

Panel 4: Government Finances with an Aging Population

Adjusting the Payroll Tax to Promote Longer Careers *

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8-1-2016

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Idea

- Existing tax system may distort labor supply decisions
- While across-the-board tax reductions can leave government services under-funded, targeted tax changes could be more efficient
- Assume household labor supply latitude comes primarily on the extensive margin
- Though an aging population may make reforms more urgent, the present work focuses on efficiency

Why Focus on the Payroll Tax?

- The Social Security system inherently has many age-specific rules
- Historically, pensions (especially DB pensions) have utilized nonlinear benefit & contribution rules

OASI: Income & Substitution Effects

- OASI Tax
 - Income Effect: $R \uparrow$
 - Substitution Effect: $R \downarrow$
- OASI Benefit
 - Income Effect: $R \downarrow$
 - Substitution Effect [weak]: $R \uparrow$
- Balance: $R \downarrow$

Income Tax: Income & Substitution Effects

- Income Taxes
 - Income Effect: $R \uparrow$
 - Substitution Effect: $R \downarrow$
- Public Services
 - Income Effect: $R \downarrow$
 - Substitution Effect [weak]
- Balance: $R \downarrow$

Project Idea

- Lower OASI payroll tax on employers & employees in a narrow age range around retirement
- The narrow age range can restrict the cost of reform
- If we target the tax reduction to the vicinity of the retirement age, the substitution effect can be large
- Goal: use the substitution effect of tax-rate reduction to offset labor-supply distortions from existing tax system

Analysis

- Set up a life-cycle of household behavior
- Estimate key parameters using HRS and other data sets
- Simulate the effects of payroll tax reductions that target ages near retirement

Model

- Certainty equivalence framework as in Laitner/Silverman [2012], though different analytical structure
- Uses utility function non-separable over consumption expenditure and leisure
- Take into account health declines that affect ability to continue working

CEX Data

- Household composition at each age is important
- Estimate equivalent-adult scale from CEX data
- See Table 1

Table 1. Estimated CEX Coefficients: Parameter (Std. Error)

Parameter	No Time Dummies	With Time Dummies
$\beta_1^{CEX} = \frac{r-\rho}{1-\gamma}$	0.0264 (0.0008)	0.0279 (0.0010)
$\beta_2^{CEX} = \beta_3 = \xi^S$	0.3351 (0.0523)	0.3066 (0.0505)
$\beta_3^{CEX} = \beta_4 = \xi^K$	0.3372 (0.0181)	0.3363 (0.0172)
$\beta_4^{CEX} = \frac{\gamma}{1-\gamma} \cdot \ln(\lambda)$	-0.0831 (0.0370)	-0.0750 (0.0355)
Observations	765	765

Source: see text. CEX adult (female) ages 25-69. Time-dummy coefficients omitted.

HRS Data

- Finish household estimation with HRS data
- Data set includes linked Social Security earnings by age, as well as extensive household demographic information
- Estimate a remaining, key parameter: the IES

$$R_h = \varphi(IES, X_h) + \varepsilon_h$$

Censoring

- Not all households reach retirement in our HRS sample, providing “censored” observations in the regression above
- Disabilities that lead to early exit from the labor force create a second type of censoring
- We consider several definitions of disability:
 - “Stringent:” the household explicitly states that it retired due to disability
 - “Broad:” the household reports, near its retirement age, a health condition limiting its ability to work

Regressions

- We use a LAD (median) regression, which takes into account both types of censoring (Powell [1984])
- Structural estimation, using demographic and earnings from the data
- See Table 2

Table 2. Quantile Regressions: HRS Data 1992-2002 Parameter Estimate/(Std Error)					
Censoring:	γ	Observations:			Local Max- ima
		Uncensored	Censored	Total	
Retirement Equation					
Out-of-sample Retirement	-0.1400 (0.0028)	694	377	1071	1174
Stringent-definition Disability	-0.1433 (0.0060)	607	464	1071	1166
Broad-definition Disability	-0.1648 (0.0047)	447	624	1071	1124
Either definition Disability	-0.1665 (0.0052)	441	630	1071	1123
Networth Equation					
None	-0.2814 (0.0245)	694	377	1071	1079

Source: see text.

Regression Outcomes

- Table-2 parameter estimates fall in familiar ranges
- Specific features of the analysis:
 - Model can be non-concave in retirement age & we search for a global maxima carefully
 - The different definitions of disability do make some difference to the estimates; the degree of censoring varies from about one-third of the sample to about two-thirds
 - The model (and richness of data) also lets us derive a second, separate regression equation for household networth:

$$N_h = \psi(IES, X_h) + \eta_h$$

Simulations

- We experiment with removing the payroll tax (employer and employee shares) at ages 64,...,58; no change in benefit formula
- Treatment of disability: simulations assume those censored by disability at \bar{R}_h cannot respond to the reform by moving above \bar{R}_h
- Table 3 reports average change in retirement age for HRS sample

Table 3. Simulated Change in Average Optimal Household Retirement Age R^* Following a Reform that Ends the OASI Payroll Tax at a Specified Age (Assume Zero Response from Households Retiring in-Sample Due to Disability)

Policy: End Payroll Tax at, or above, Age				Fraction Non-disabled Households
64	62	60	58	
Censoring: Out-of-Sample Retirement				
0.12	0.30	0.47	0.72	1.00
Censoring: Stringent-Definition Disability				
0.15	0.31	0.49	0.69	0.92
Censoring: Broad-Definition Disability				
0.26	0.45	0.61	0.76	0.77
Censoring: Stringent or Broad-Definition Disability				
0.26	0.47	0.56	0.78	0.76

Source: see text.

Simulation Outcomes

- Removing the tax at age 64 has small average effect on retirement age — most households are unaffected, having retired earlier
- Removing the tax at 62 yields about one-third of a year more labor force participation; at 60, we gain about one-half a year; and, at 58, we gain about three-quarters of a year

Welfare Gains

- A household that works longer after reform has a welfare gain, in the range $[0, \textit{tax reduction}]$, from being given more choice
- Social gain:
social gain = household gain +
added income tax revenues
- Second component can be large

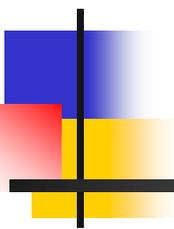
Redistribution

- Despite the rather narrow age range of the tax reductions above, the amount of lost payroll-tax revenue can be significant
- Possible remedies:
 - Try to condition a household's last age of payroll taxation on more attributes
 - Raise the payroll tax uniformly at earlier ages — see Laitner/Silverman [2012]

Social Security System Solvency

- The principal gain of the reform analyzed above might well be the societal gain from enhanced income-tax revenues
- If Treasury collects the additional taxes, there is precedent for it refunding that sum to the Social Security Trust Fund — recall the Greenspan Commission reforms of the early 1980s

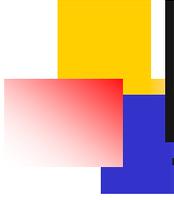
No slides from Eugene Steuerle



The Earnings of Undocumented Immigrants: Towards an Assessment of the Impact of Status Regularization

George J. Borjas
Harvard University

August 4, 2016



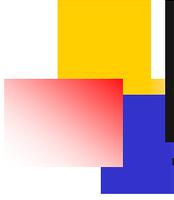
1. Regularizing the status of undocumented workers

- DHS estimates that 11.4 million undocumented persons reside in the United States (as of January 2012).
- Congress is considering proposals to regularize the status of the undocumented population and provide a “path to citizenship,” while President Obama has issued executive orders that grant some form of amnesty to about half of this population.



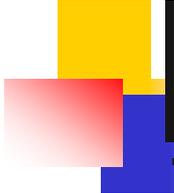
2. Evaluating the impact of regularization

- Predicting the impact of the regularization on the inflows and outflows of funds into any government program immediately runs into a important roadblock: We are now only beginning to learn about the economic status of the 11.5 million undocumented persons.
- In last year's presentation, I examined the labor supply of undocumented immigrants. Undocumented men work far more than other men; undocumented women work far less.
- But we know little about their earnings history, their financial contributions to various government programs, or how those earnings and contributions would change if their status were regularized.



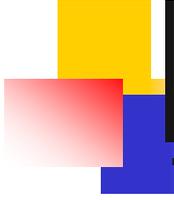
3. What this paper does

- This paper continues my attempt at providing some of the requisite background information involved in conducting any such future evaluation. In particular, the paper provides a comprehensive empirical study of the earnings of undocumented immigrants in the United States.
- The analysis is based on data drawn from CPS and ACS files that attempt to identify the “likely undocumented” population at the individual level. This identification is an extension of the methodology employed by DHS to estimate the size of the undocumented population.
- I have the 2012-2013 CPS files created by the Pew Research Center, and have “reverse engineered” the method to all 1994-2015 March CPS files and all 2001-2014 ACS files.



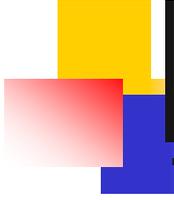
4. Main findings

- Hourly wage of undocumented workers < Hourly wage of documented workers < Hourly wage of natives. And this is true for both men and women.
- Much of the wage disadvantage of undocumented persons can be explained by differences in observable characteristics (particularly education).
- Age-earnings profiles of undocumented workers are flatter than that of other workers.
- Hourly wage rate of undocumented men rose after 2007. The penalty to undocumented status is now very small (probably less than 3 to 5 percent).
- The differences in labor supply across the groups attenuate much of the earnings disadvantage for men, but accentuate it for women.



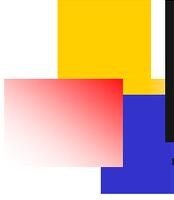
5. Undocumented immigration (DHS estimates)

- **Jan. 2000:** 8.5 million.
- **Jan. 2005:** 10.5 million.
- **Jan. 2007:** 11.8 million.
- **Jan. 2008:** 11.6 million.
- **Jan. 2010:** 10.8 million
- **Jan. 2011:** 11.5 million
- **Jan. 2012:** 11.4 million
- 25% live in California; 16% in Texas; 59% come from Mexico.



6. Estimating size of undocumented population

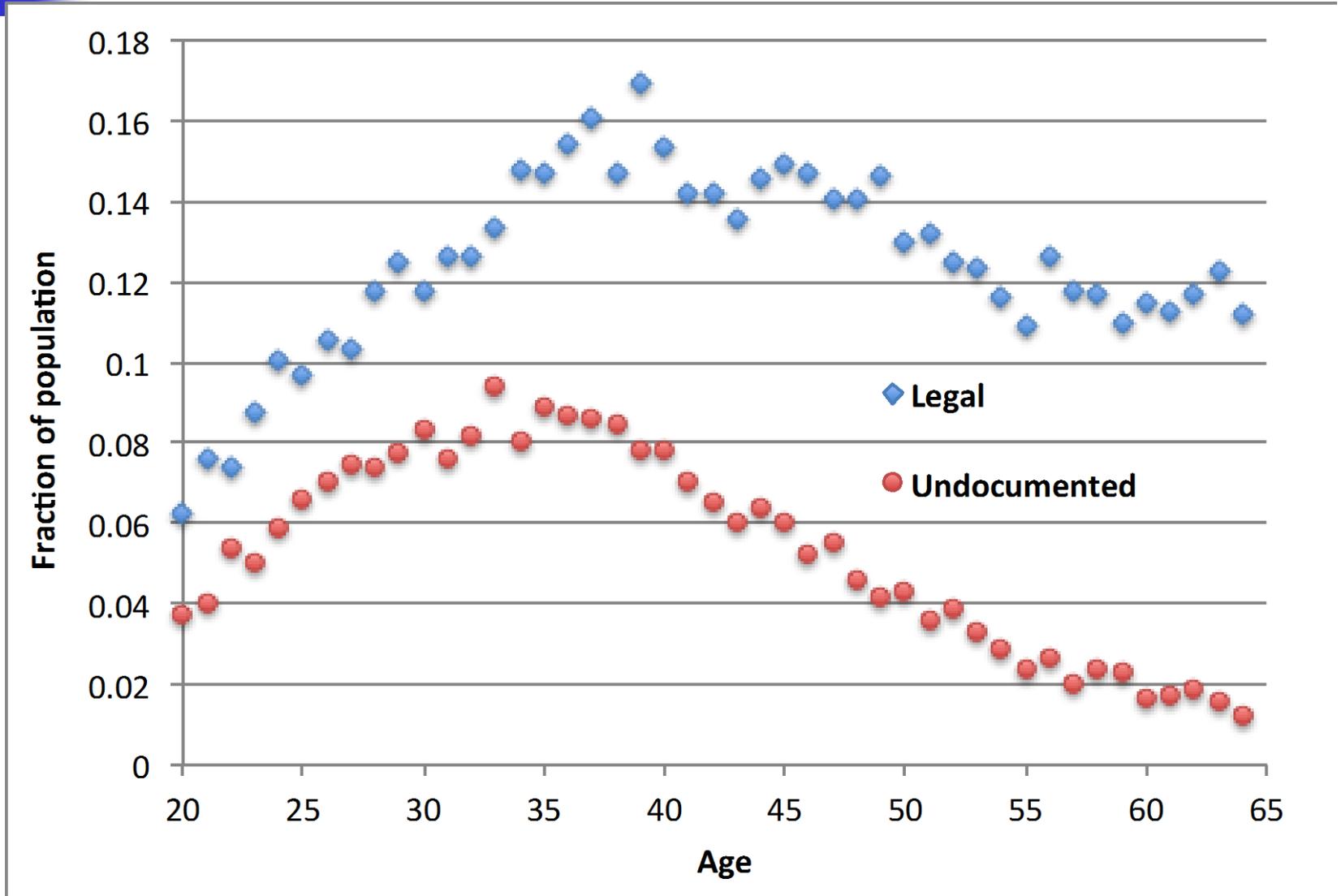
- **Residual Method.** Originated in 1987 in work by Jeffrey Passell (now at PEW Research Center) and Robert Warren (Chief Statistician of INS at the time).
- We know how many “green cards” have been given out. We can calculate expected size of legal immigrant population by using mortality rates and age at migration, and accounting for out-migration.
- We have enumerations of number of foreign-born in country (Census, ACS, CPS).
- Adjust the number of foreign-born for persons in US with student visas, H-1Bs, etc.
- Difference between the adjusted number enumerated and the expected number of legal immigrants is the DHS estimate of the number of undocumented immigrants.



7. Pew method to identify undocumented at micro level in CPS

- Created by Jeff Passell.
- Immigrants entering the U.S. before 1980 are legal.
- Immigrants entering as refugees are identified as such based on country of origin and year of entry.
- Immigrants with temporary visas (e.g., students, diplomats, high-tech workers) are legal.
- Immigrants in some occupations are legal (working for the government, licensed occupations, veterans).
- Immigrants receiving some types of public assistance are legal.
- Some family relationships extend legal status to relatives.
- Residual number of undocumented immigrants is larger than DHS estimates. So use a “probabilistic assignment process.” Passell then creates a new weight so that aggregates match DHS numbers.
- I have the micro files for March 2012 and March 2013 CPS.

8. Pew: fraction of legal and undocumented immigrants in population

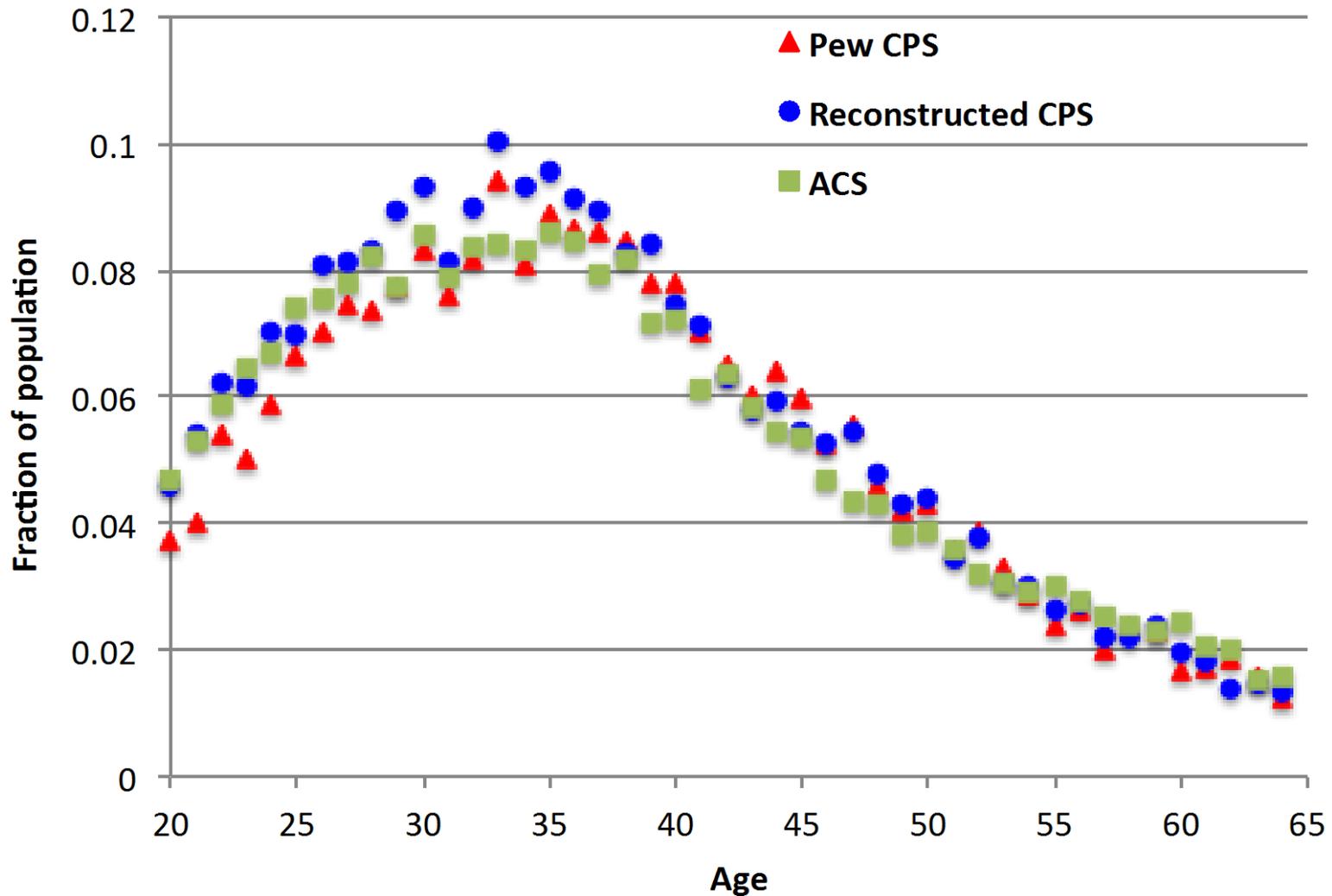




9. Reverse engineering the process

- Legal if citizen.
- Legal if arrived before 1980.
- Legal if receives Social Security, SSI, Medicaid, Medicare, or Military Insurance.
- Legal if works for government or is a veteran.
- Legal if lives in public housing.
- Legal if works in occupation that requires some type of licensing (Examples: Legislators, Accountants, Architects, RNs, Teachers, Inspectors of Agricultural Products, Lawyers, Air Traffic Controllers).
- Legal if certain family members are legal immigrants.
- The residual group is undocumented.
- I have added the undocumented identifier to all March CPS files between 1994 and 2014.

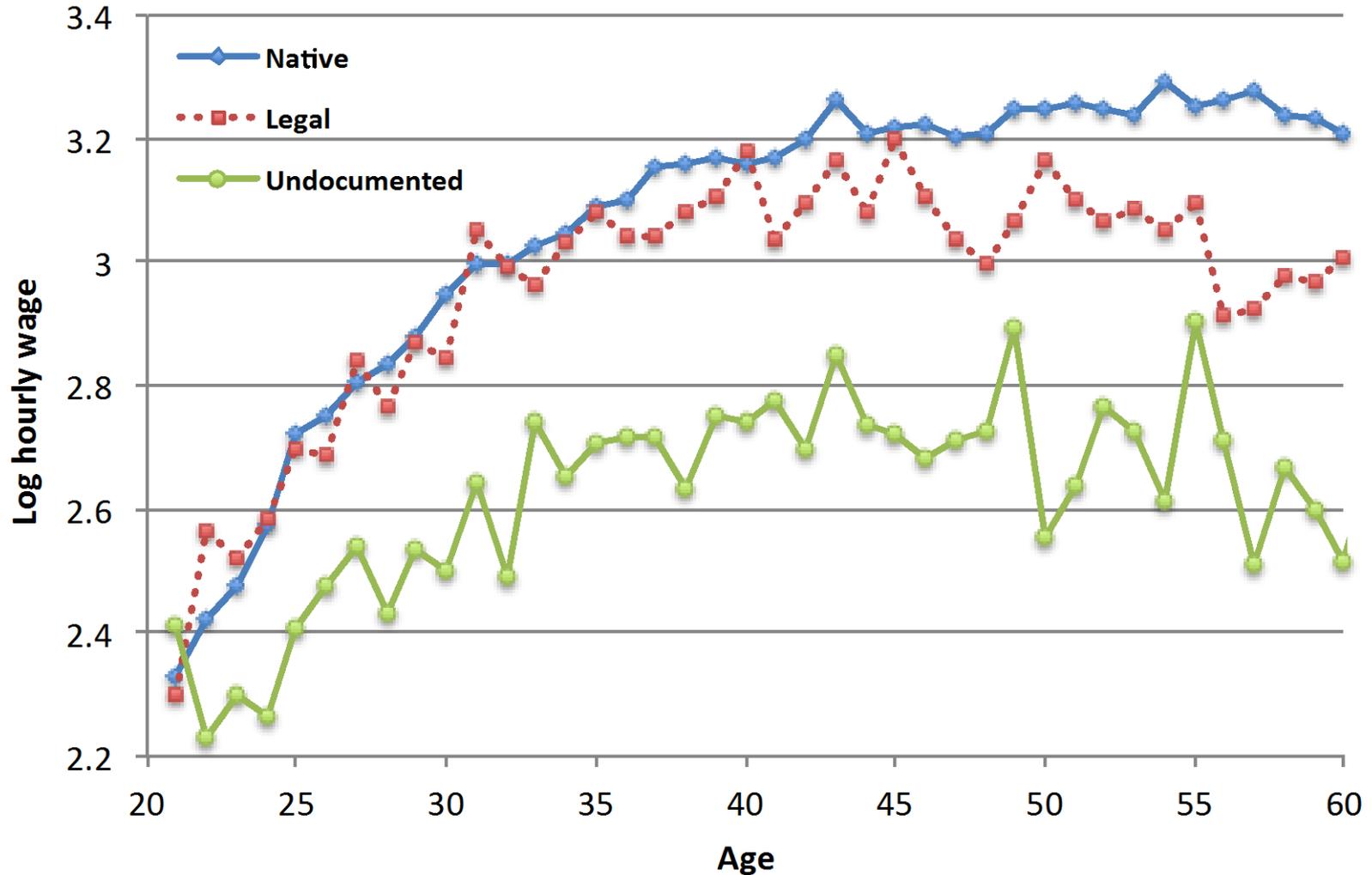
10. Fraction of undocumented immigrants in population (2012-2013)



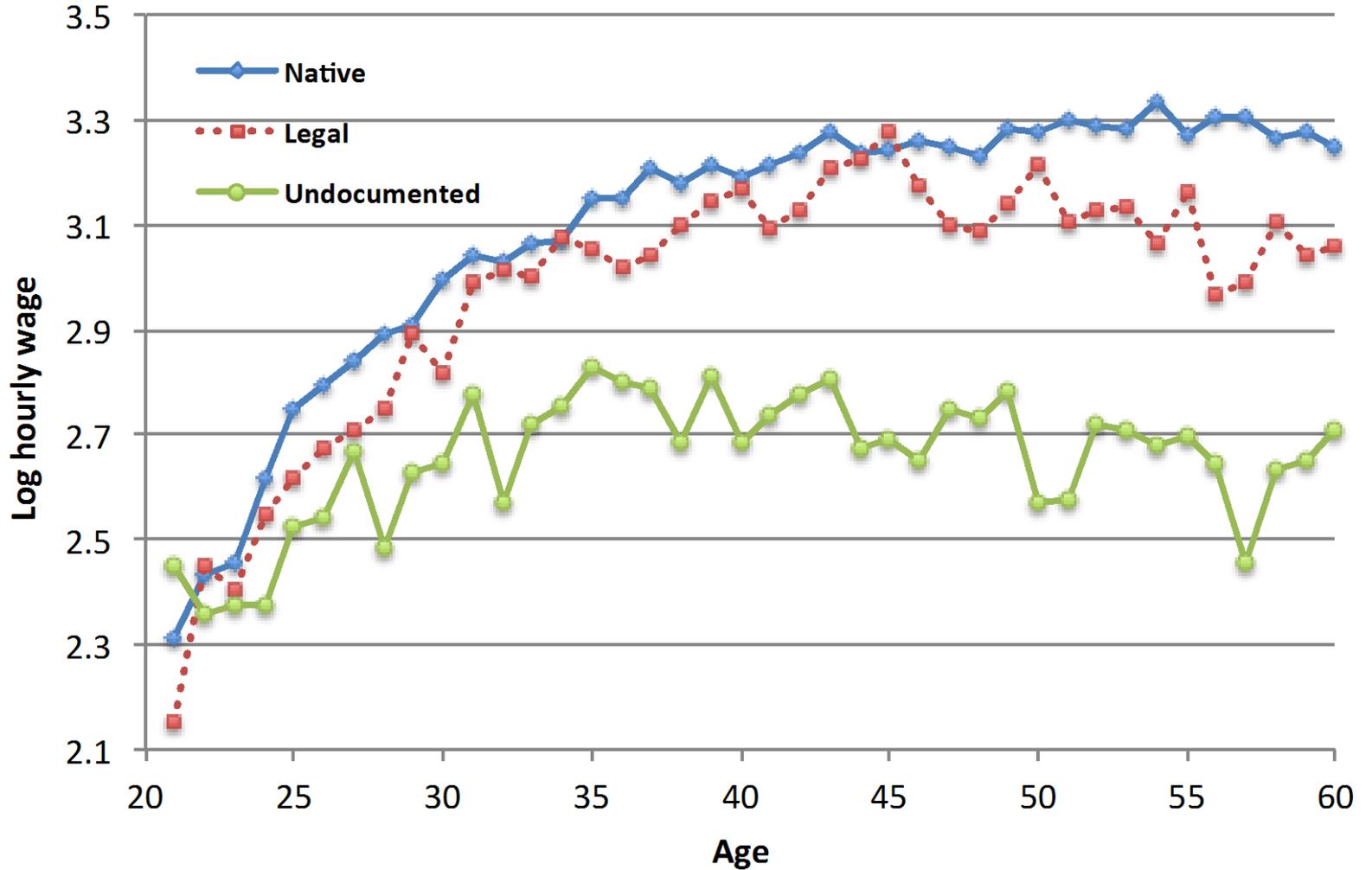
11. Means of key variables for men (2012-2013)

	Natives	Legal Immigrants	Undocumented immigrants
A. Pew CPS files:			
Percent of population	80.6	12.5	6.9
High school dropouts	5.3	20.5	45.5
Log wage gap relative to natives	0.0	-0.068	-0.455
Sample size	62,247	15,059	6,851
B. Reconstructed CPS files:			
Percent of population	81.0	11.6	7.4
High school dropouts	4.7	19.7	42.2
Log wage gap relative to natives	0.0	-0.069	-0.452
Sample size	54,120	8,058	4,933
C. ACS files:			
Percent of population	81.6	11.6	6.8
High school dropouts	5.8	20.5	43.7
Log wage gap relative to natives	0.0	-0.042	-0.404
Sample size	950,171	119,077	56,636

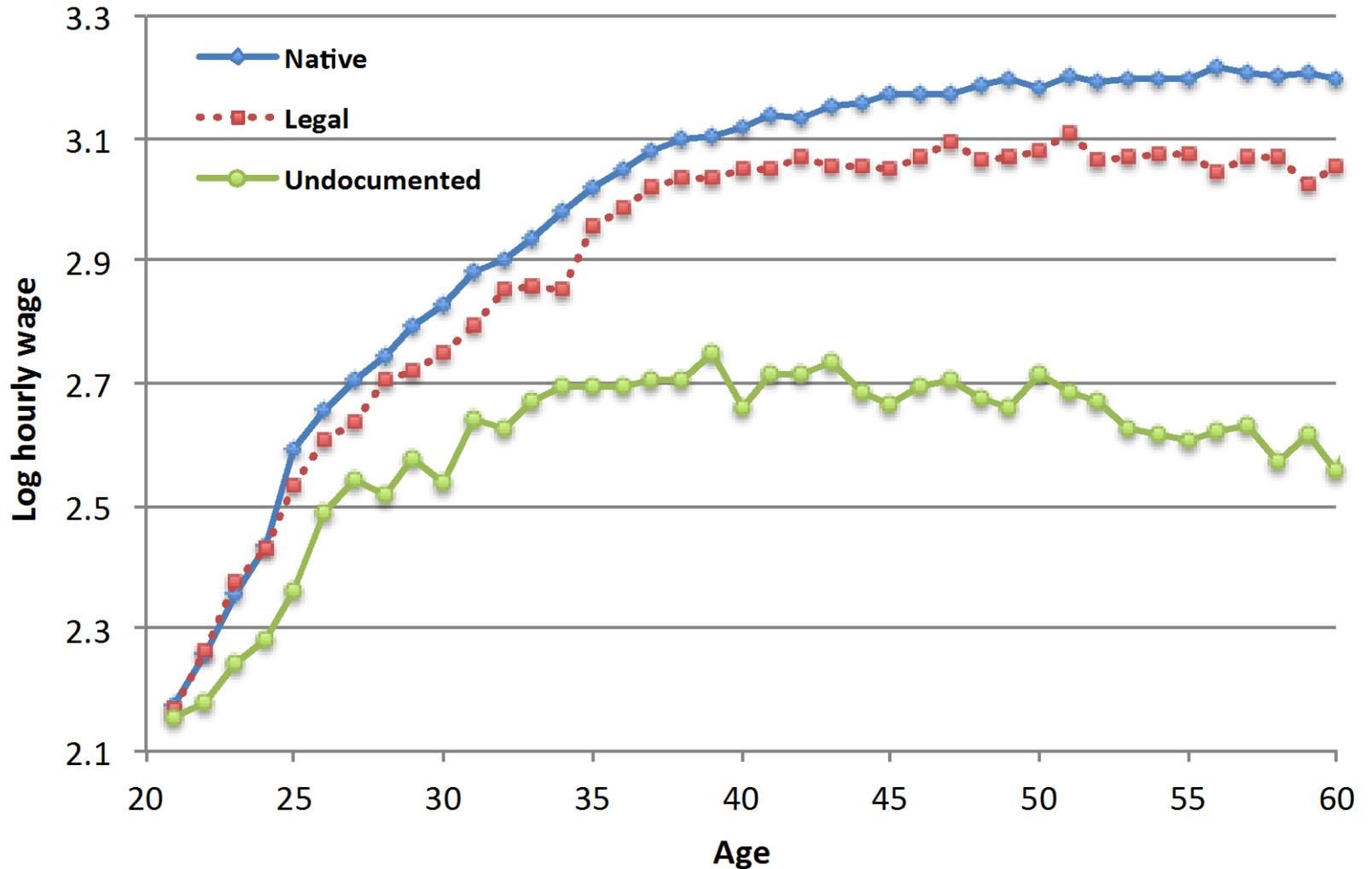
12. Age-earnings profile, Pew Men



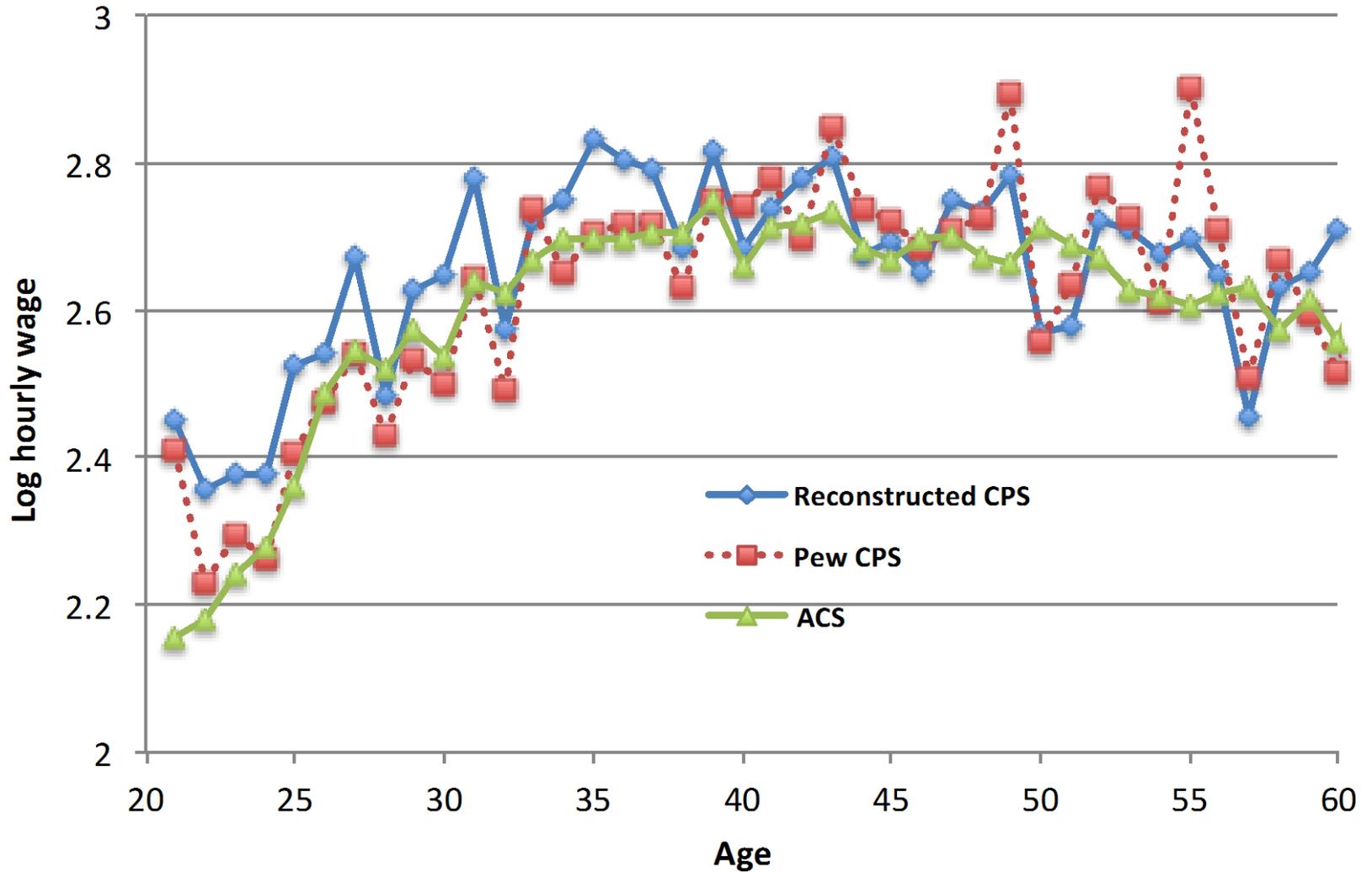
13. Age-earnings profile, CPS reconstruction, men



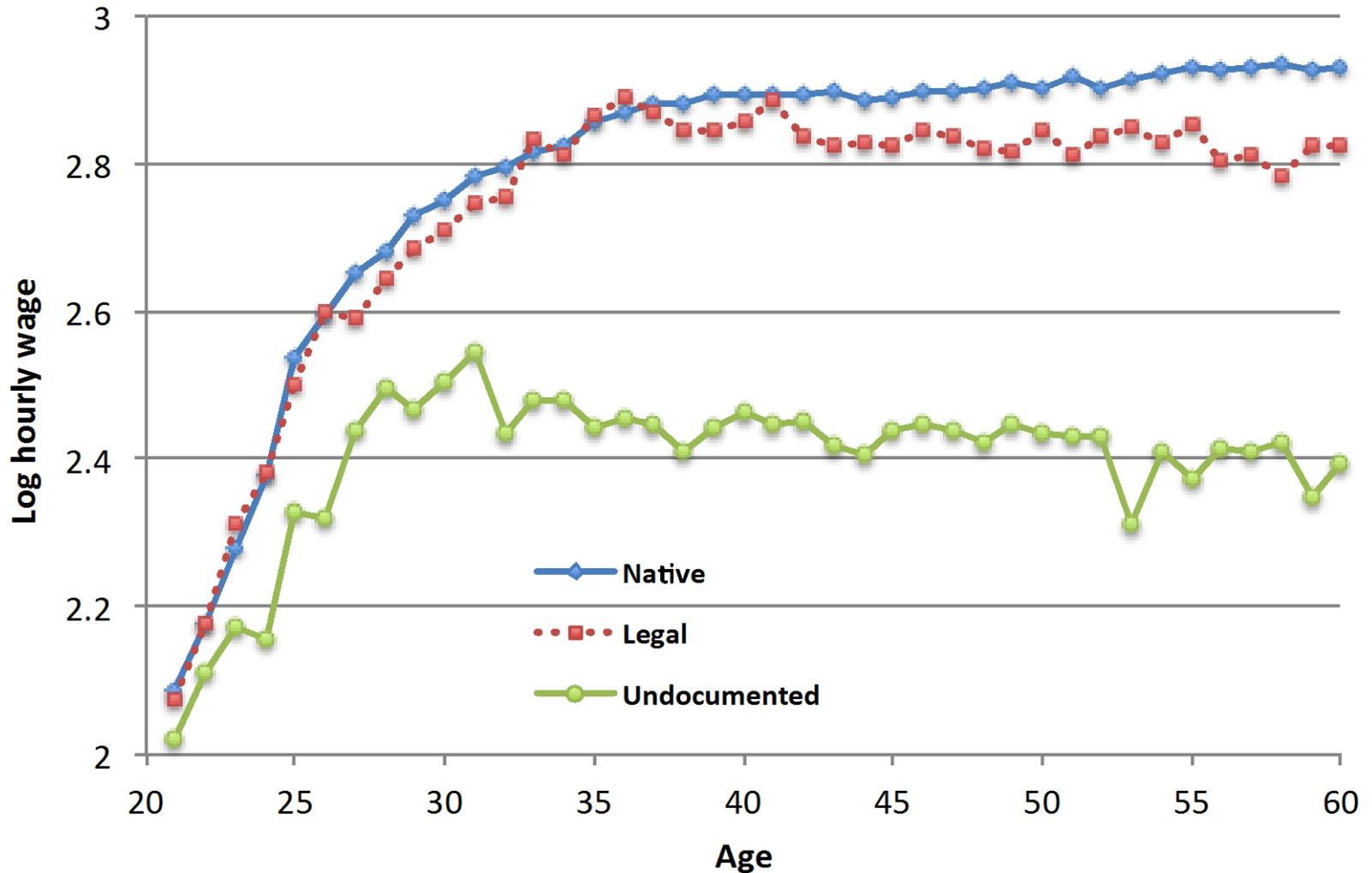
14. Age-earnings profile, ACS, men



15. Undocumented age-earnings profiles, men



16. Age-earnings profiles, ACS, women



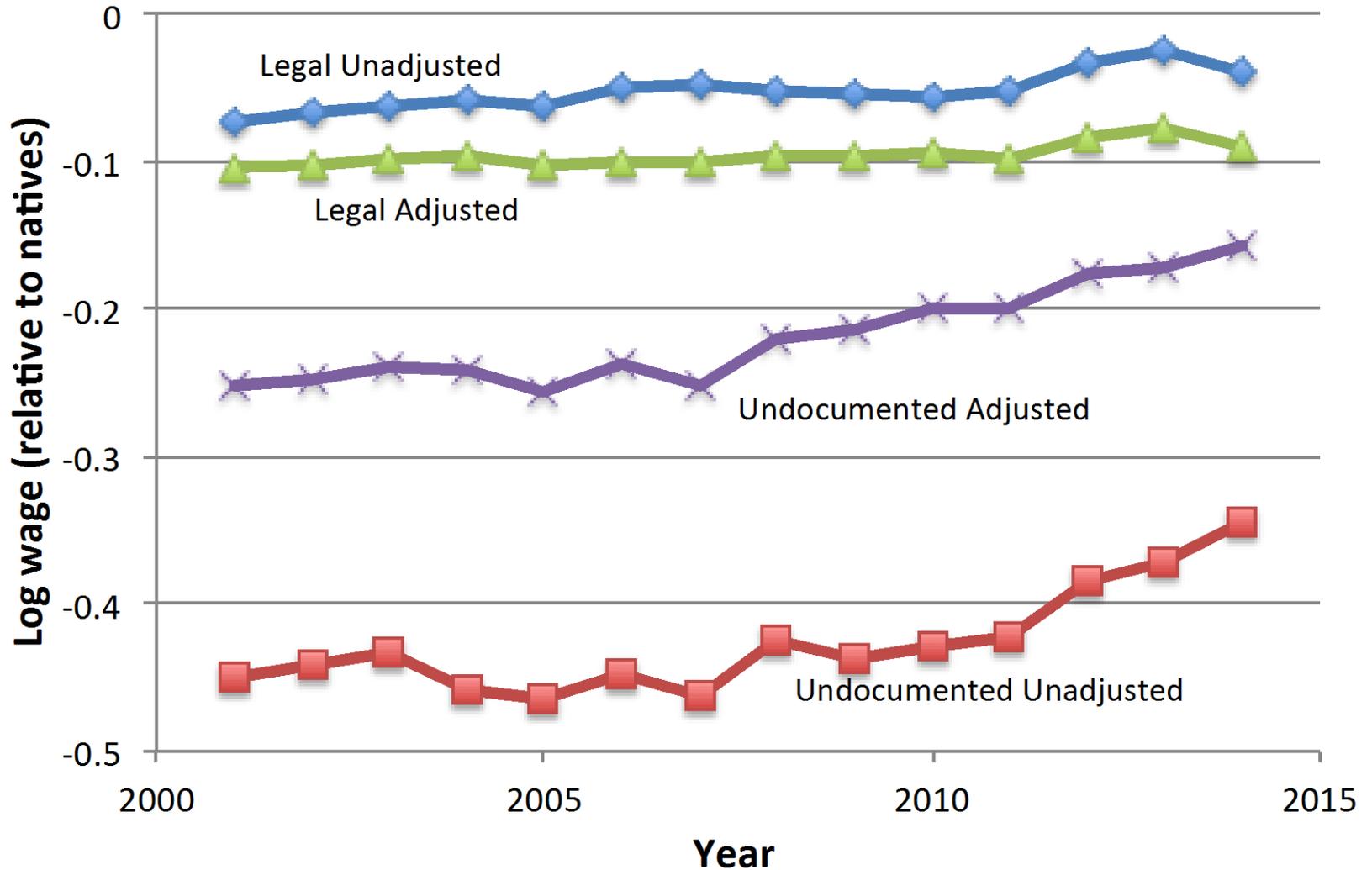
17. Differences in hourly wage rates (relative to natives)

Regression specification:	Men		Women	
	Legal immigrants	Undocumented immigrants	Legal immigrants	Undocumented immigrants
C. ACS				
No controls	-.042	-.404	-.017	-.396
	(.002)	(.003)	(.002)	(.004)
Adds age	-.093	-.350	-.051	-.381
	(.002)	(.003)	(.002)	(.003)
Adds age, education	-.048	-.150	-.010	-.143
	(.002)	(.003)	(.002)	(.003)
Adds age, education, <u>geography</u>	-.091	-.188	-.074	-.199
	(.002)	(.003)	(.002)	(.003)

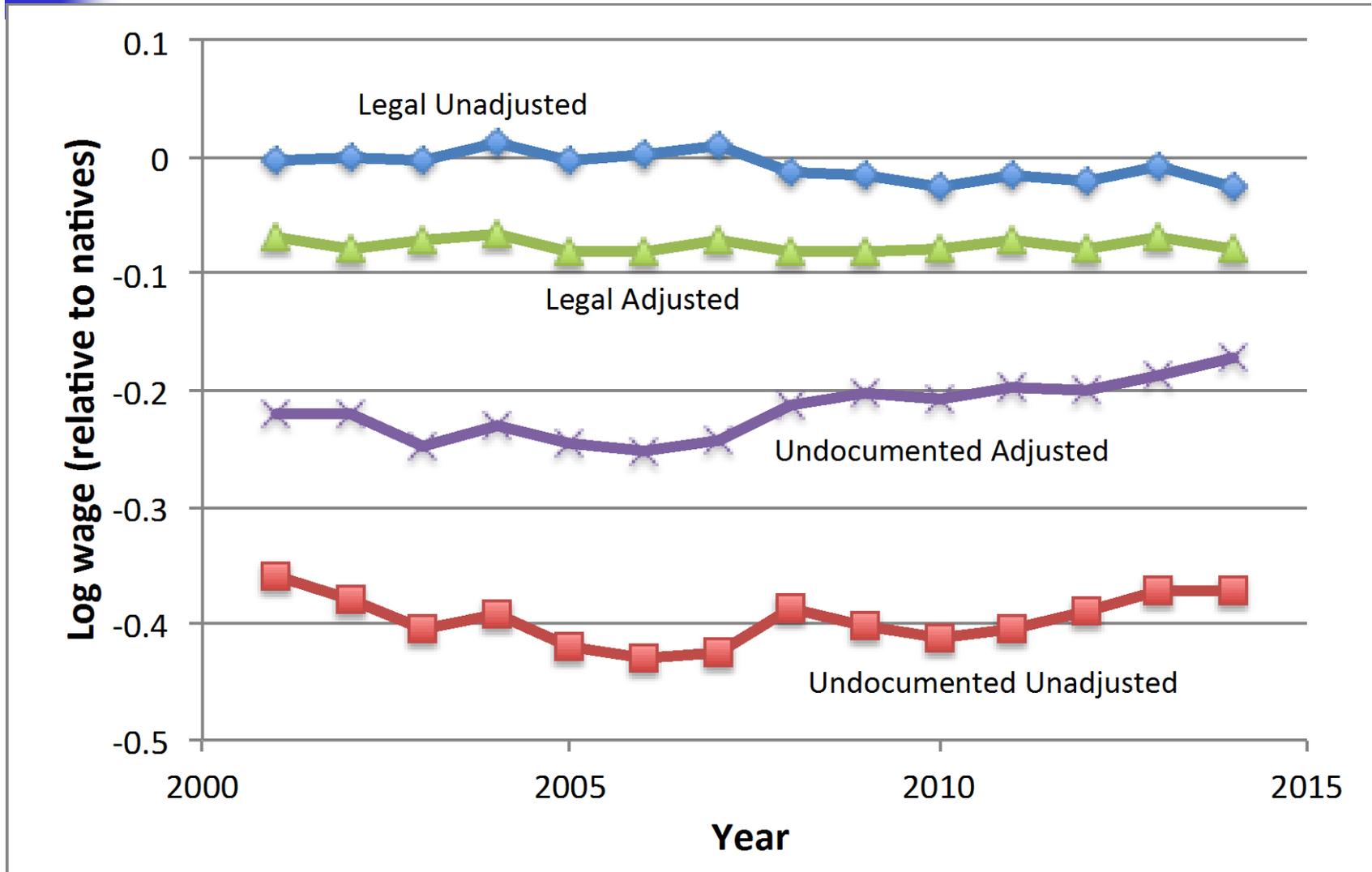
18. Wage penalty to undocumented status, ACS, 2012-2013

Sample	Specification					
	(1)	(2)	(3)	(4)	(5)	(6)
A. Men						
3. ACS	-0.361	-0.271	-0.229	-0.067	-0.065	-0.050
	(.004)	(.004)	(.004)	(.004)	(.004)	(.004)
B. Women						
3. ACS	-0.379	-0.340	-0.283	-0.071	-0.064	-0.033
	(.004)	(.005)	(.005)	(.004)	(.004)	(.005)
Controls for:						
Age	No	Yes	Yes	Yes	Yes	Yes
Years-since-migration	No	No	Yes	Yes	Yes	Yes
Education	No	No	No	Yes	Yes	Yes
State of residence	No	No	No	No	Yes	Yes
Country of birth	No	No	No	No	No	Yes

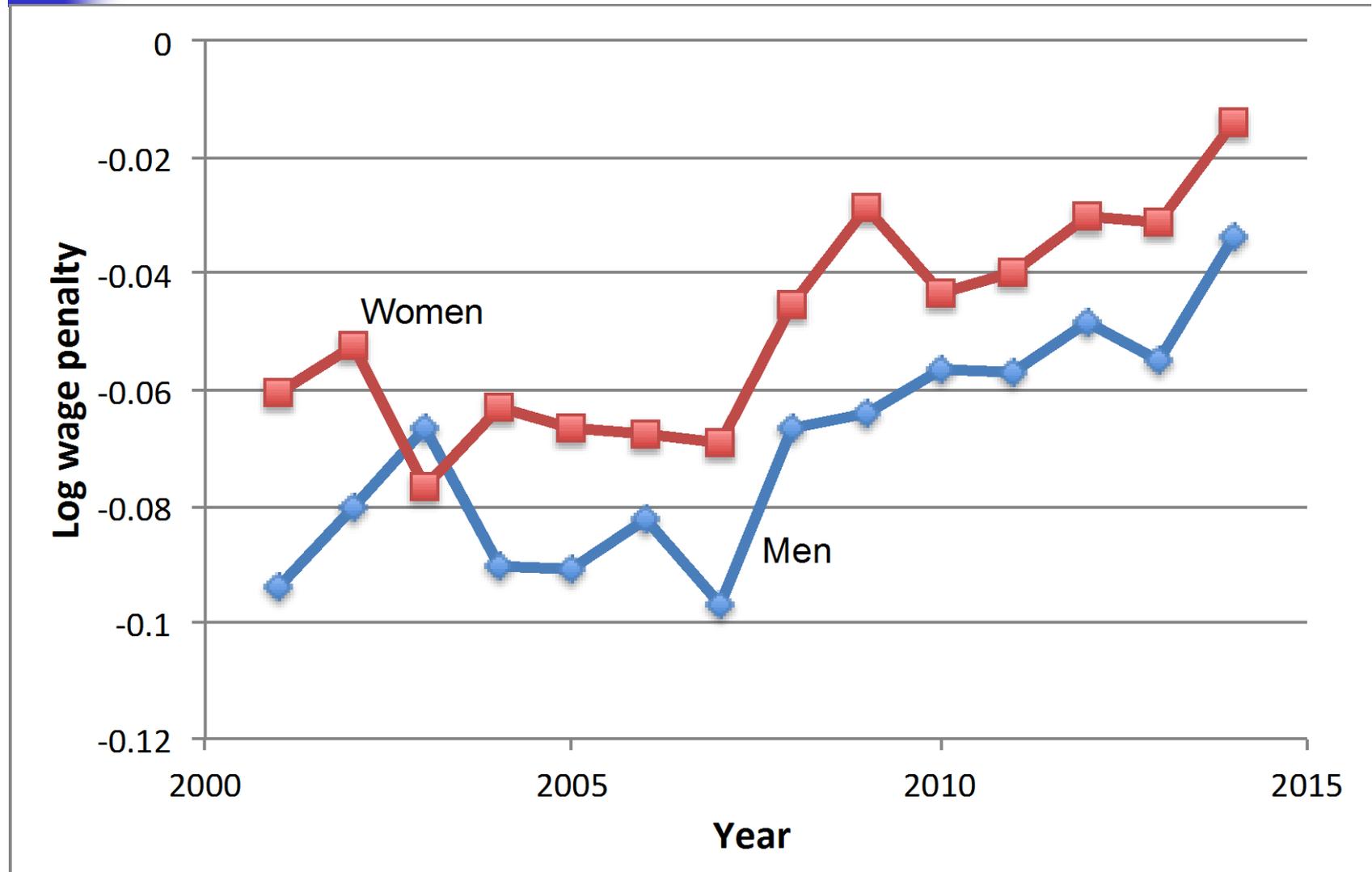
19. Trends in log hourly wage rate, ACS, men



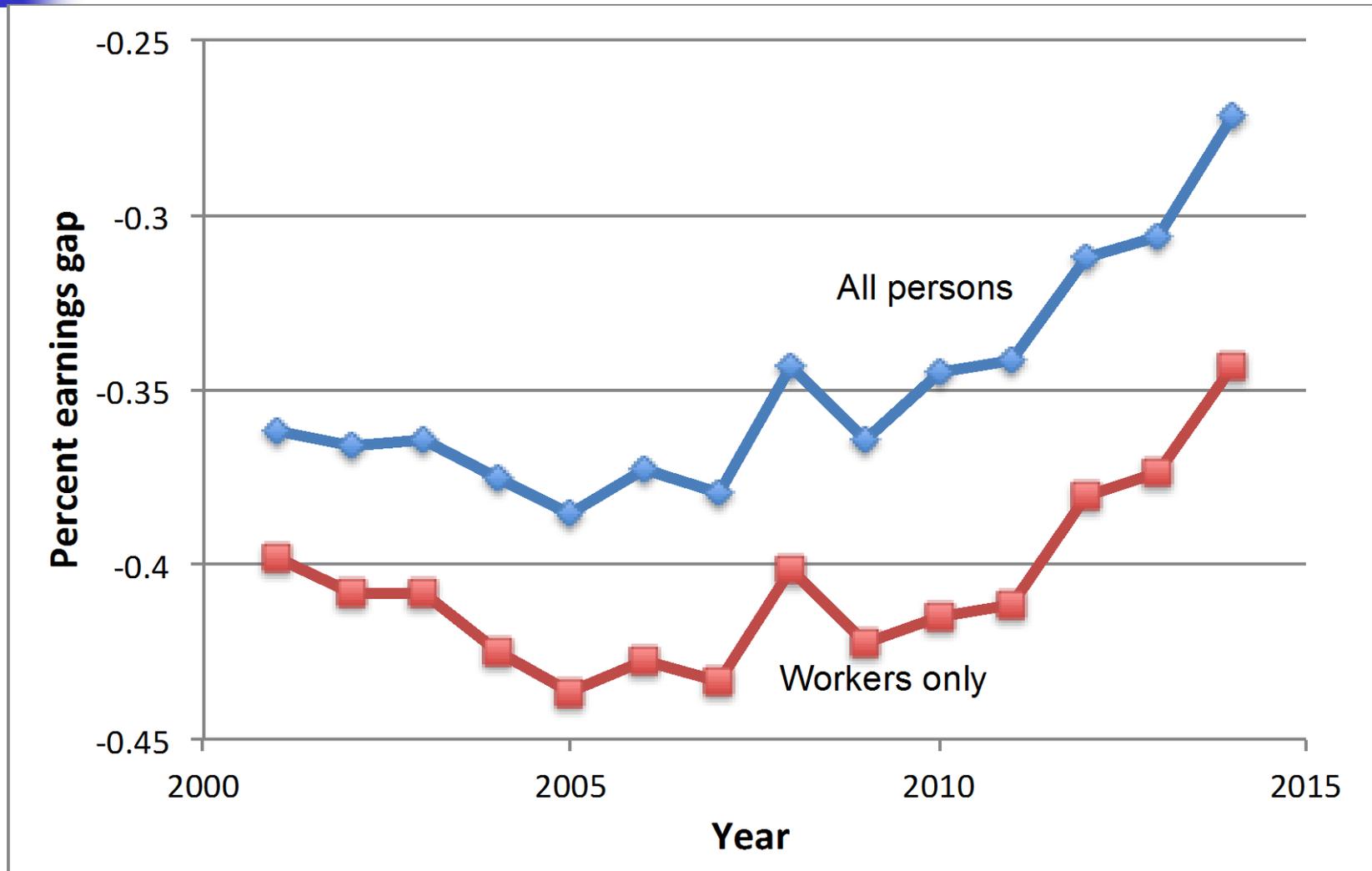
20. Trends in log hourly wage rate, ACS, women



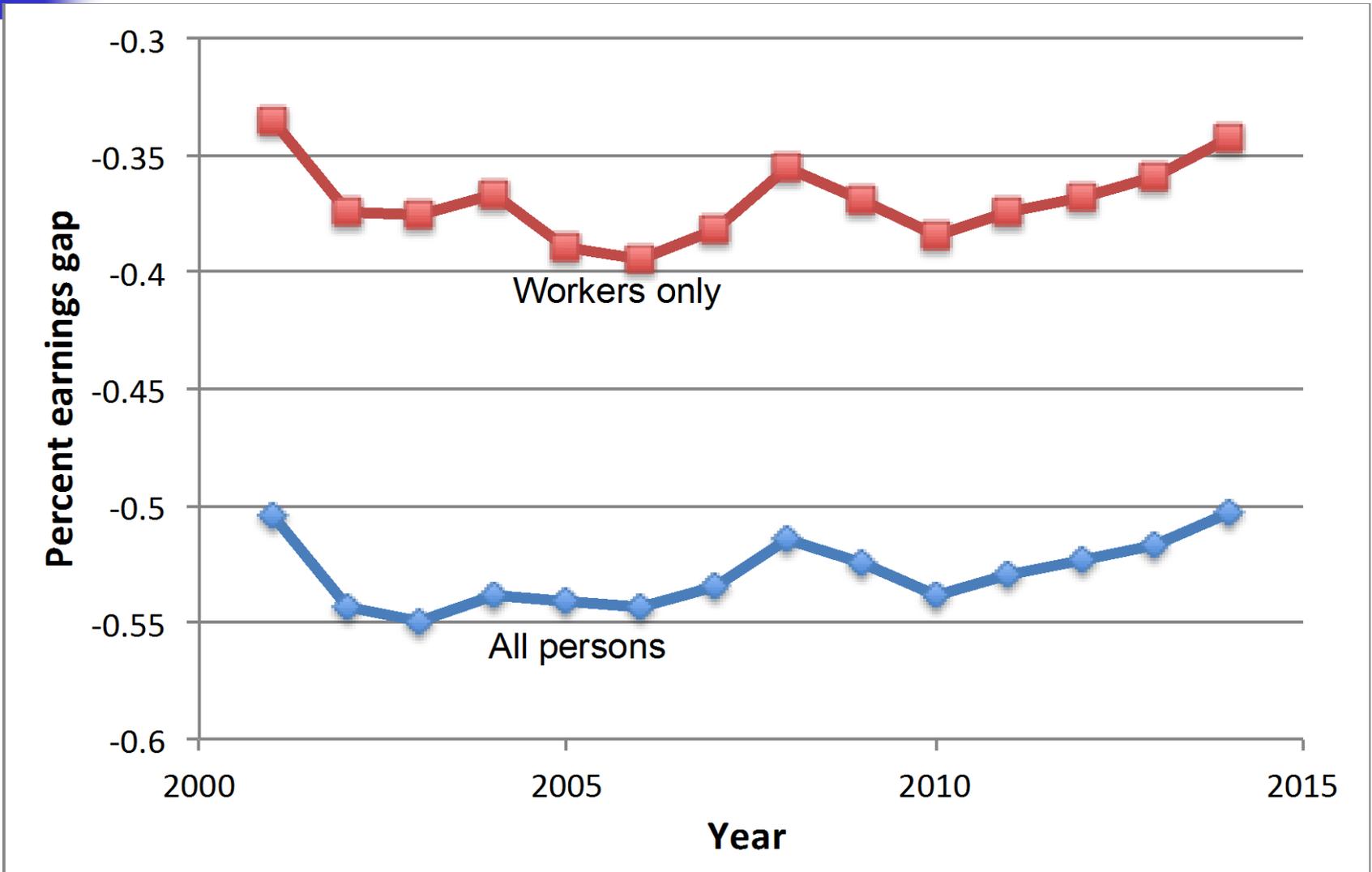
21. Trends in log wage penalty to undocumented status

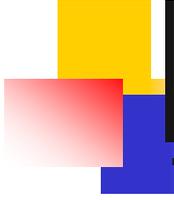


22. Role of labor supply in determining (unadjusted) earnings relative to natives, men



23. Role of labor supply in determining unadjusted earnings relative to natives, women





24. Towards an evaluation of regularization programs

- The research suggests a few stylized facts. Although undocumented workers earn far less than natives, much of the gap is due to differences in observable socioeconomic characteristics.
- There was a noticeable improvement in the relative earnings of undocumented workers in the past decade, beginning around 2007. The wage penalty to undocumented status is now at a historical low—of 3 to 5 percent (relative to what they would earn if they were legal immigrants).
- The small magnitude of the current wage penalty suggests that the enactment of a regularization program is likely to have only modest effects on the wage of undocumented workers.

Discussion of Earnings of Undocumented Immigrants



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AUGUST 4, 2016

Unauthorized Workers and Social Security



- **Earnings mostly “underground” (not taxed or covered)**
 - Most potential for changes affecting Social Security finances
 - Underground earnings hard to estimate → research is valuable
- **Some earnings taxed, cannot be matched to individuals**
 - Employee uses a false SSN, employer fails to verify
 - Earnings recorded in the Earnings Suspense File (~\$60B/yr)
- **Some workers have SSNs**
 - Overstayed a visa that temporarily authorized them to work, or obtained a SSN in other ways (easier before 2002)
 - Don't qualify for benefits now, but may qualify if the law changes

Notes on Terminology

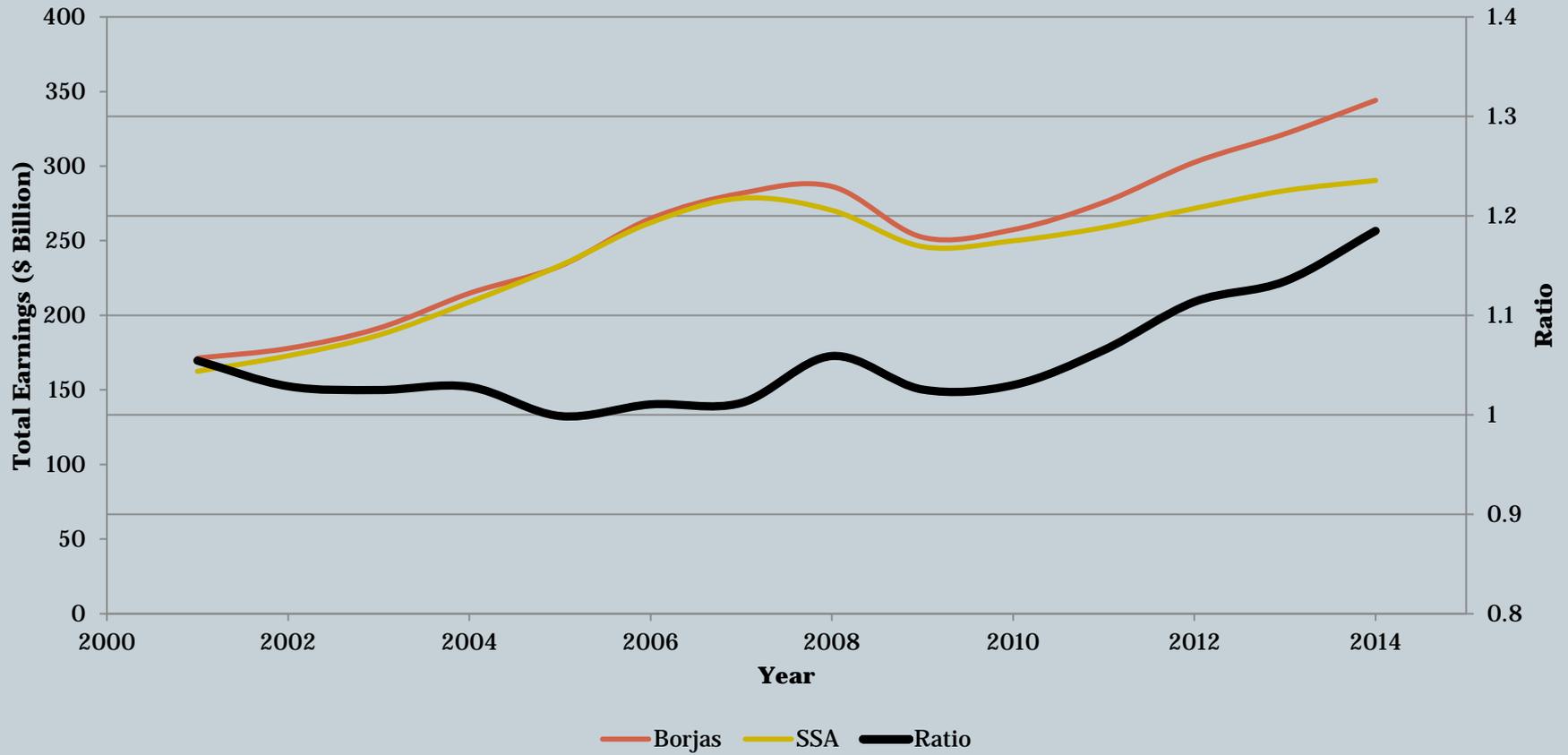


- The paper is really about **unauthorized** immigrants – they are not authorized to be in the US now, although they may have been at some point
- Temporary worker/student visa **overstayers** – were initially authorized to reside and work in the US; typically have legitimate SSNs (about 10%)
- **Undocumented** immigrants were never authorized to work or stay for more than a short period
 - Some entered legally, e.g., on a tourist visa (~40%)
 - Some entered illegally (~50%)

Our Estimates Are Similar (Until Recently)



Estimated Earnings of Unauthorized Immigrants



Wage Penalty

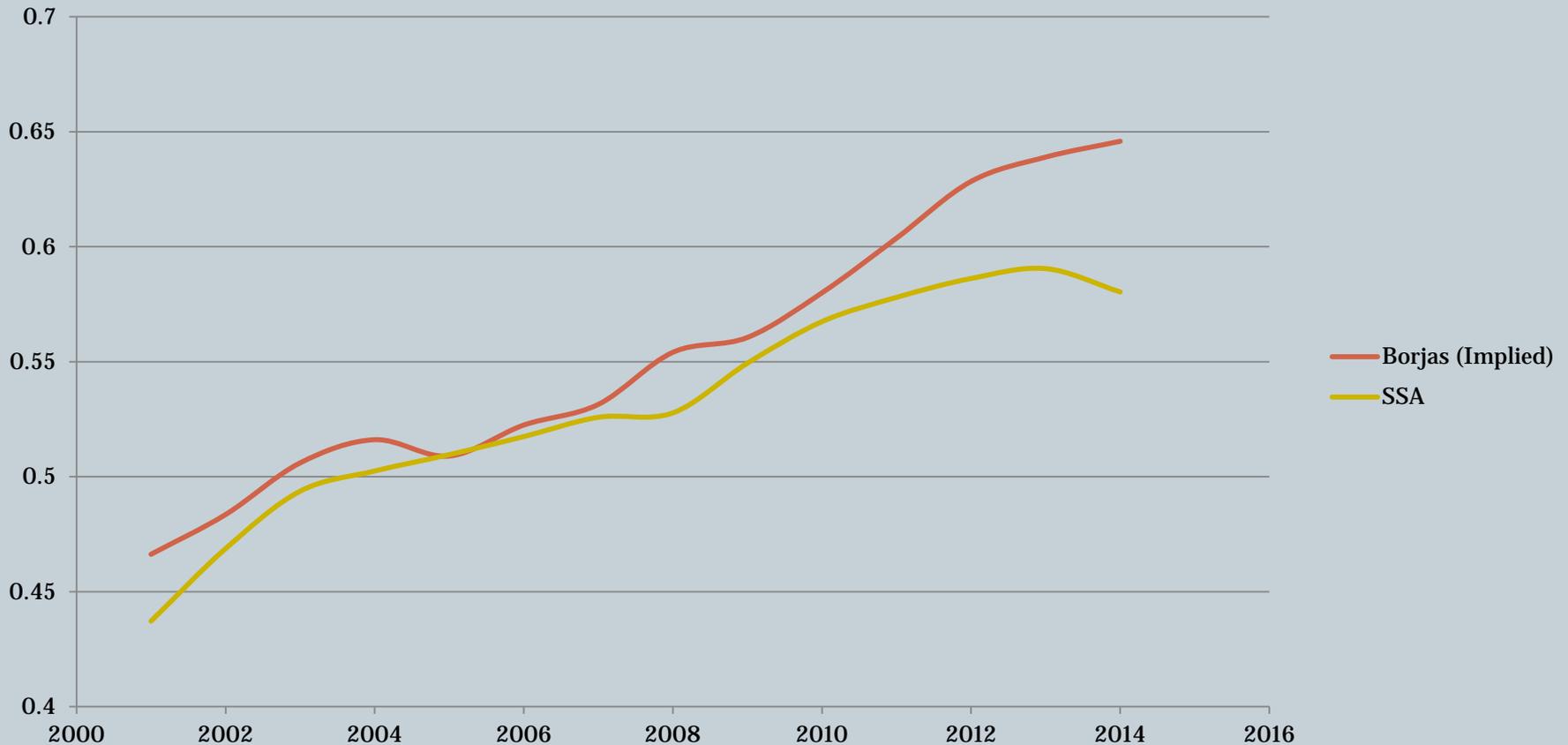


- **Unauthorized workers would be expected to accept a lower wage than comparable legal residents**
 - Vulnerable status – less bargaining power
 - Some of them don't pay (some) taxes
- **Employee's payroll tax rate = 7.65%, so if 50% of earnings is underground, ~3.8% wage "penalty" is just equalizing net wage**
 - Holds if employees don't value future benefit accruals
 - But underground proportion has increased while the wage penalty has decreased

Underground Proportion Is Increasing



Estimated Underground Proportion of Earnings



Does Changing Earnings Distribution Affect Results?



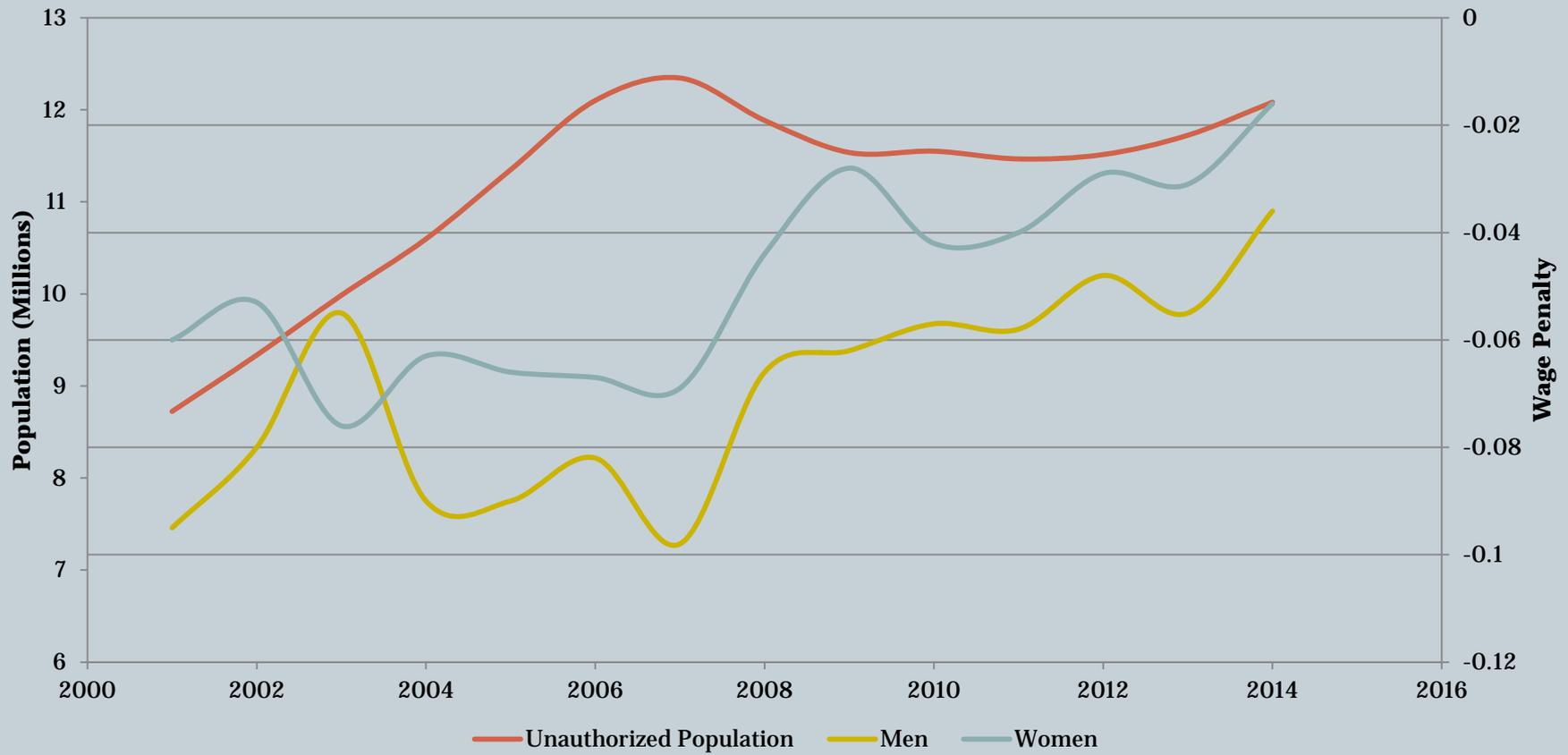
Ratio of Median to Average Net Compensation



The Unauthorized Population Has Changed



Wage Penalty and the Size of Unauthorized Population



Puzzles? Possible Answers?



- **Wage penalty is smaller than might be expected**
 - Unobserved characteristics of unauthorized immigrants?
 - Method of imputing status may misidentify many legal immigrants working in the private sector as unauthorized
- **Is the decrease in wage penalty unexpected?**
 - Underground proportion of earnings has increased
 - Median earnings have not kept pace with mean earnings
 - The unauthorized population has changed as labor conditions changed (selection effect)



HOW WOULD INVESTING IN EQUITIES HAVE AFFECTED THE SOCIAL SECURITY TRUST FUND?

Gary Burtless, Anqi Chen, Wenliang Hou,
Alicia H. Munnell *and* Anthony Webb

ANNUAL MEETING OF THE RETIREMENT RESEARCH CONSORTIUM
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Chart. Mean Returns and Standard Deviation of Returns of Four Portfolios, 1928-2015

Percent

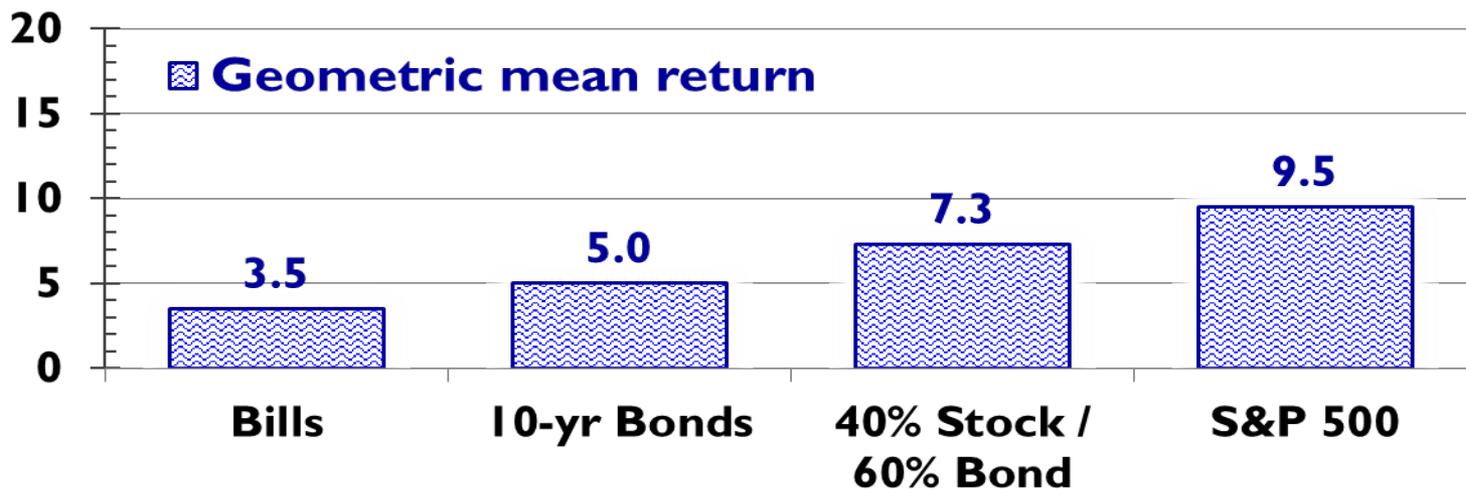


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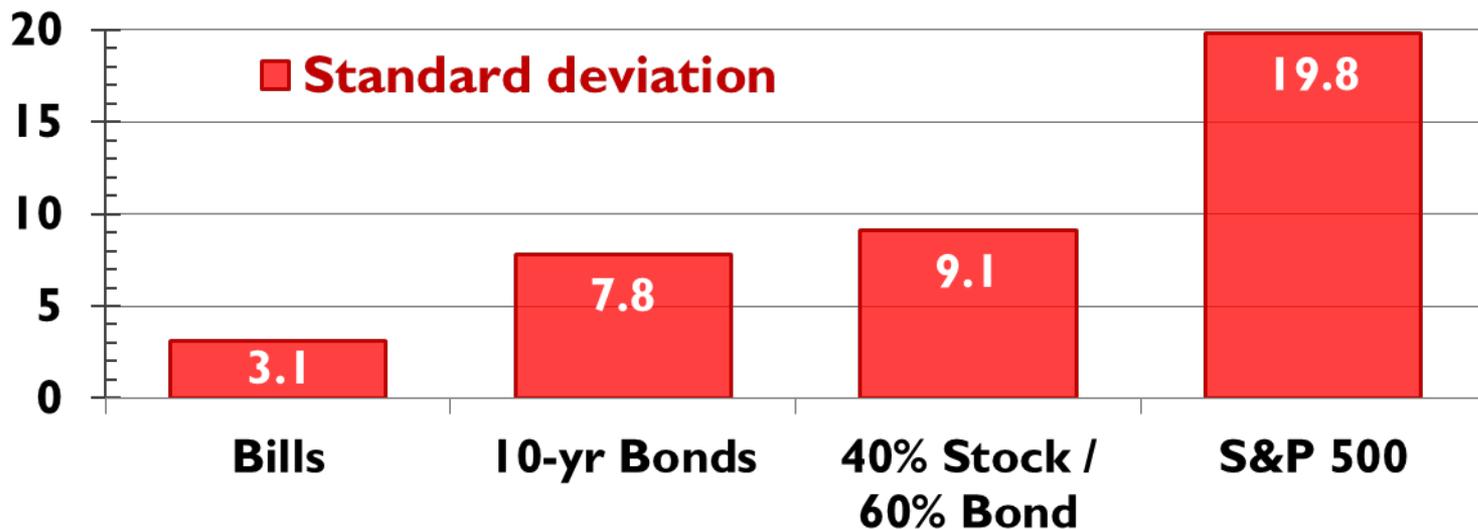
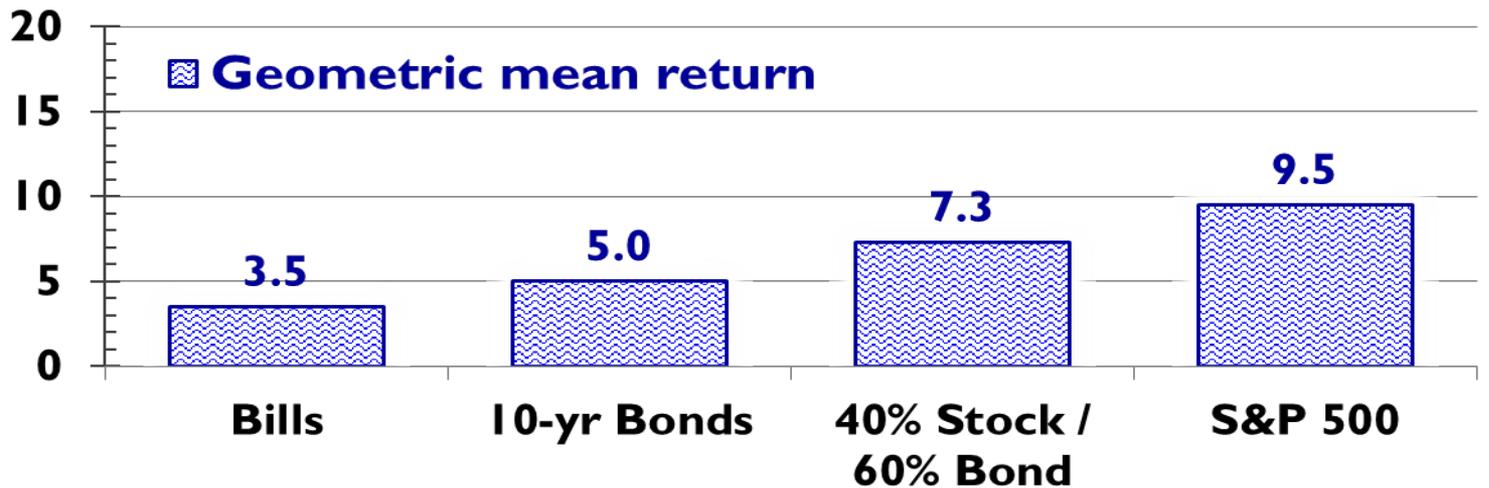
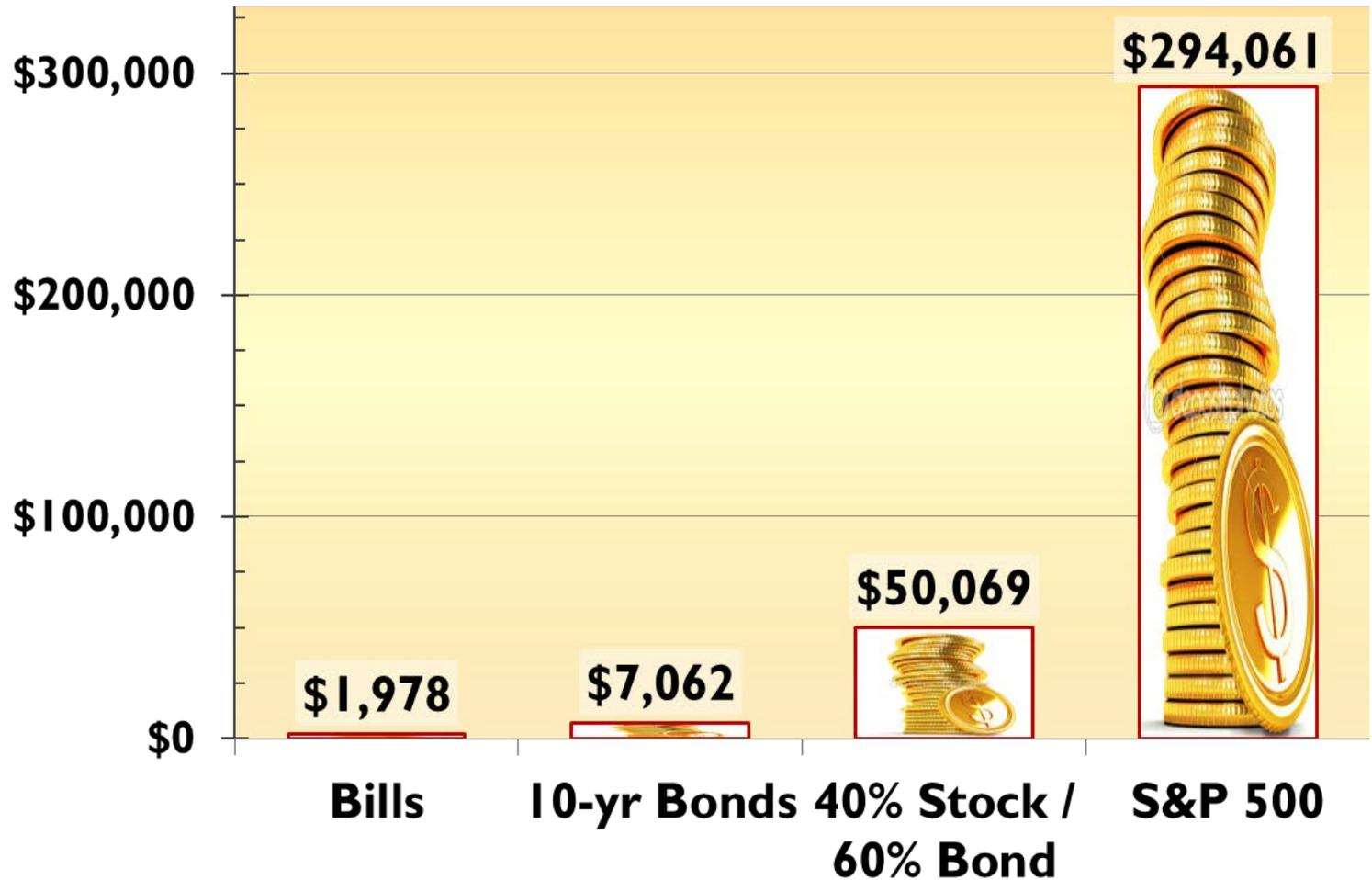


Chart. Compound Value of \$100 Invested in 1928 and Held through 2015

Value at year-end 2015



Plan of the paper

- Investigate **1984-2015** Trust Fund ratio if part of portfolio had been invested in equities
 - Actual equity returns; actual U.S. Treasury interest rates
- Simulate **2016-2090** Trust Fund ratio after 2.62% hike in payroll tax, investment of up to 40% of Trust Fund in equities
 - Historical equity returns adjusted for difference between past and predicted future inflation
 - Historical U.S. Treasury interest rates adjusted for difference between past and predicted future inflation
- Pros and cons of equity investment in TF portfolio

Conclusions

- **Investing part of TF in equities improves SS finances**
 - Higher expected return increases share of future SS benefit costs that can be financed out of investment income; Eventually reduces size of required tax hikes.
- **Policy also increases variance of future outcomes**
 - On risk-adjusted basis, little up-front gain from policy shift
- **TF would not end up holding out-size share of all U.S. equities**
- **Annual purchases and sales of bonds & equities could be large, however**
- **TF purchases of equities and exercise of shareholder rights would have to be structured to limit gov't interference in company decision-making**

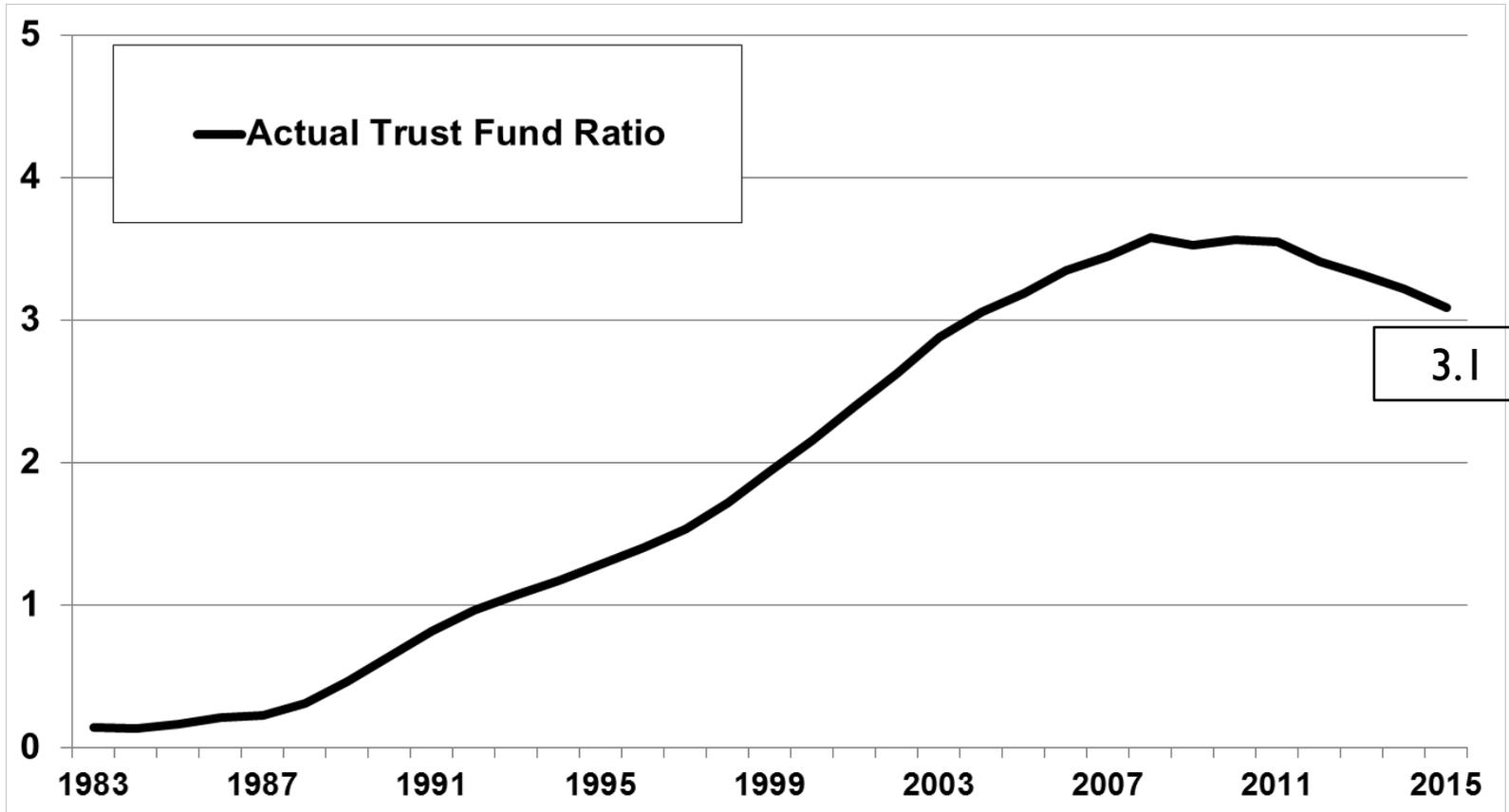
Procedure

- **Boost SS payroll tax by just enough to eliminate projected 75-year funding shortfall at year end 2015**
 - Required increase: **+2.62%** of currently taxed earnings
- **Aim for a ceiling allocation of TF portfolio in equities**
 - Most of our analyses: **Equity allocation = 40% of TF**
 - Phase-in rate: **2.67 percentage points per year [15 years]**
- **Bond holdings held in Treasury special issues**
 - Interest rate on new issues set using current formula
 - **1/15** of net new issues assigned maturities of **1, 2, 3, ... , 15** years
 - Forced sale of old bonds at par, proportionately for each maturity class
- **Portfolio rebalanced at end of each calendar year to hit target allocation of equities**

Data

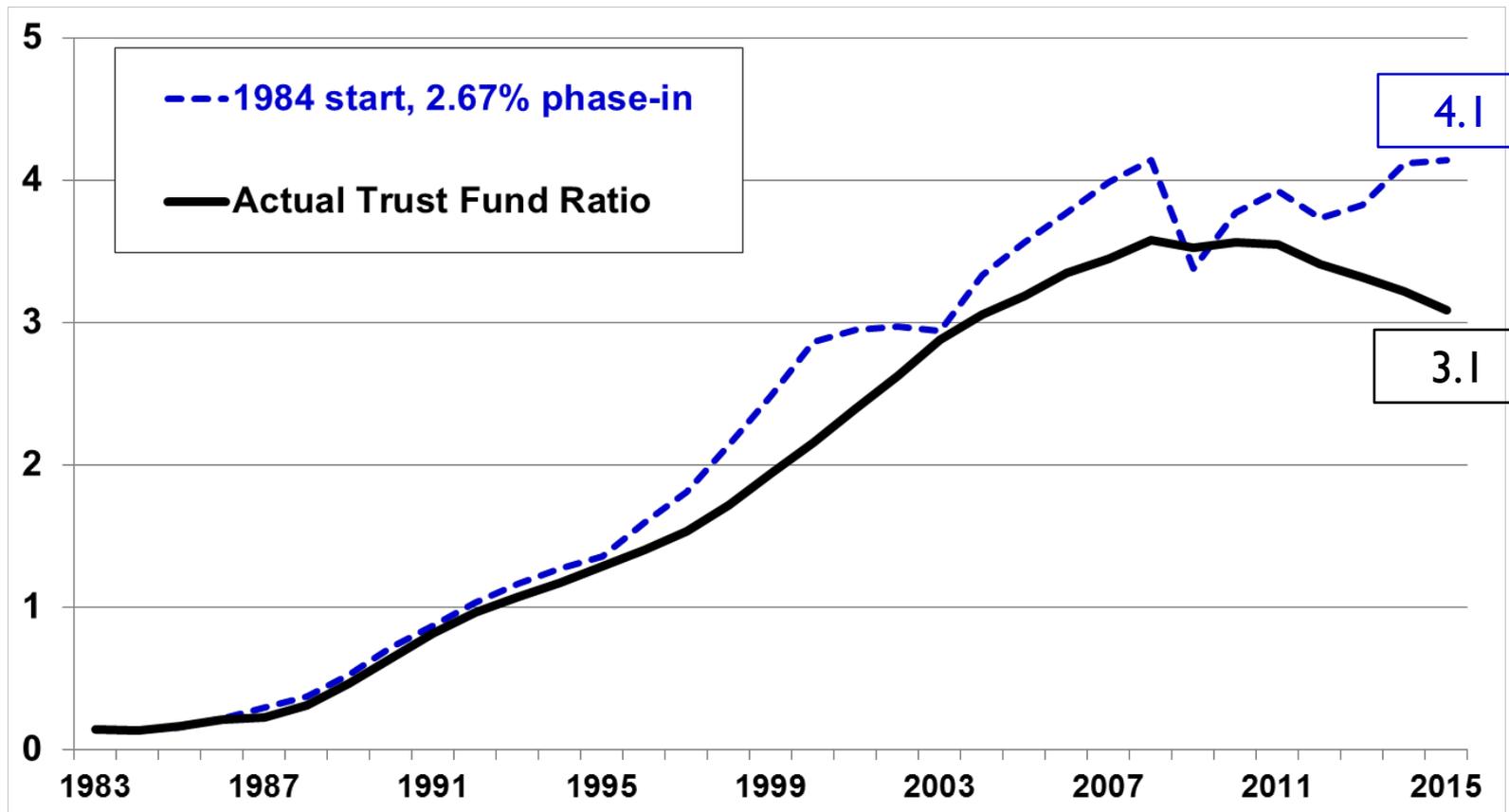
- **Historical equity returns: Geo. mean real return = 6.5%**
 - Broadest index: Wilshire 5000 [1971-2015]
 - Backdated using Ibbotson Large Cap Index [1929-1970]
- **Future expected equity returns**
 - Using alternative methods based on current P/E ratio, cyclically adjusted P/E ratio, and projected GDP ratio, we expect future real returns centered on **3.9% to 4.6%** per year
 - Our central findings rest on mid-point of this range: **4.08%**
- **Bond interest rates on new Treasury special issues**
 - Historically: Close to nominal yield on constant-maturity 10-yr bonds
 - High serial correlation
 - Zero correlation with current equity returns
- **Monte Carlo simulation: 10,000 draws of stock returns & bond interest rates for 2016-2090**

Figure 1a. OASDI Trust Fund Ratio with Equity Investment starting in 1984 and 1997: 100% bonds



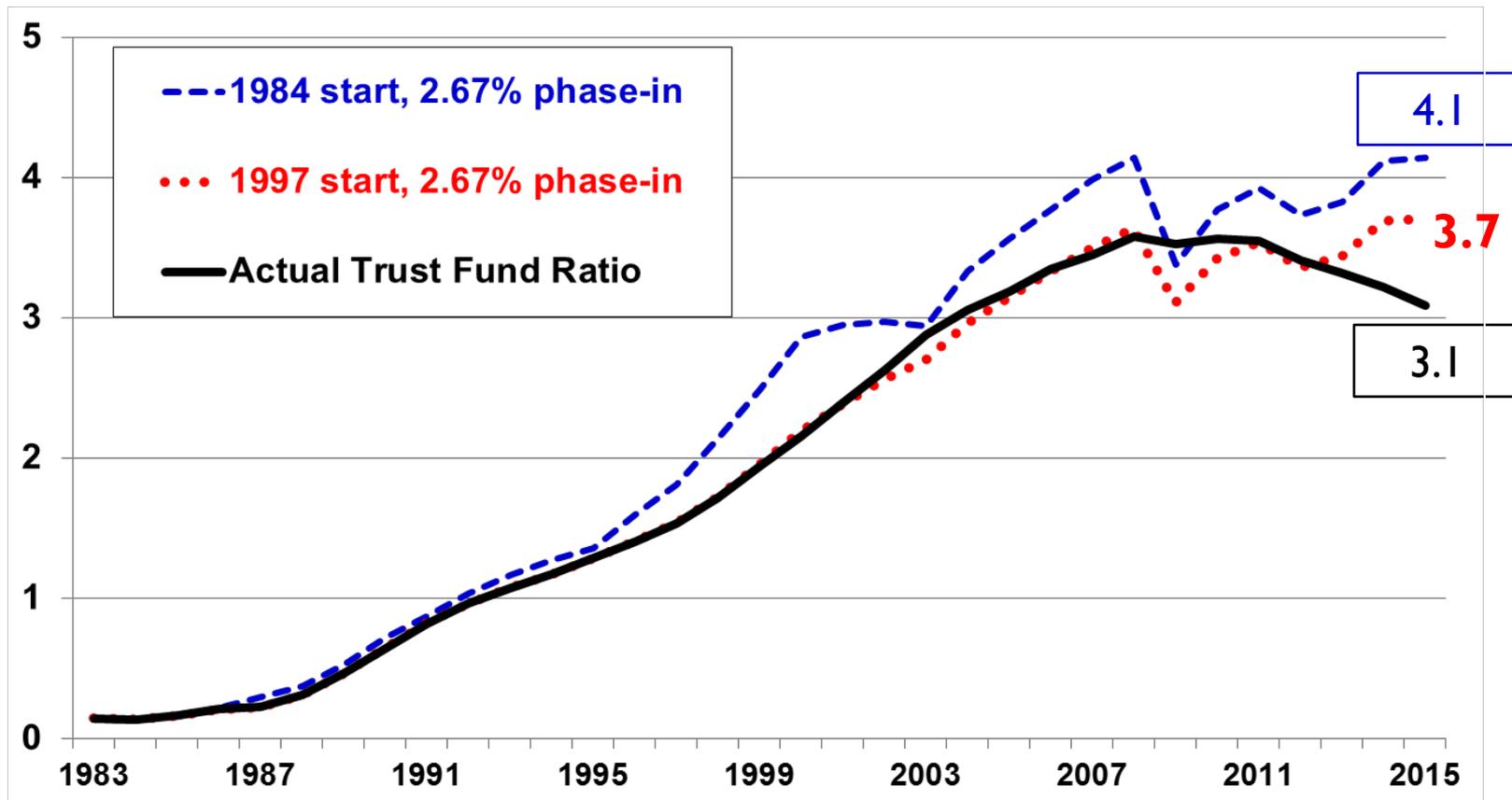
Source: Social Security Trustees' Reports (1983-2014).

Figure 1b. OASDI Trust Fund Ratio with Equity Investment starting in 1984 and 1997: 100% bonds vs. 40% stock/60% bonds



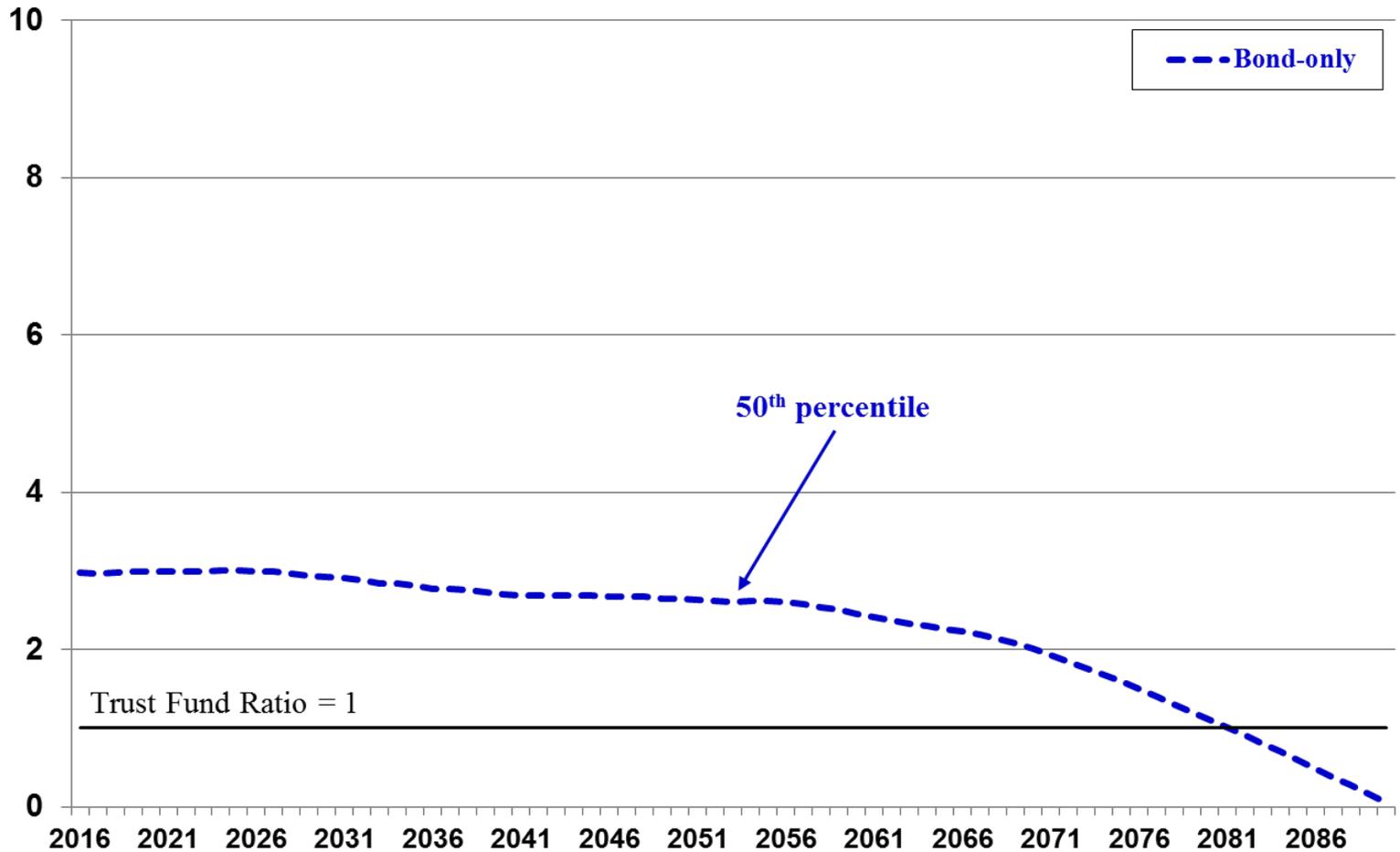
Source: Authors' calculations.

Figure 1c. OASDI Trust Fund Ratio with Equity Investment starting in 1984 and 1997: 100% bonds vs. 40% stock/60% bonds



Source: Authors' calculations.

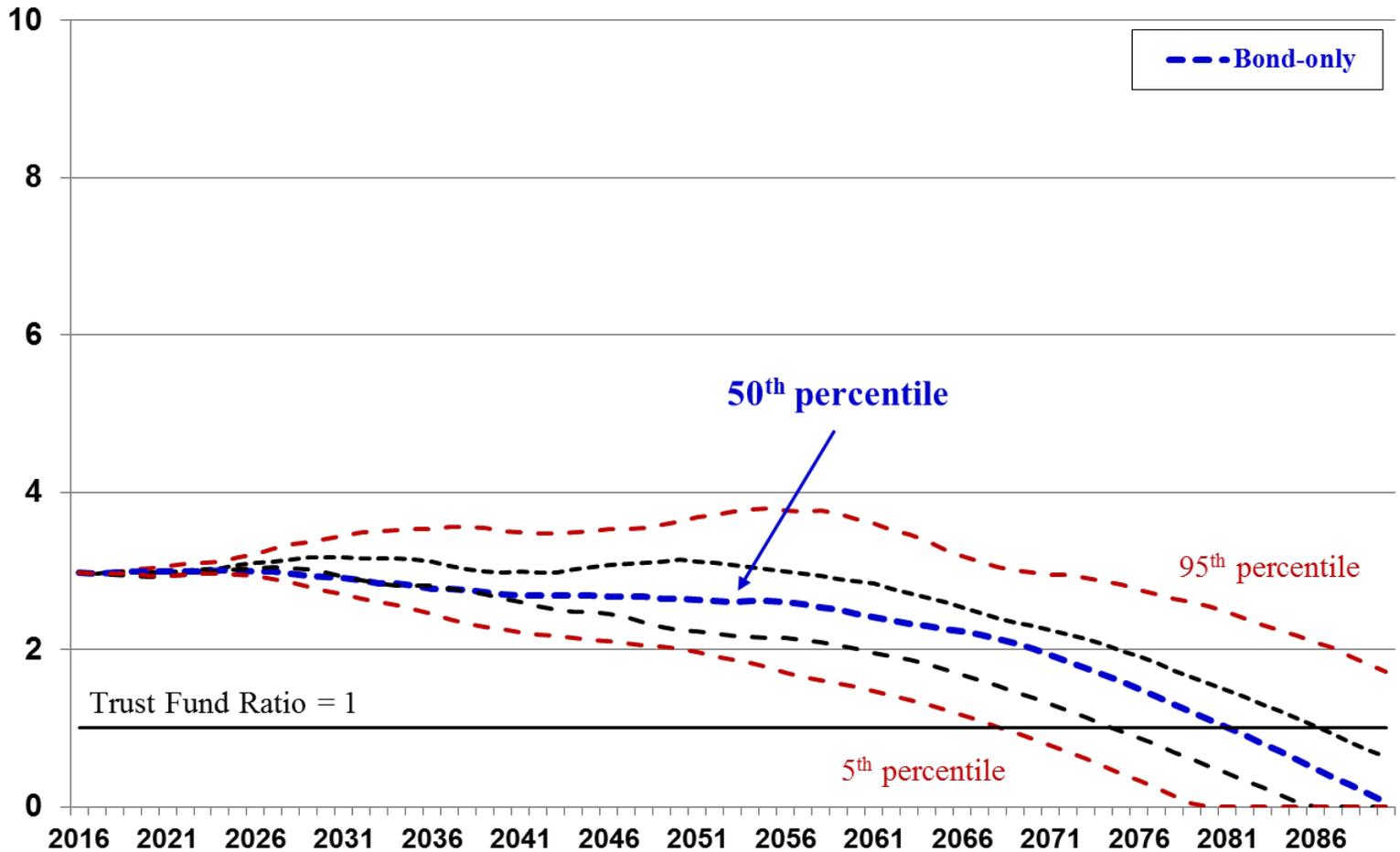
Figure 2a. Projected Trust Fund Ratio, 2016-2090 100% Bonds – median forecast



Source: Authors' calculations.

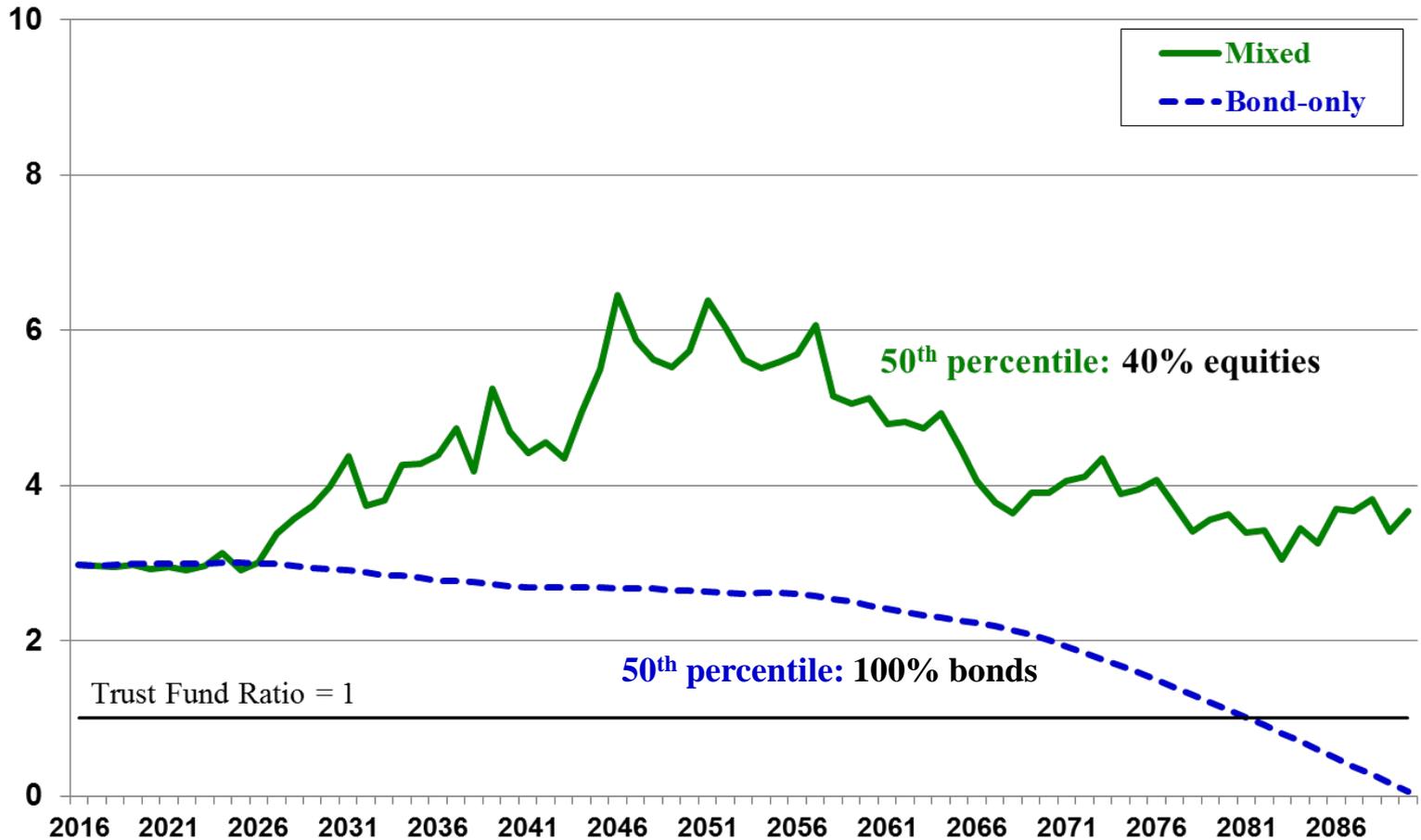
Figure 2b. Projected Trust Fund Ratio, 2016-2090

100% Bonds – 5th, 25th, 50th, 75th & 95th percentile forecasts



Source: Authors' calculations.

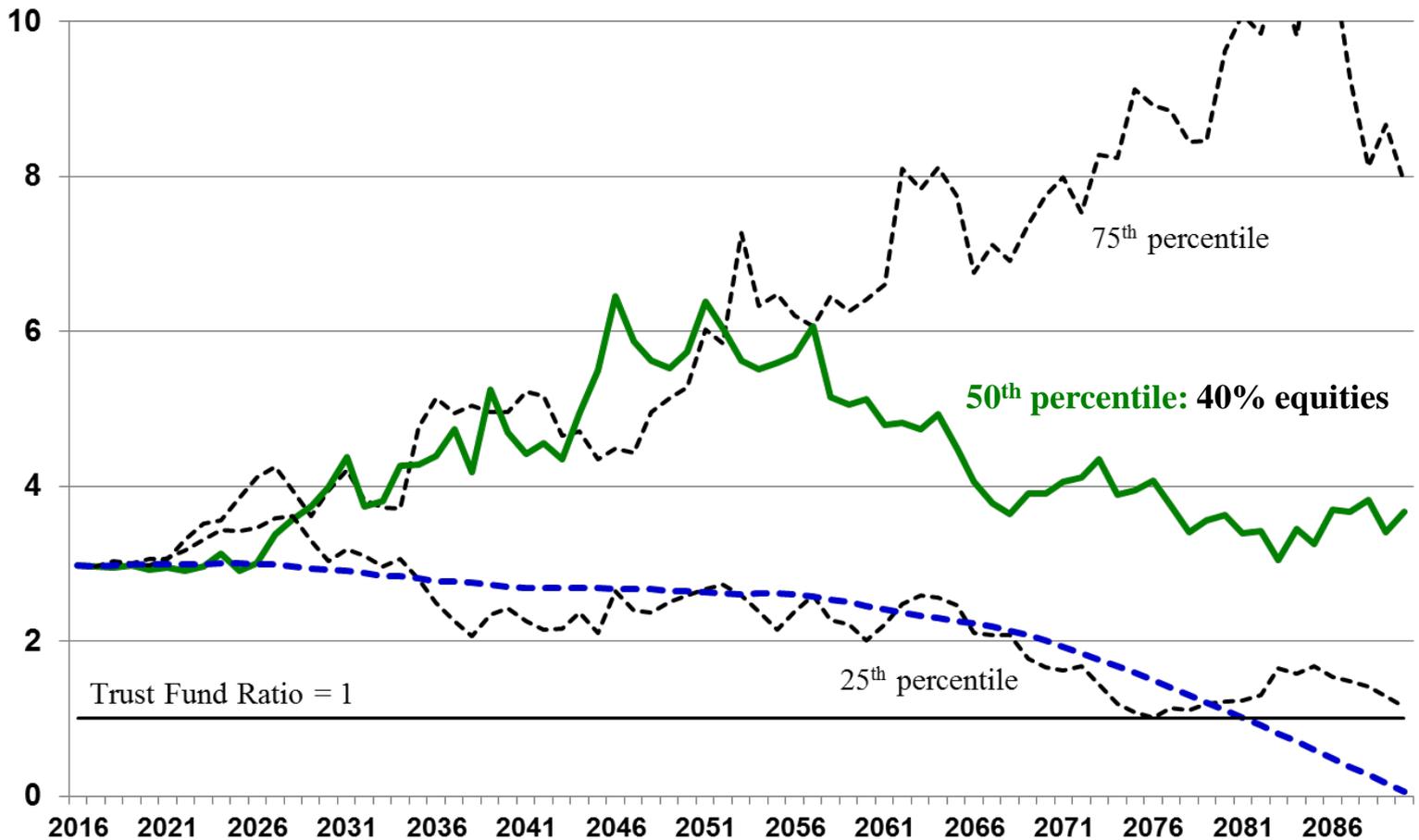
Figure 2c. Projected Trust Fund Ratio, 2016-2090
100% Bonds vs. 40% Equity/60% Bonds – median forecasts



Source: Authors' calculations.

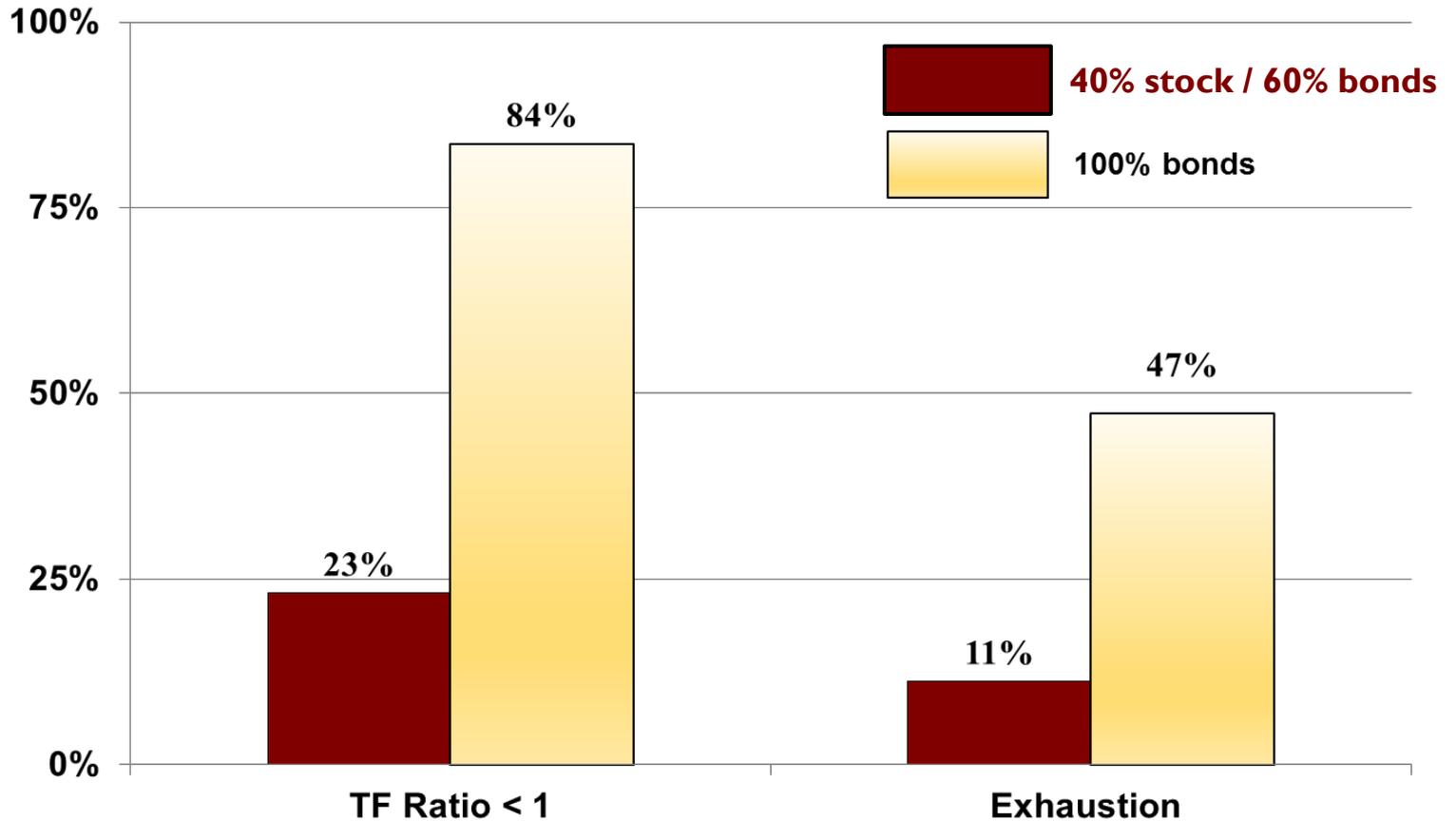
Figure 2d. Projected Trust Fund Ratio, 2016-2090

40% Stock/60% Bonds – 25th, 50th and 75th percentile forecasts



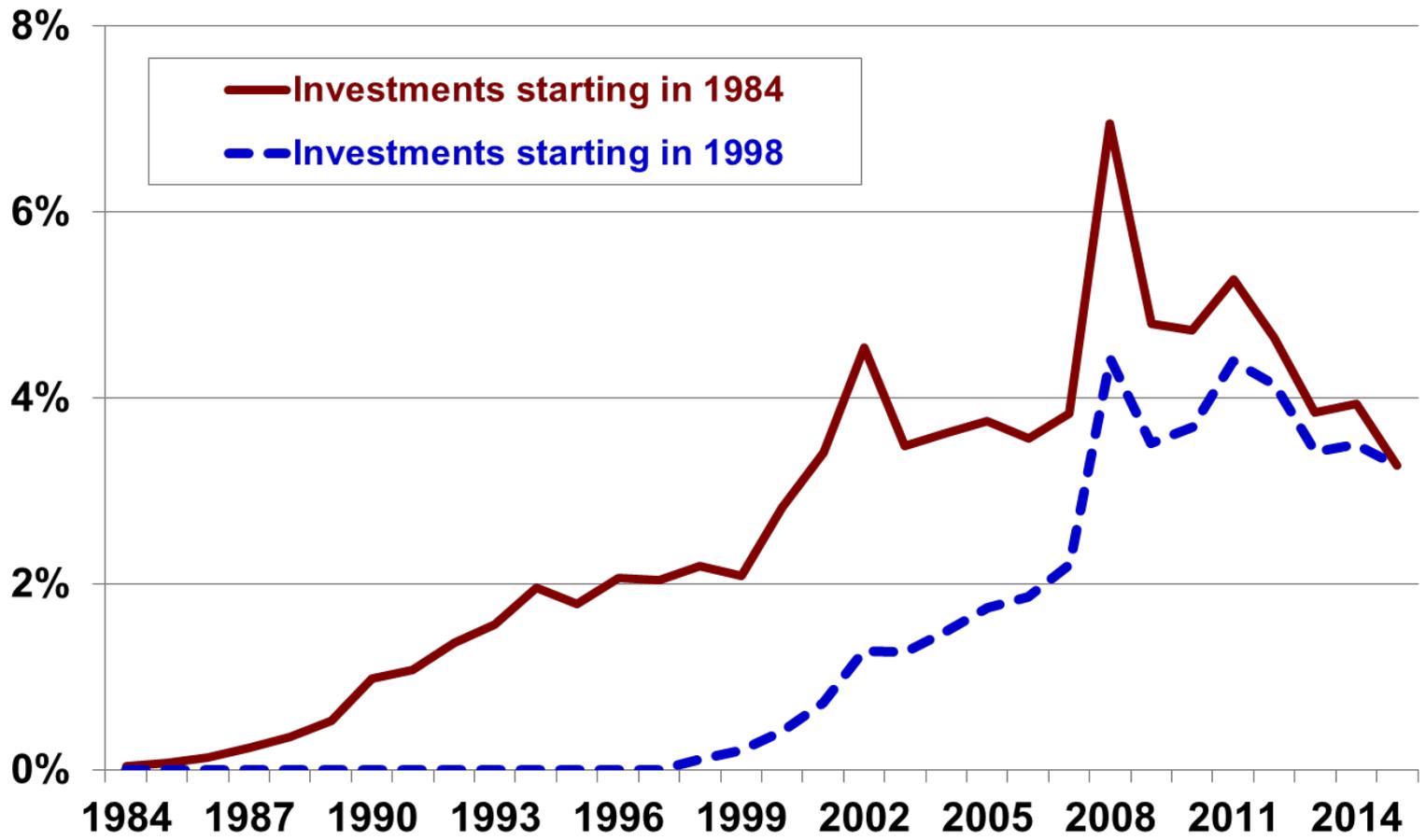
Source: Authors' calculations.

Figure 3. Percentage of Simulations Across 75-year Horizon in Which Trust Fund Assets Drop below Specified Thresholds, by Portfolio



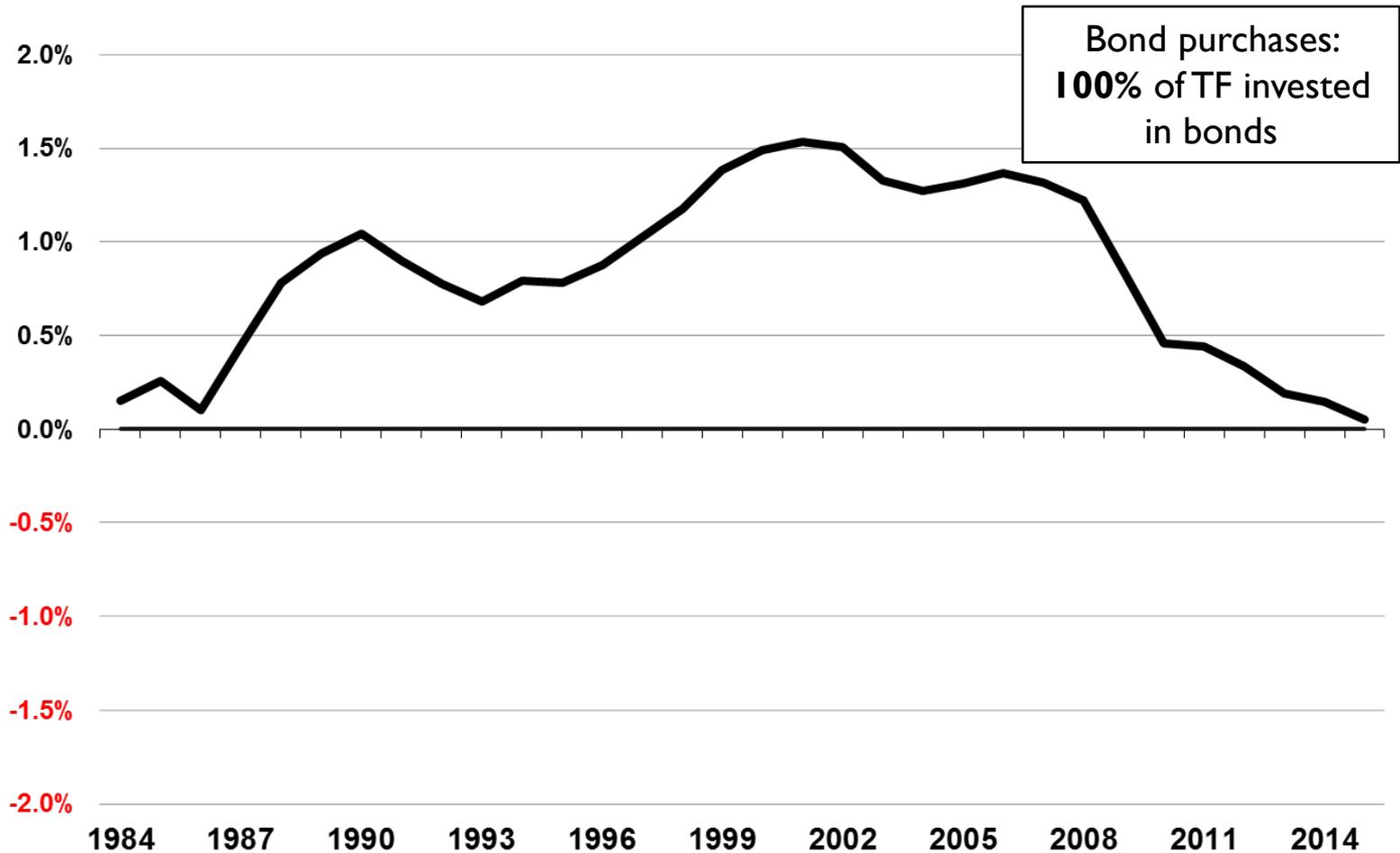
Source: Authors' calculations.

Figure 4. Percent of Total Equities Held by Trust Fund, 1984-2015



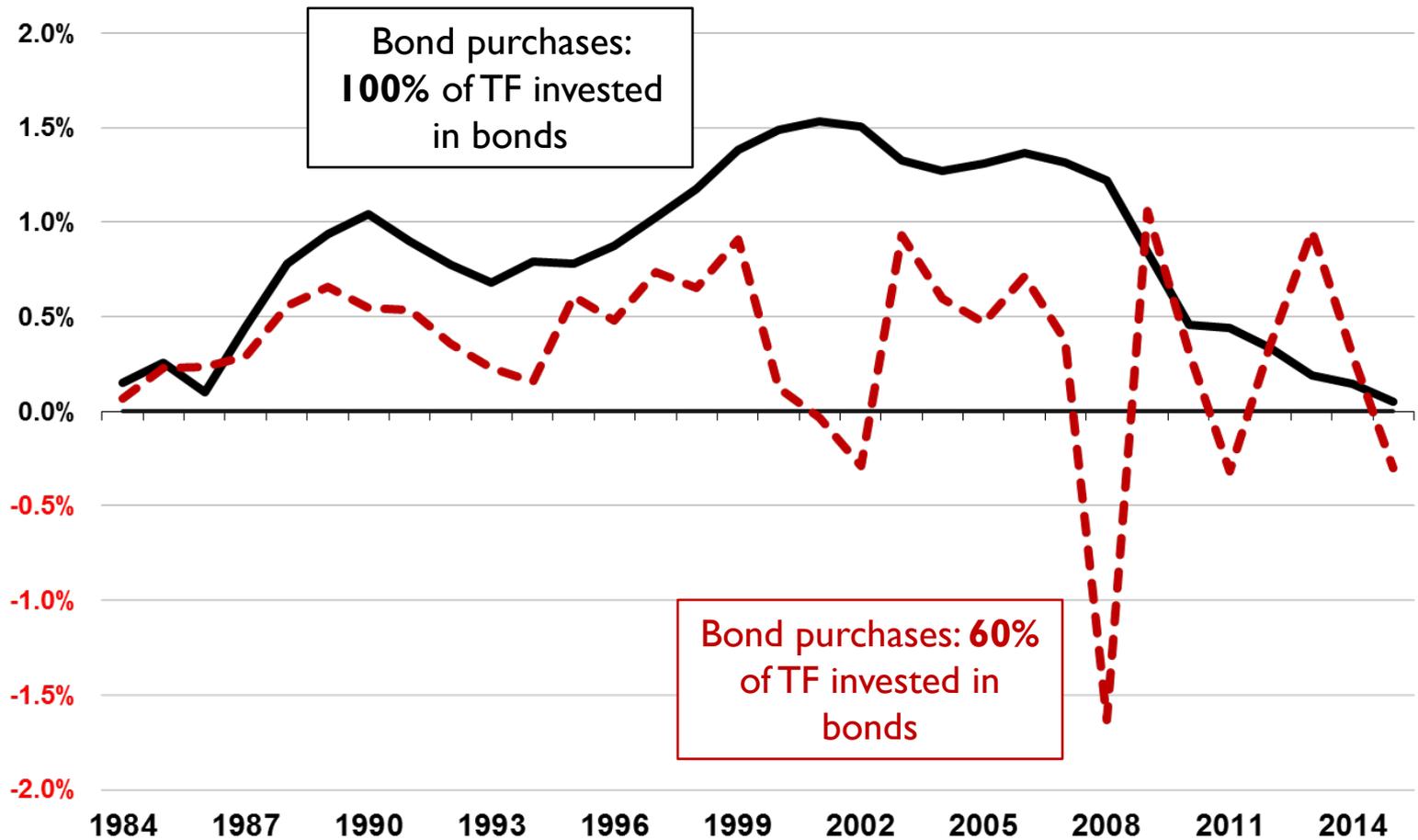
Source: Authors' calculations.

Figure 5a. Annual Net Bond Purchases as a Percent of GDP when 100% of Trust Fund Is Invested in Bonds, 1984-2015



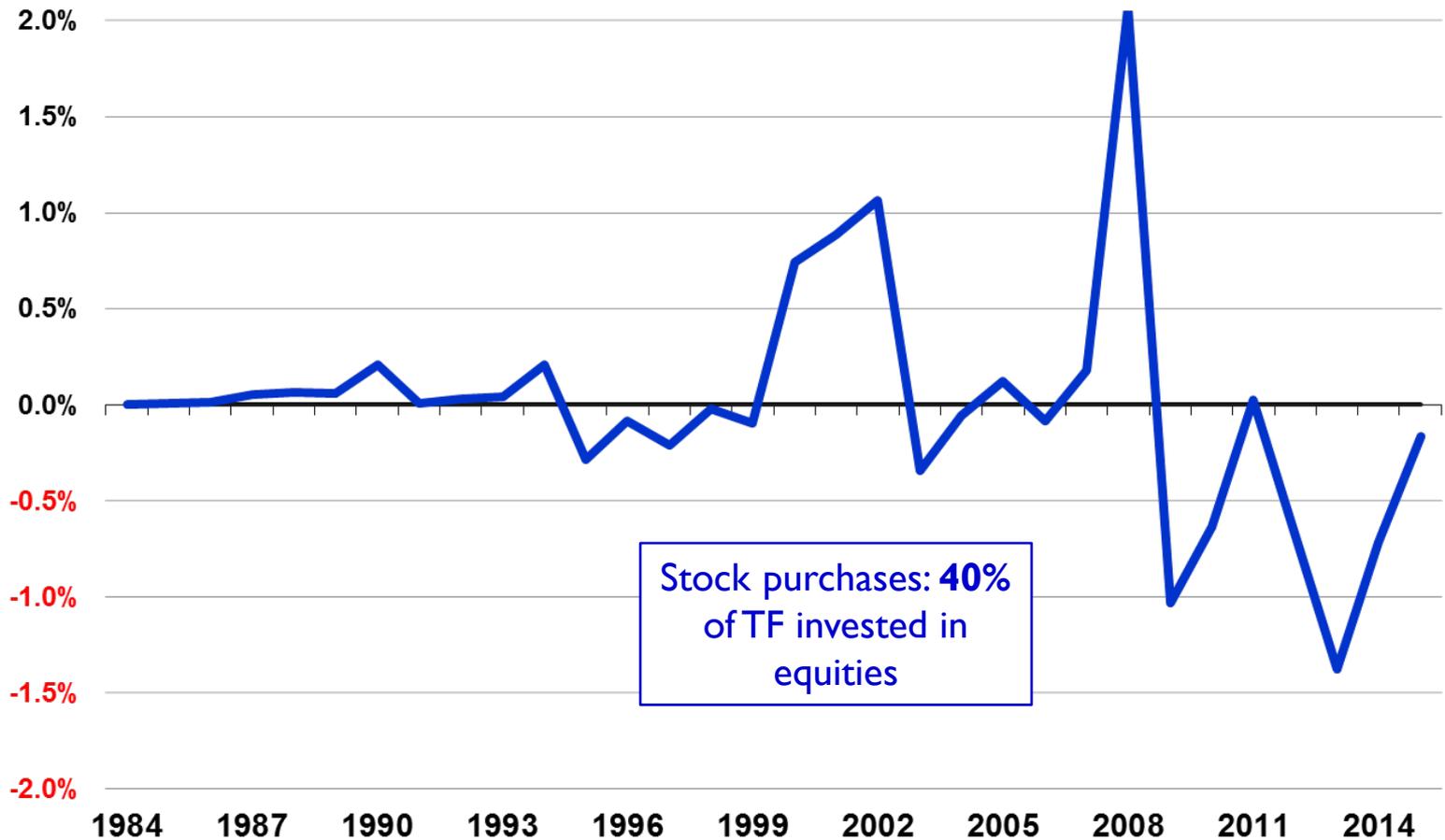
Source: Authors' calculations.

Figure 5b. Annual Net Bond Purchases as a Percent of GDP when 100% & 60% of Trust Fund Is Invested in Bonds, 1984-2015



Source: Authors' calculations.

Figure 5c. Annual Net Equity Purchases as a Percent of GDP when 40% of Trust Fund Is Invested in Equities, 1984-2015



Source: Authors' calculations.

Summary

- Investing part of TF in equities improves SS finances
 - **TF Ratio at year-end 2015 would have been --**
 - 3.1 with **100% bond** allocation
 - 4.1 with **40% equity** / 60% bond allocation
 - 4.4 with **60% equity** / 40% bond allocation
- Probability TF is exhausted in 75-yr projection period –
 - In **3½%** of simulations, TF is exhausted with **40% equity** / 60% bond allocation but is NOT exhausted with 100% bonds.
 - In **40%** of simulations, TF is exhausted with 100% bond allocation but is NOT exhausted with **40% equity** / 60% bonds.
- Policy would require large stock, bond sales & purchases, esp. in years with big stock-price changes



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How Would Investing in Equities have Affected the Social Security Trust Fund?

Discussion by
Jeffrey R. Brown
University of Illinois & NBER

What Does This Paper Do?

1. Chooses two dates (1984 and 1997) and asks what would have happened to OASDI Trust Funds if they had been invested in equities
2. Uses Monte Carlo simulations to show distribution of possible future outcomes if we start investing TF in equities in 2016
3. Provide very general discussion of some of the other issues associated with TF investment, such as political risk

Historical Results

- If you have been staying awake at night wondering what the TF's would be worth if we had invested in equities starting in 1984 or 1997, you now have one possible answer ...
- However,
 - Not surprising given that stocks had higher average returns than bonds over these periods
 - Assumes a static political economy story that no other policy changes would have resulted
 - Assumes no general equilibrium effects
 - Diamond and Geanakoplos model that investing in equities can increase risky investment, reduce safe investment, raise interest rates, lower expected returns on risky assets, and reduce the equity premium

Forward Looking Results

- Monte Carlo simulations are informative about the distribution of possible outcomes, given the assumptions made
 - These are executed well in the paper
- However, risk is about more than distributions of outcomes, it is also about whether the bad outcomes occur when marginal utility is high or low
 - EX: Under a Monte Carlo approach, there is a 99.9% chance you would be better off cancelling your homeowner's insurance. But in that 0.1%, there is a huge hit to marginal utility.



We've had this discussion before ...

- Should OASDI invest in equities?
- What returns should we assume when evaluating Social Security personal accounts?
- What is the cost of benefit guarantees for individual accounts?
- Should PBGC invest in equities?
- Should PBGC premiums be adjusted to reflect the risk of a pension fund's investment portfolio?
- What discount rate is appropriate for discounting state and local pension liabilities?
- How should an insurance company invest to guarantee a long-duration annuity?
- Should individual invest their 401(k) in employer stock?

- ***THESE ARE ALL DEBATES ABOUT THE SAME FUNDAMENTAL ISSUE***

So, what *is* the issue?

- *HOW TO ACCOUNT FOR RISK*
 - Actuarial approach is to look at distributions of outcomes
 - Financial economists price the risk, based on the theory and evidence that higher returns are compensation for bearing risk.
- An asset is riskier (and thus demands a higher expected return) when it pays off in low marginal utility states and experiences losses in high marginal utility states
 - Risk is about *correlations*
 - For individual, it is about correlation with rest of portfolio, with their own labor earnings, etc.
 - For pension fund, it is about correlation with liabilities that the fund is backing
 - For Social Security, it is about correlation with the rest of the economy – especially aggregate wages
- *None of this is captured by Monte Carlo simulations*

Are There Any Good Economic Arguments for Equities in TF?

- Intergenerational risk-sharing
 - Bohn (1999) shows it could help complete missing markets. But Smetters (2003) shows this can be inefficient depending on how high is the low-frequency correlation between wages and capital returns.
- Equity market non-participation
 - Diamond and Geanakoplos (2003) under certain assumptions, equity investment can raise social welfare
- Illiquidity premium (e.g., Campbell)
 - Is OASDI the ultimate patient investor?
 - Interestingly, though, this would NOT lead to investing in S&P 500 firms. It would lead OASDI to put SMALL amount into illiquid alternatives (agriculture, timber, etc.)

Political Economy

- Political interference in investment decisions
 - Authors acknowledge, but point to state and local investment behavior as counter evidence
 - Brown, Pollet and Weisbenner (2015): state and local pensions significantly over-weight in-state stocks in a manner not explained solely by familiarity bias or information advantages
- PBGC investment portfolio has gone down risky investment paths under some leadership regimes
- Investing in equities might lead to same flawed approach to discounting that we have observed in GASB rules for public pensions