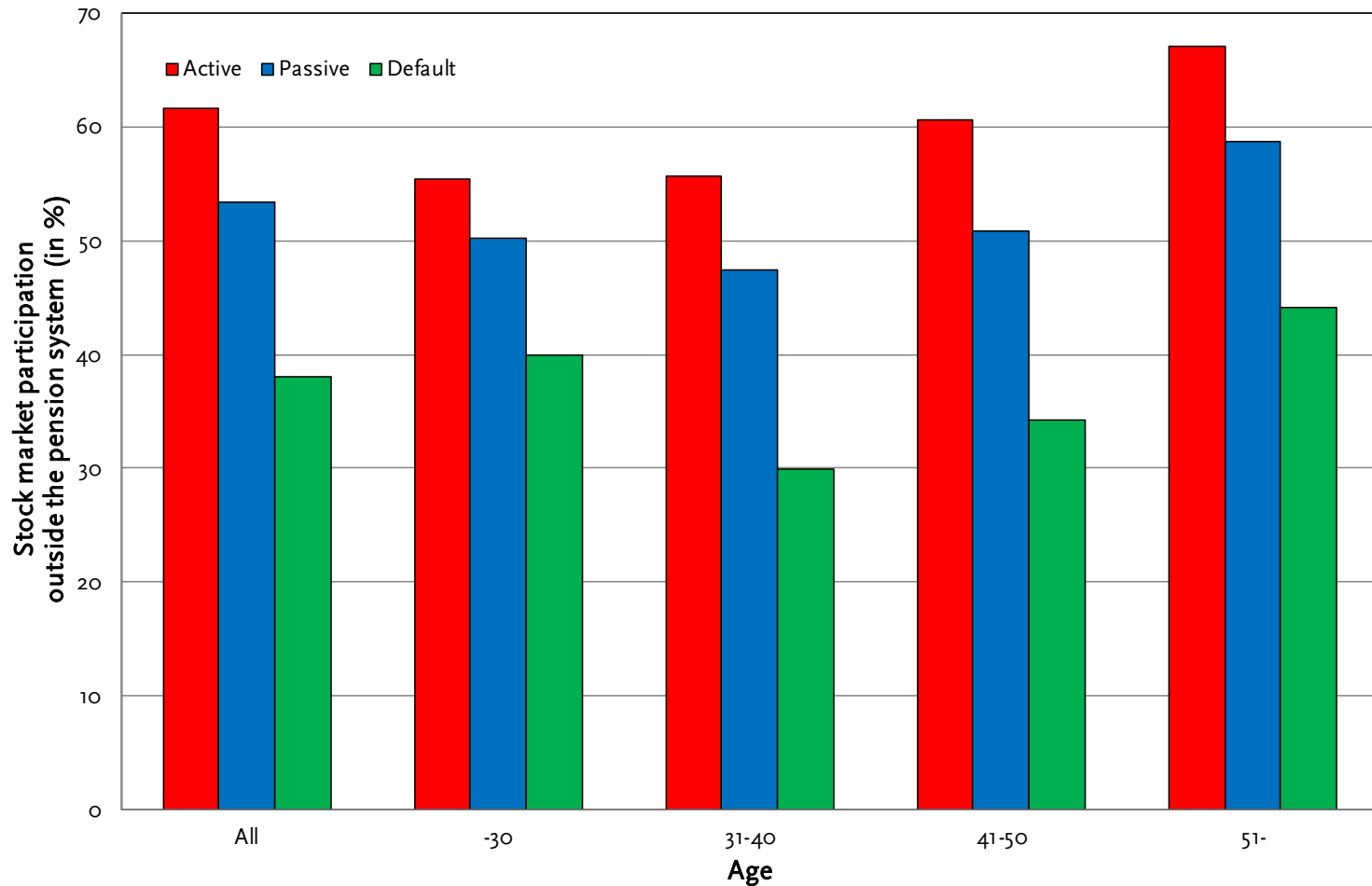
# Education



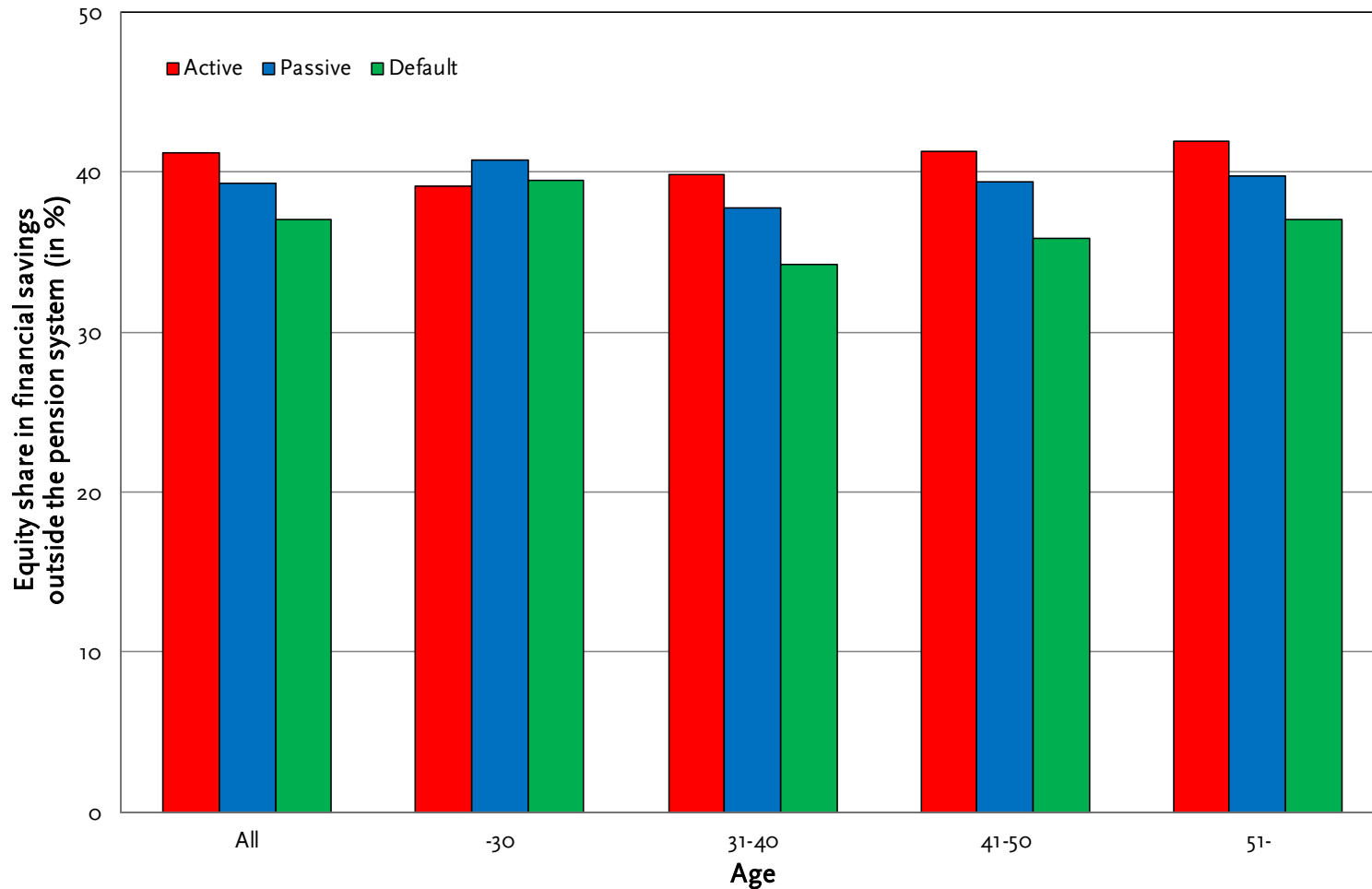
# Financial savings in premium pension



# Stock market participation



# Equity share



# Stock market participation

|                        | I     | II     | III    | IV     |
|------------------------|-------|--------|--------|--------|
| Default investor       |       | -0.135 | -0.088 | -0.087 |
| Passive investor       |       | -0.055 | -0.037 | -0.038 |
| Age                    | 0.074 | 0.017  |        |        |
| Labor income           | 0.168 | 0.132  |        |        |
| Financial wealth       | 0.292 | 0.287  |        |        |
| D(real estate)         | 0.153 | 0.130  | 0.063  | 0.054  |
| Splines (age/income/w) | No    | No     | Yes    | Yes    |
| D(education)           | Yes   | Yes    | Yes    | Yes    |
| D(geography)           | Yes   | Yes    | Yes    | Yes    |
| D(industry/occupation) | No    | No     | No     | Yes    |
| <b>R-squared</b>       | 0.148 | 0.160  | 0.301  | 0.284  |

Based on Table II in the paper. All reported estimates are significant at 1% or 5% level (using standard errors that account for conditional heteroskedasticity). Age is scaled down by 100; and labor income and financial wealth are scaled down by 1,000,000. The number of observations is 337,032 in I-III and 191,468 in IV. Specifications III and IV replace the linear specification in age, labor income, and financial wealth with piecewise linear splines. Unconditional participation rates are 0.381 (default investors), 0.534 (passive investors), and 0.617 (active investors).

# On the dynamics of stock market participation and default investing...

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- Participation in 1999 increases likelihood of opting out from default fund by 10.7 percentage points (and the effect is not due to the effect of launch per se).
- Participation in 1999 slightly decreases the likelihood of rebalancing in the future (−0.18 percentage points in 2001).
- Among non-participants in 1999 who chose to opt out, the likelihood of being a participant later is greater than for those who remained in the default fund (1.8 percentage points in 2001; unconditional probability is 5.5%).

# Empirical results

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- We find that default investors (relative to active investors):
  - are less educated,
  - have lower income,
  - have less wealth, and
  - are more reliant on their premium pension account.
- They may be characterized as less sophisticated.
- Importantly, we also find a strong negative relation between default investing and stock market participation.

# Policy experiments

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- We build a life-cycle portfolio choice model to investigate two main experiments in the design of the default fund:
    1. Vary the equity exposure in the default fund.
    2. Force all investors into the default fund.
  - Preliminary results:
    - A high equity exposure seems optimal in the default fund (the marginal effect of increasing the equity exposure at 100% is about the same as decreasing it).
    - Active investors are better at accommodating the equity exposure in the pension system (the effect on inequality depends on the equity exposure in the new system).
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# The life-cycle model (in a nutshell)

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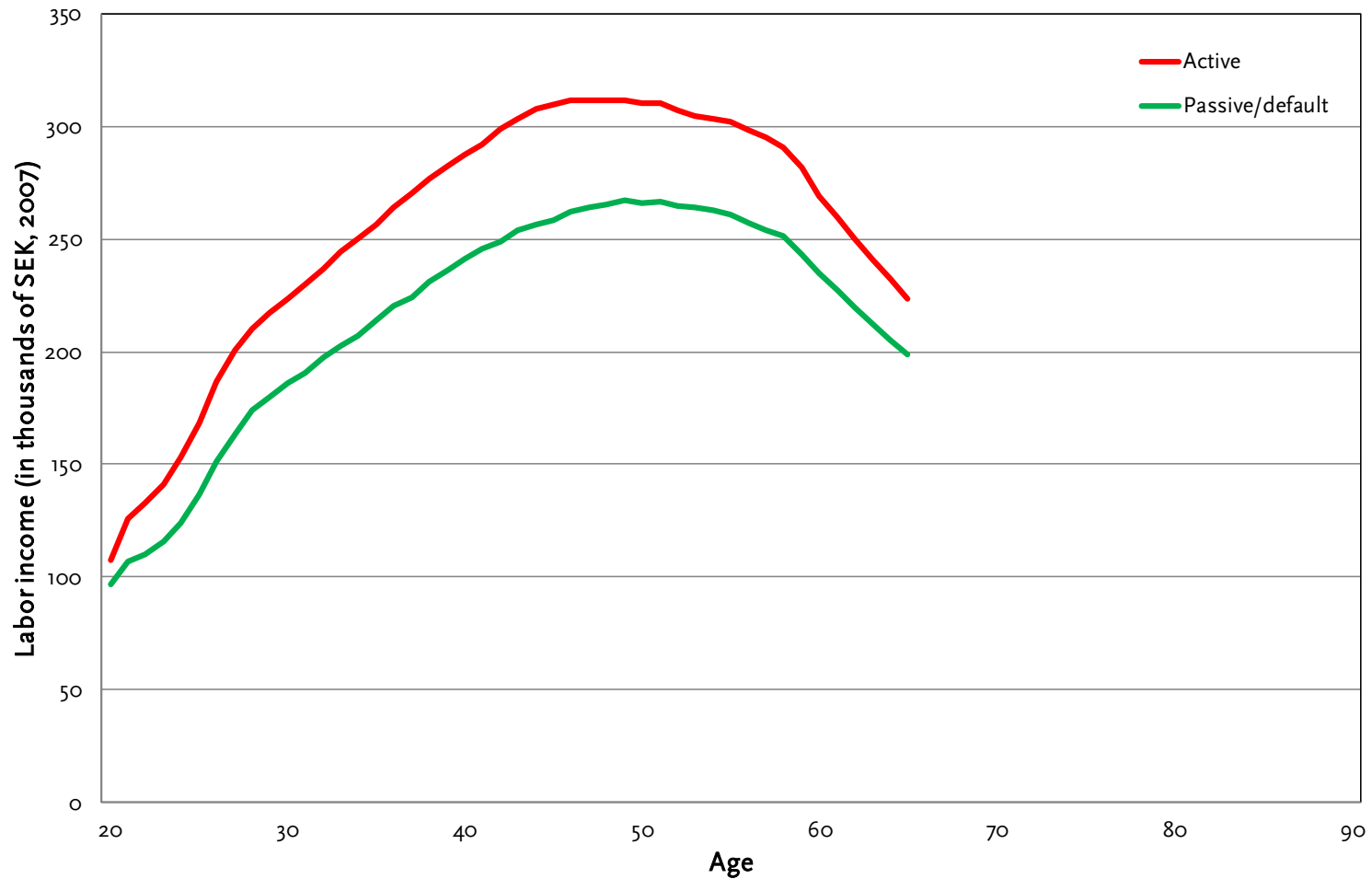
- There are active and passive (default) investors, who live from age 20 up to at most age 100; and they retire at age 65.
  - During working age, the investors have labor income and receive at retirement annuities from the pension system.
  - They save outside the pension system in stocks (with participation costs) and bonds; in the pension system they have three illiquid savings accounts: an income pension account (with a bond-like return); a premium pension account (stock/bond return, depending on active/passive); and an occupational pension account (stock/bond return).
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# Some key model parameters

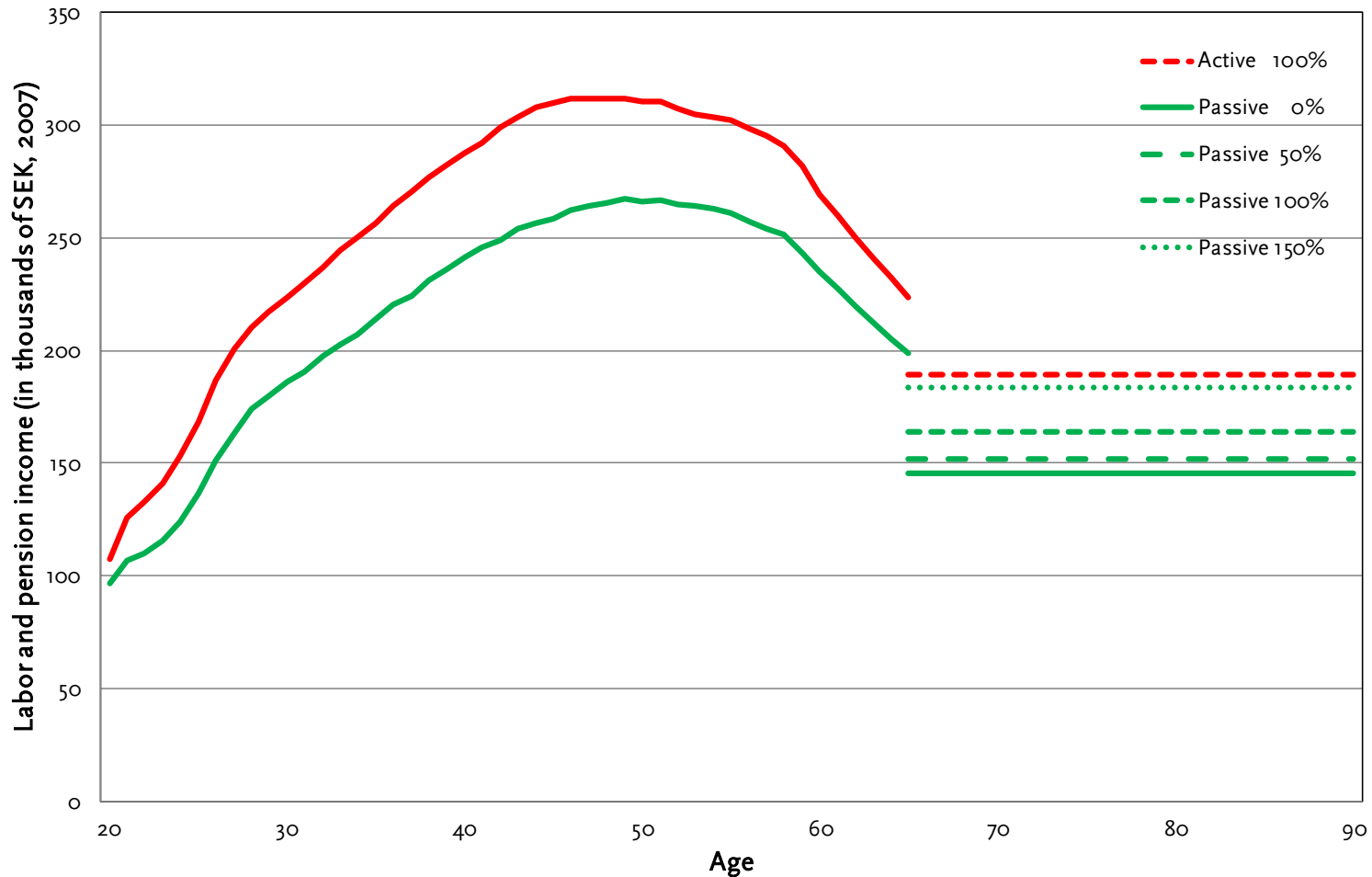
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- Epstein-Zin preferences and stock market entry costs:
  - Discount factor: 0.88 (\*).
  - Elasticity of intertemporal substitution: 0.20.
  - Relative risk aversion: 8.
  - Stock market entry costs: SEK 25,000 (\*).
- Returns:
  - Equity premium: 4% per year.
  - Equity volatility: 18% per year.
- Labor income, labor income profile (\*\*) and survival rates.

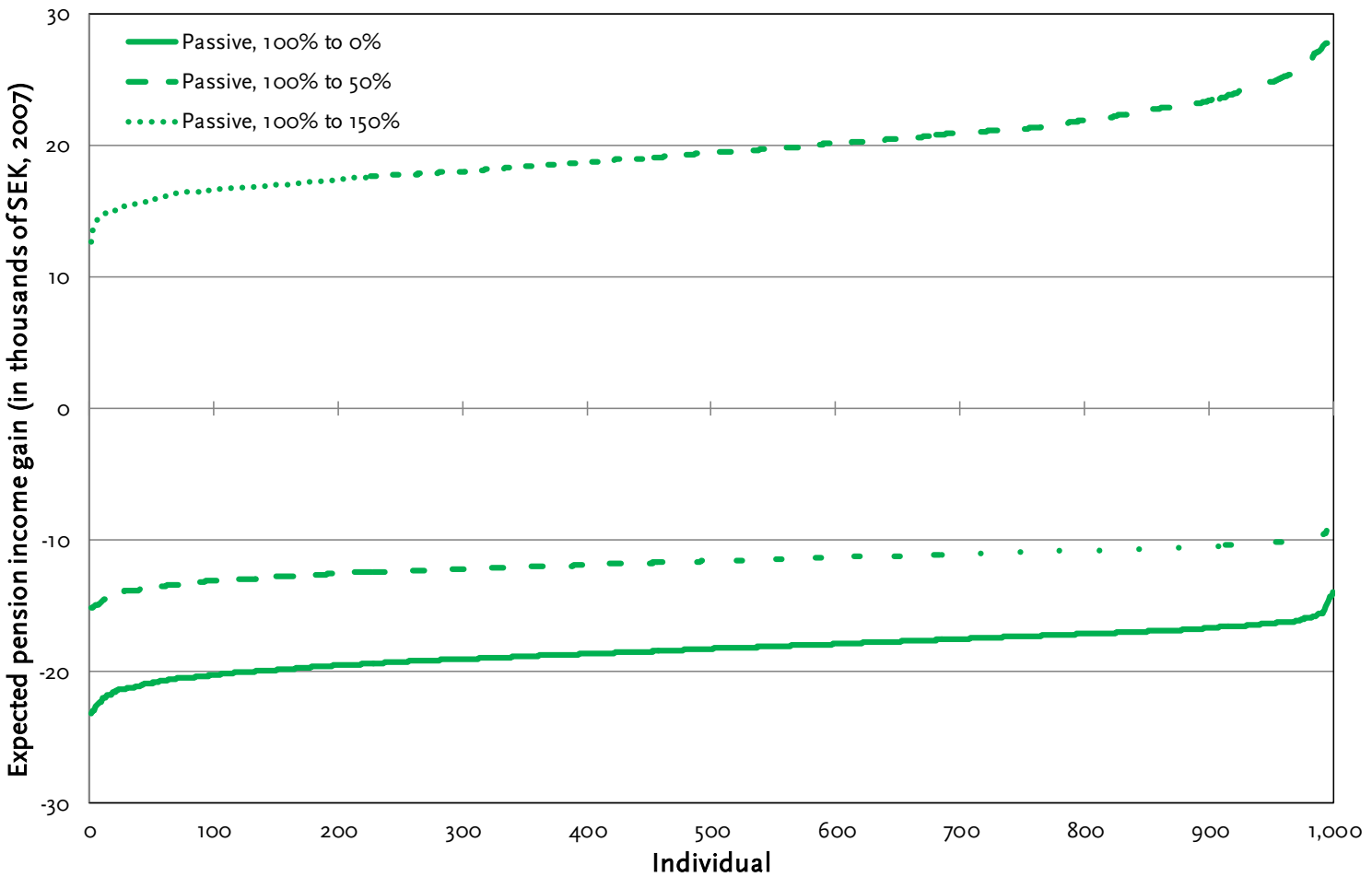
# Labor income profiles



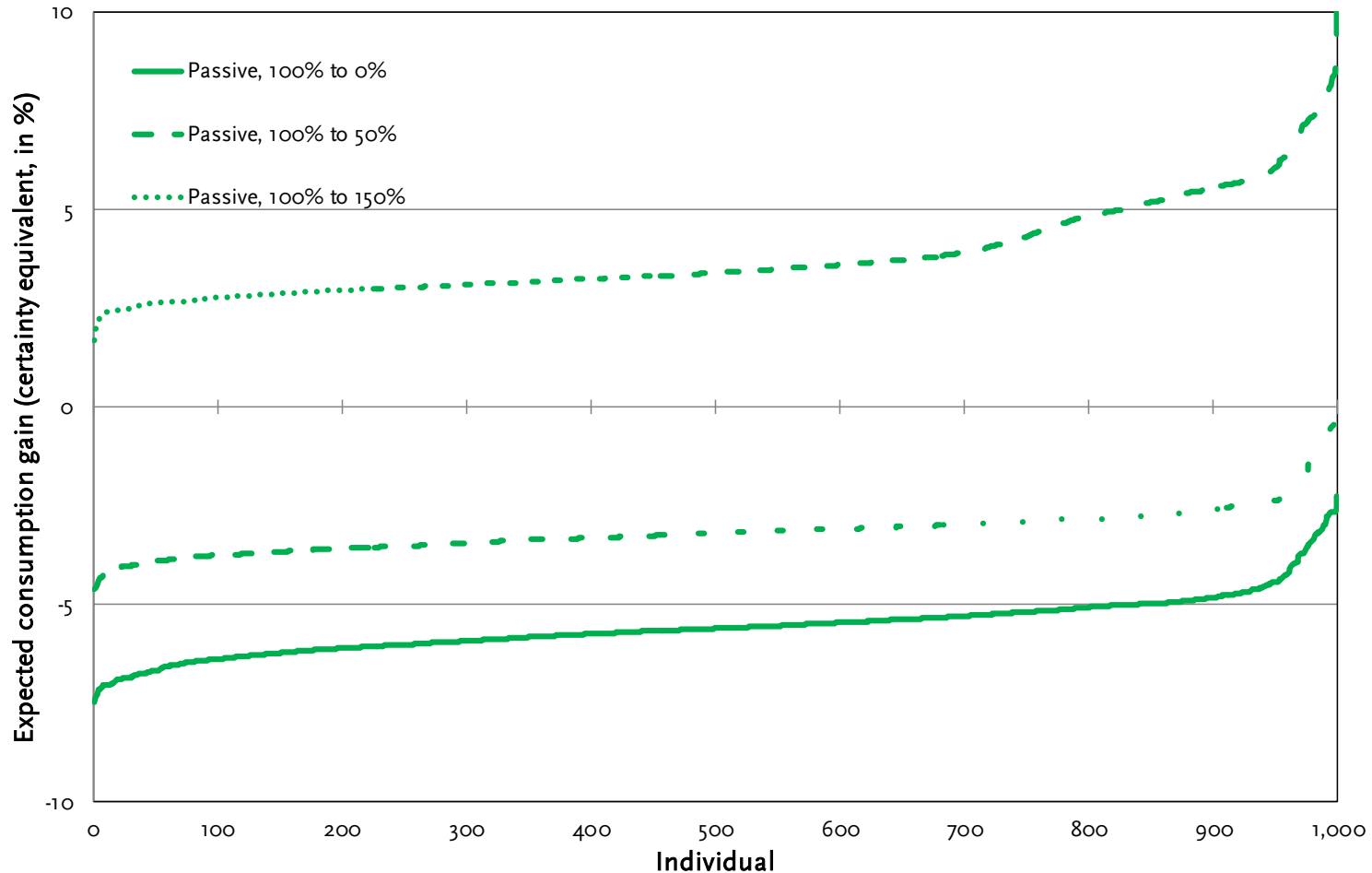
# Labor income and expected pension



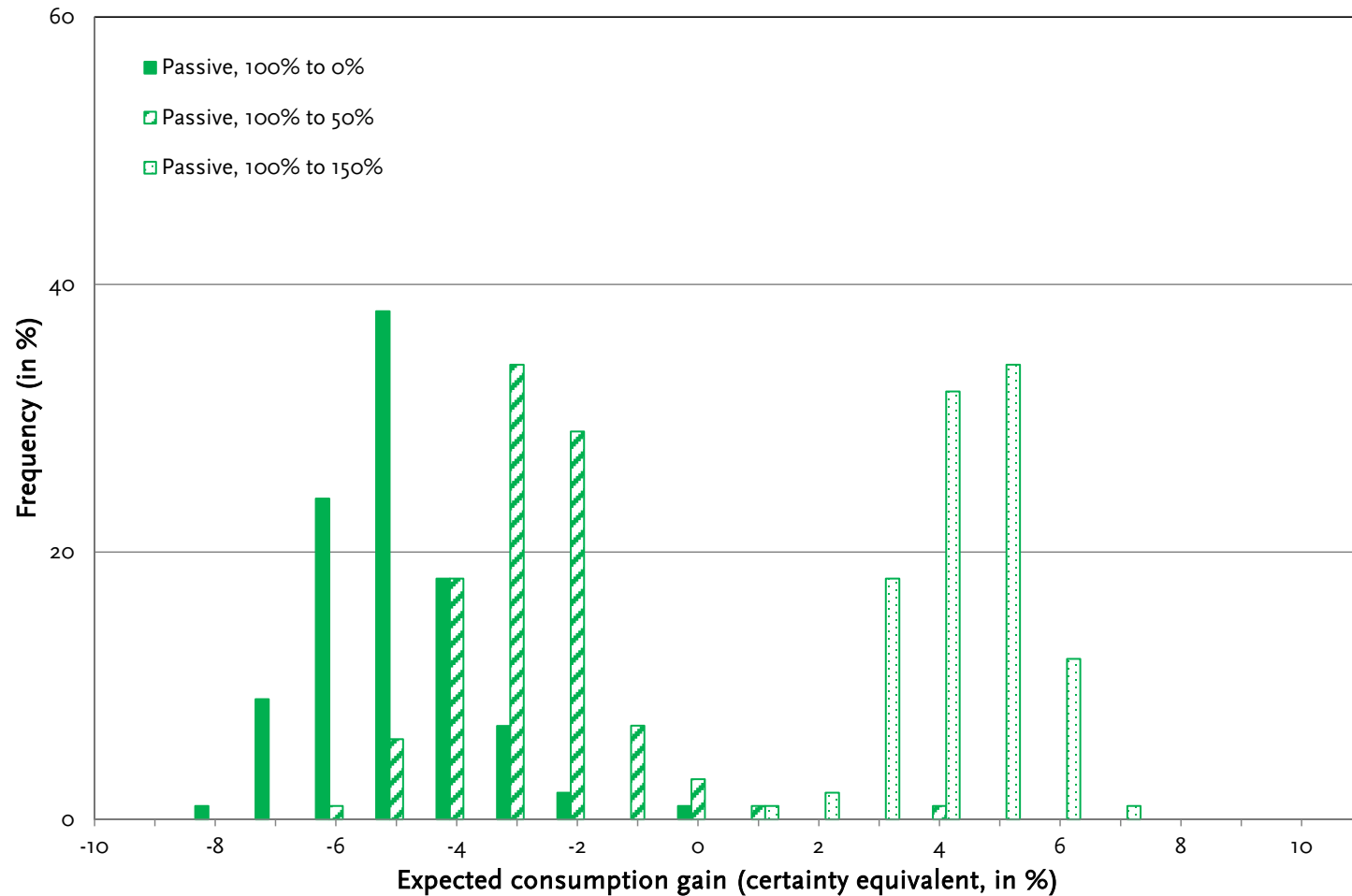
# Passives' expected pension income gains



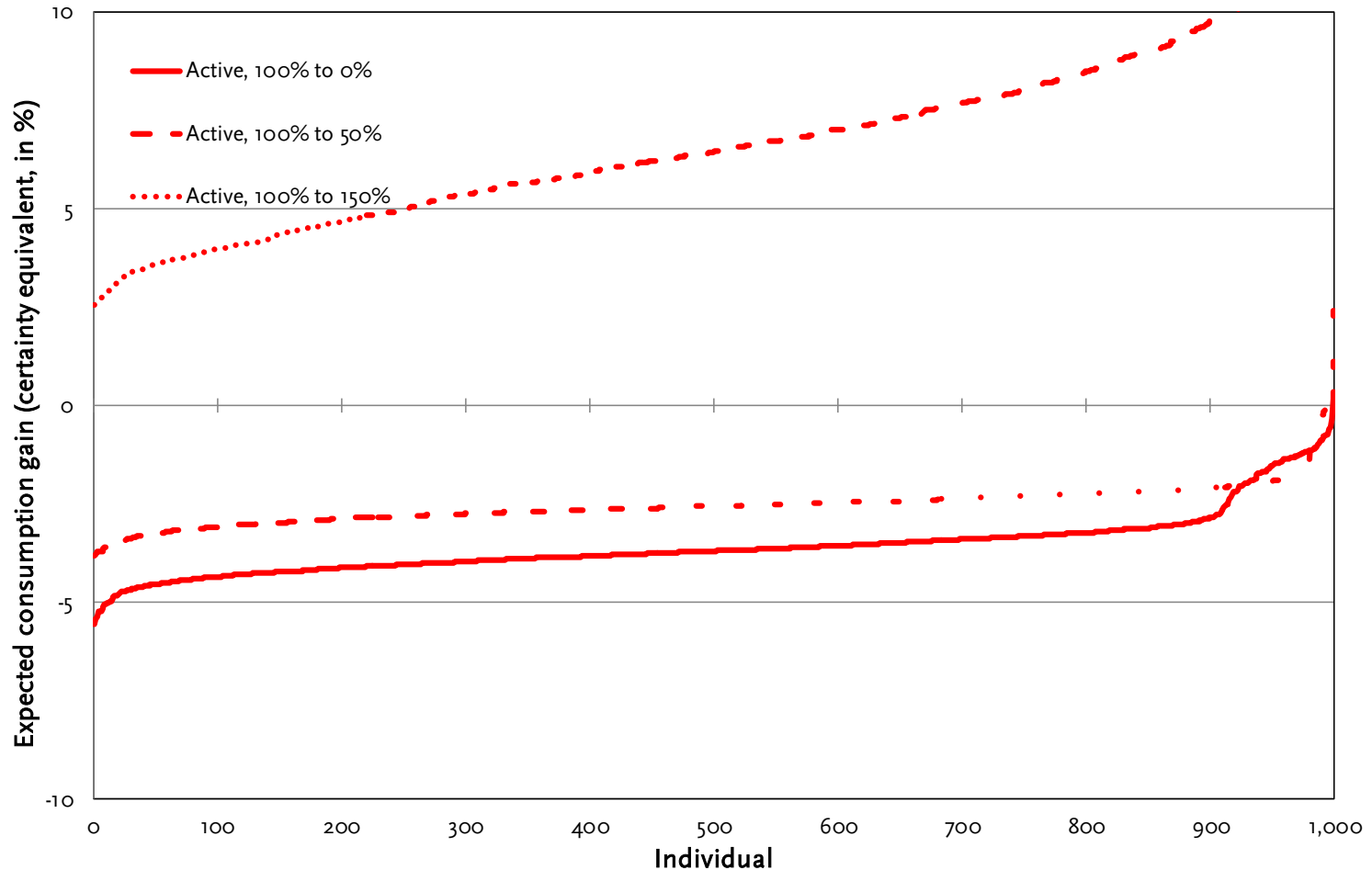
# Passives' expected consumption gains



# Passives' aggregate effects

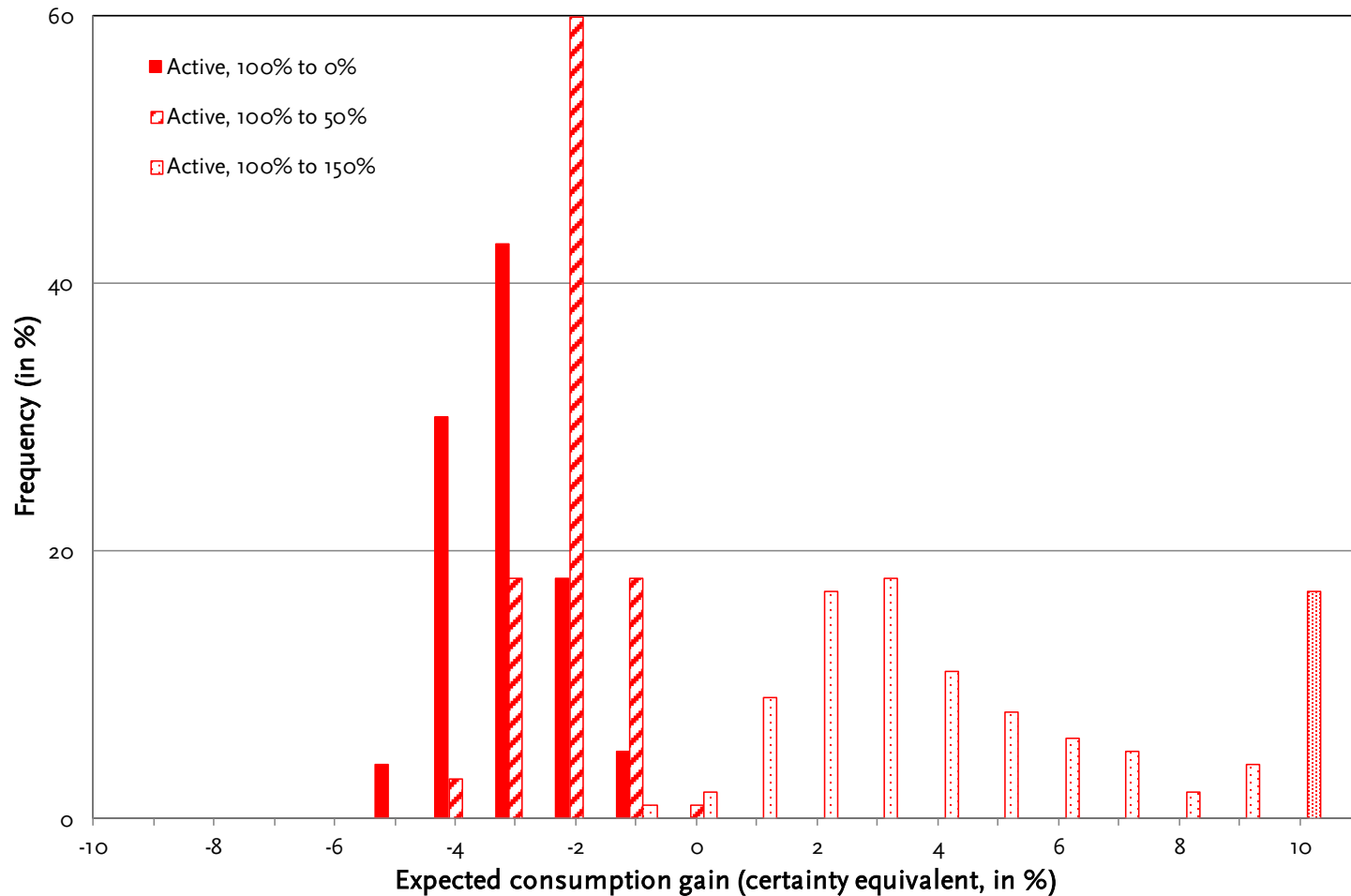


# Actives' expected consumption gains





# Actives' aggregate effects



# Responses and inequalities

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- Response in behavior due to higher equity exposure in default fund for both passive and active individuals:
  - Less savings outside the pension system.
  - Higher consumption in retirement.
  - Lower degree of stock market participation.
  - Lower equity share.
- Effects on inequality:
  - Higher dispersion in pension income.
  - Lower dispersion in savings outside the pension system.
  - Moderately higher dispersion in retirement consumption.

# Now and in the future

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- **Where we are:**
    - We have documented systematic differences in investor types in the pension system (age, education, income, wealth, and savings outside the pension system), which matters for the design of the default fund.
    - We build a life-cycle model of portfolio choice to help us investigate the welfare effects of default fund designs.
  - **What we are currently doing:**
    - Extend empirical analysis.
    - Refine model and better understand mechanisms.
    - Consider alternative policy experiments.
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Thanks!

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