

U.S. PUBLIC PENSION ASSET ALLOCATIONS

Research Question: How do fund characteristics (performance and composition) effect the asset allocations of U.S. public pension funds from 2001-2016?

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IMPORTANCE OF TOPIC

What factors influence asset allocation of U.S. public pensions?

- Why public pensions?
 - Many U.S. pensions are underfunded
 - In 2016, the median funding ratio (assets available for payments to retirees) was 71.1% (Bloomberg)
 - This can contribute to bankruptcy (e.g. Detroit, Puerto Rico)
- Why asset allocation?
 - Modern portfolio theory - reducing portfolio risk through diversified, uncorrelated assets

DATA

- Public Plans Database

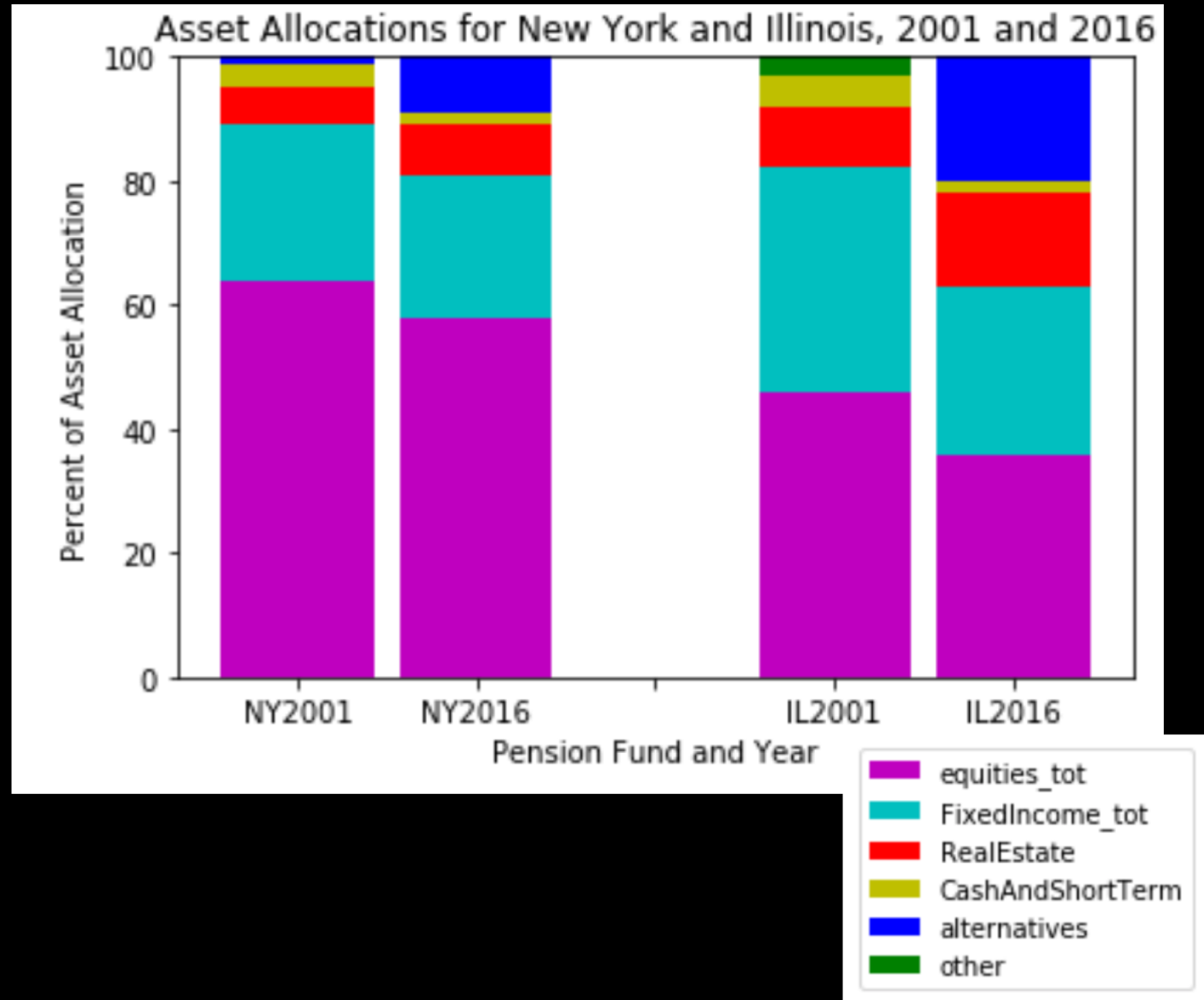
- Plan-Level data on 170 public pension plans: 114 administered at a state level and 56 administered locally
- Covers 2001-2016 (16 years)
- Covers 95 percent of public pension membership and assets nationwide
- Includes information on
 - Asset Allocation
 - Membership (type and quantity), funding, returns, etc.

VARIABLES

- Endogenous:
 - Asset Allocation
- Potential exogenous variables to consider:
 - Funded Ratio
 - Number of pensioners in plan
 - Pension industry
 - Previous year's investment return

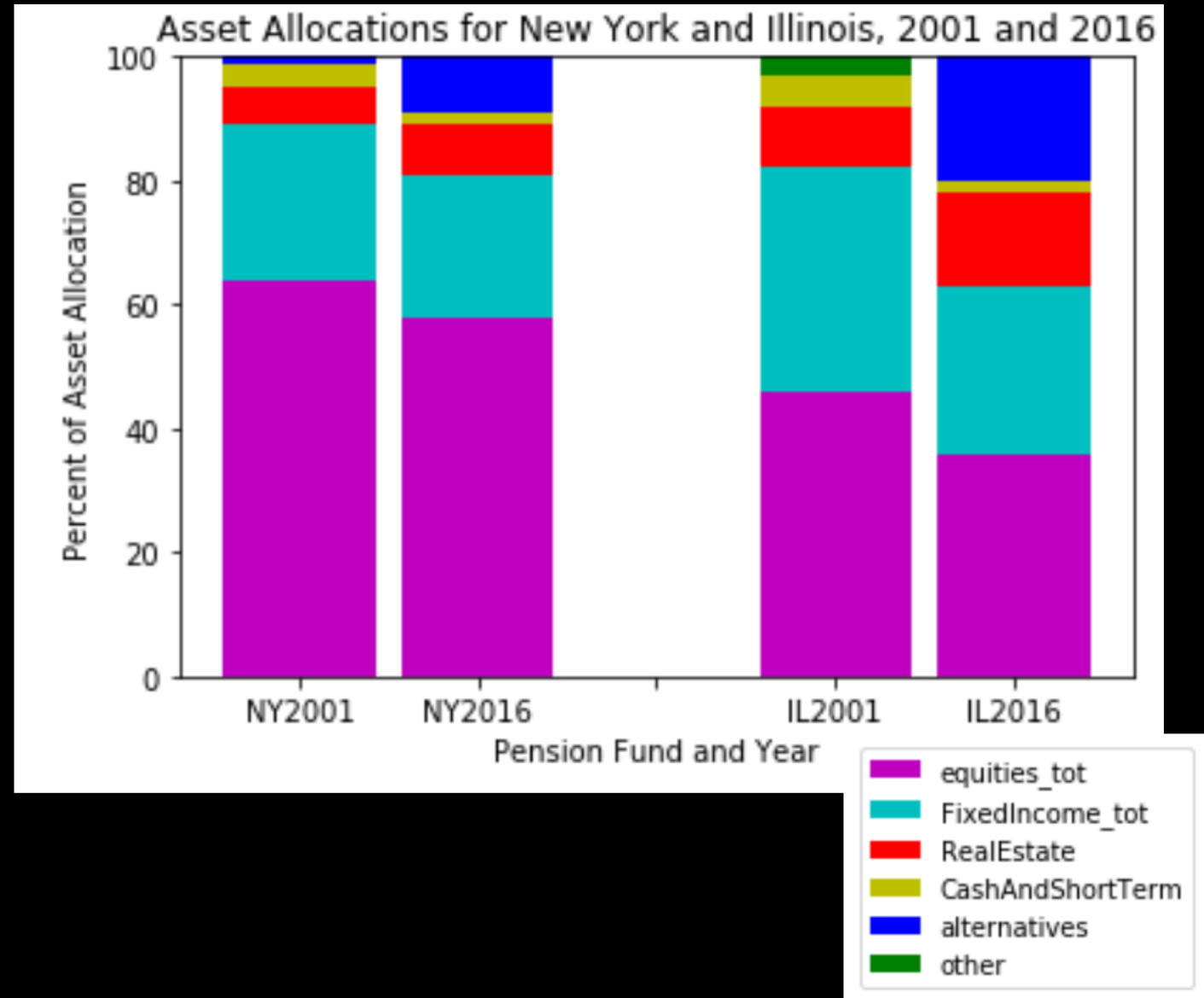
DEFINING ASSET ALLOCATION: BREAKDOWN

- Percent of total invested in:
 - Equities
 - Fixed Income
 - Alternatives
 - Real Estate
 - Cash/Short-Term
 - Other
- Vary by year and plan
 - NY has higher funded ration than IL



DEFINING ASSET ALLOCATION: CATEGORICAL?

- Operationalizing asset allocation
 - Classifier
 - High (1) and low (0) equity to fixed income ratio?
 - Continuous
 - Scale of allocation profiles?
 - Different Models?
 - Predict 6 categories



MODEL/THEORY

- Let's do a horse race!
 - Logistic regression vs. Random Forest vs. Neural Net
- Categorical vs. continuous asset allocation variable will influence model selection
- Take model strengths/weaknesses into account

POTENTIAL ISSUES WITH MODEL

- Data is relatively small for training and testing set (170 obs/year)
 - Include resampling methods
- Time-Series data
 - Will need to account for changes in markets and investment strategies over time
- Omitted Variable Bias and correlations between variables:
 - Need to think hard about the variables I use

PLACE IN EXISTING LITERATURE

- Pennacchi and Rastad, 2010
 - Analyzed factors that effect risk in 125 public pension funds, as measured by tracking error
- Weller and Wegner, 2008:
 - Have public sector pension plan managers acted “imprudently” to chase returns after encountering underfunding? No.

CONTRIBUTION

- Looking at overall asset allocation (not a measure of risk or prudent behavior)
- Different exogenous variables
- More data years and more recent (as pensions have gotten more underfunded)
- Different model