Reconciling Trends in Volatility: Evidence from the SIPP Survey and Administrative Data

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Research Questions

What are the trends over time in earnings volatility in the SIPP survey and SIPP-matched administrative earnings data?

How do choices about the treatment of low earnings and imputation effect the trends?

Background

- Recent work on men's earnings volatility has come to different conclusions
  1. Declines in aggregate volatility at the macro level have been accompanied by increasingly stable earnings at the micro level
  2. As earnings inequality has grown, so has volatility for workers
- But studies use different sources of data and do not use comparable samples and methods
- This study is part of a group of studies using similar samples and methods to compare trends in earnings volatility in six datasets: CPS (survey and admin earnings), SIPP (survey and admin earnings), LEHD, and PSID.

Methods

Volatility

$$\text{Var}\left(\frac{Y_{it} - Y_{i,t-\tau}}{\frac{Y_{it}+Y_{i,t-\tau}}{2}}\right) \tag{1}$$

where Y_{it} is annual earnings, and $\tau = 1$.

We estimate Equation 1 using residuals from a regression of Equation 1 on a quadratic in age separately by year.

Data

Survey of Income and Program Participation (SIPP)

- Nationally representative sample of 14,000 to 52,000 households
- 16 SIPP panels from 1984
- Data from 1985-2012
- Retrospective questionnaire covering previous four months
- Panels vary in length from 2 to 4 years

Data

Baseline Measure of Annual Earnings

- Monthly Earnings
  - Two measures of employment status: worked during wave, weeks worked during month
  - Five components of monthly earnings: 2 jobs, 2 self-emp, and casual
  - Sum all non-imputed components of earnings
  - Set earnings to zero if not working during the month, and earnings are not imputed
- Annual earnings are the sum of monthly earnings, including months of zero earnings
- Volatility requires:
  - 24 months of non-imputed monthly earnings
  - Two consecutive years of non-zero earnings

Data

Sample Size and Imputations

- Average 4200 observations per year
- Imputations are non-trivial (Czaka and Denmead, 2008)
  - 49.5% of those with wage and salary income in the SIPP had imputed values
  - 29% of total wage and salary income imputed and 39.5% of self-employment income
- Imputation tends to bias estimates of volatility in household income upwards in 1996-2004 panels
- Imputation rate for earnings and self-employment income increased from 35% to 54% between 1993 and 1996 panels (Dahl, DeLeire, and Schwabish, 2008)

Data

SIPP Gold Standard File (GSF)

- All SIPP participants in 1984 and 1990–2008 panels
- Linked to DER maintained by SSA/IRS
- Non-topcoded earnings from 1978 - 2014
- Basic demographic/education data from SIPP survey

Data

Sample Size and Matching

- Linked prospectively and retrospectively
- Data on 700,000+ individuals
- Average 103,106 observations per year
- Use only individuals matched to DER
- Annual match rates between 74% and 83 %

Data

Baseline Sample

Men age 25 to 59 with positive annual earnings in two consecutive years.

Additional SIPP Sample Restrictions

- Baseline: only non-imputed earnings components for 24 months
- Imputed: use SIPP-imputed earnings for 24 months (including unit non-response and item non-response)
- Also use SIPP-imputed earnings on baseline sample (include item non-response only)

Data

How Samples Differ

1. GSF pools across panels in year t, SIPP does not
2. Datasets have different earnings measures with different reporting issues
3. GSF sample includes only individuals matched to DER
4. Matching samples across datasets is a challenge

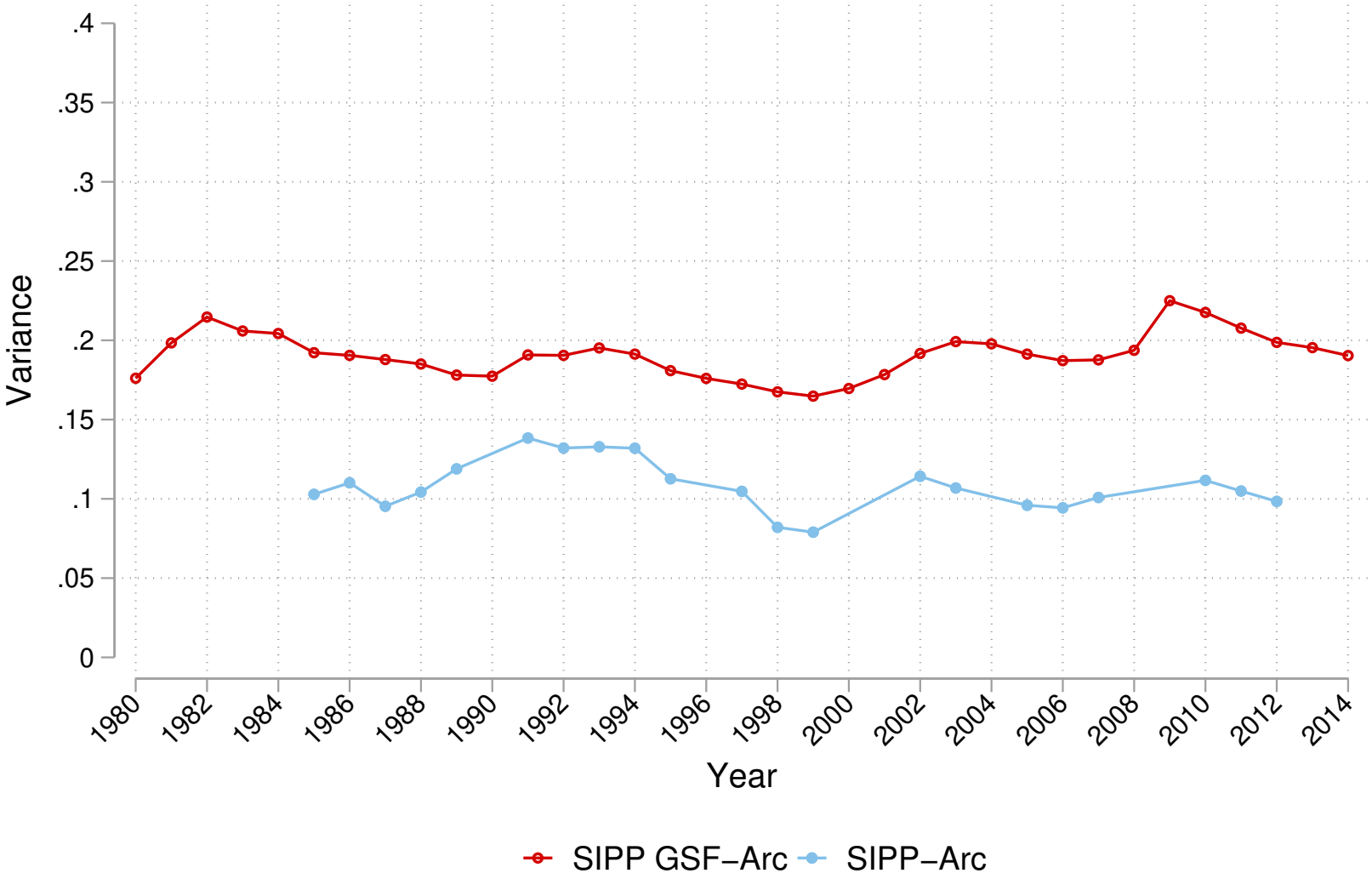
Data

Table 1: Demographic Characteristics in the SIPP GSF and Survey Samples

			Volatility Samples	
	All	Matched	SIPP GSF	SIPP
<High School	0.185	0.165	0.141	0.101
High School	0.305	0.302	0.305	0.310
Some College	0.264	0.273	0.283	0.283
College	0.155	0.164	0.172	0.185
College+	0.090	0.096	0.100	0.121
White	0.725	0.750	0.771	0.834
Black	0.116	0.108	0.099	0.064
Other	0.053	0.050	0.046	0.044
Hispanic	0.107	0.092	0.083	0.058
Age	40.380	40.720	40.150	39.404

Main Results

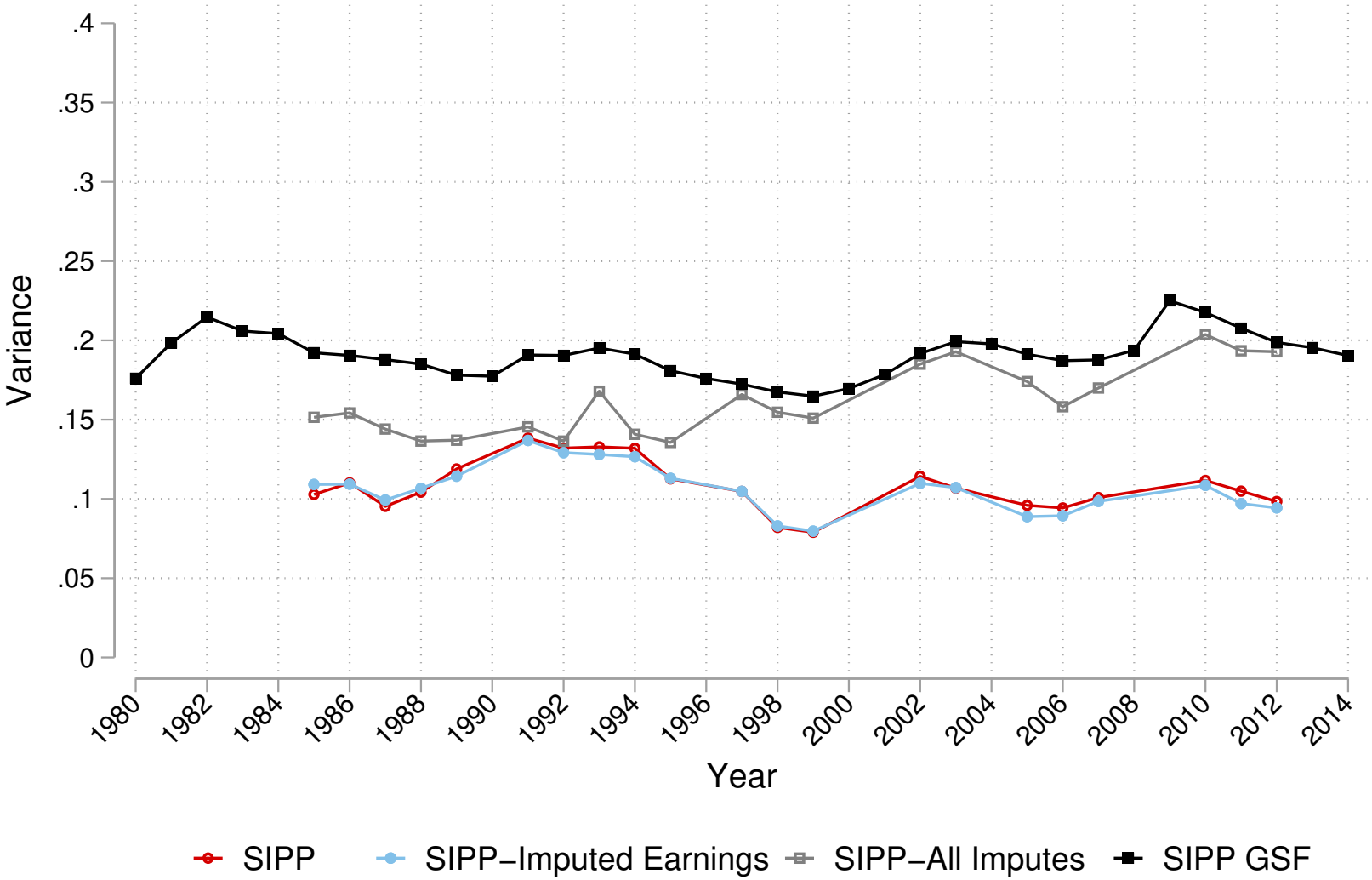
Figure 1: Trends in Male Earnings Volatility



Notes: Authors' calculations based on SIPP GSF and SIPP. Sample includes men age 25 to 59 with positive annual earnings in two consecutive years. Earnings are trimmed at the bottom and top 1% of the full distribution of earnings. Earnings changes are adjusted using a quadratic in age, separately by year. Earnings volatility is measured in arc percent change.

Imputations in the SIPP

Figure 2: Trends in Male Earnings Volatility, With and Without Imputations



Notes: Authors' calculations based on SIPP. Sample includes men age 25 to 59 with positive annual earnings in two consecutive years. SIPP-Arc and SIPP-GSF Arc are the baseline series, SIPP-Arc Imputed Earnings includes imputed earnings components, SIPP-Arc All Imputes includes unit nonresponse and imputed earnings components..

Adjusting for Differences in the Distribution of Earnings

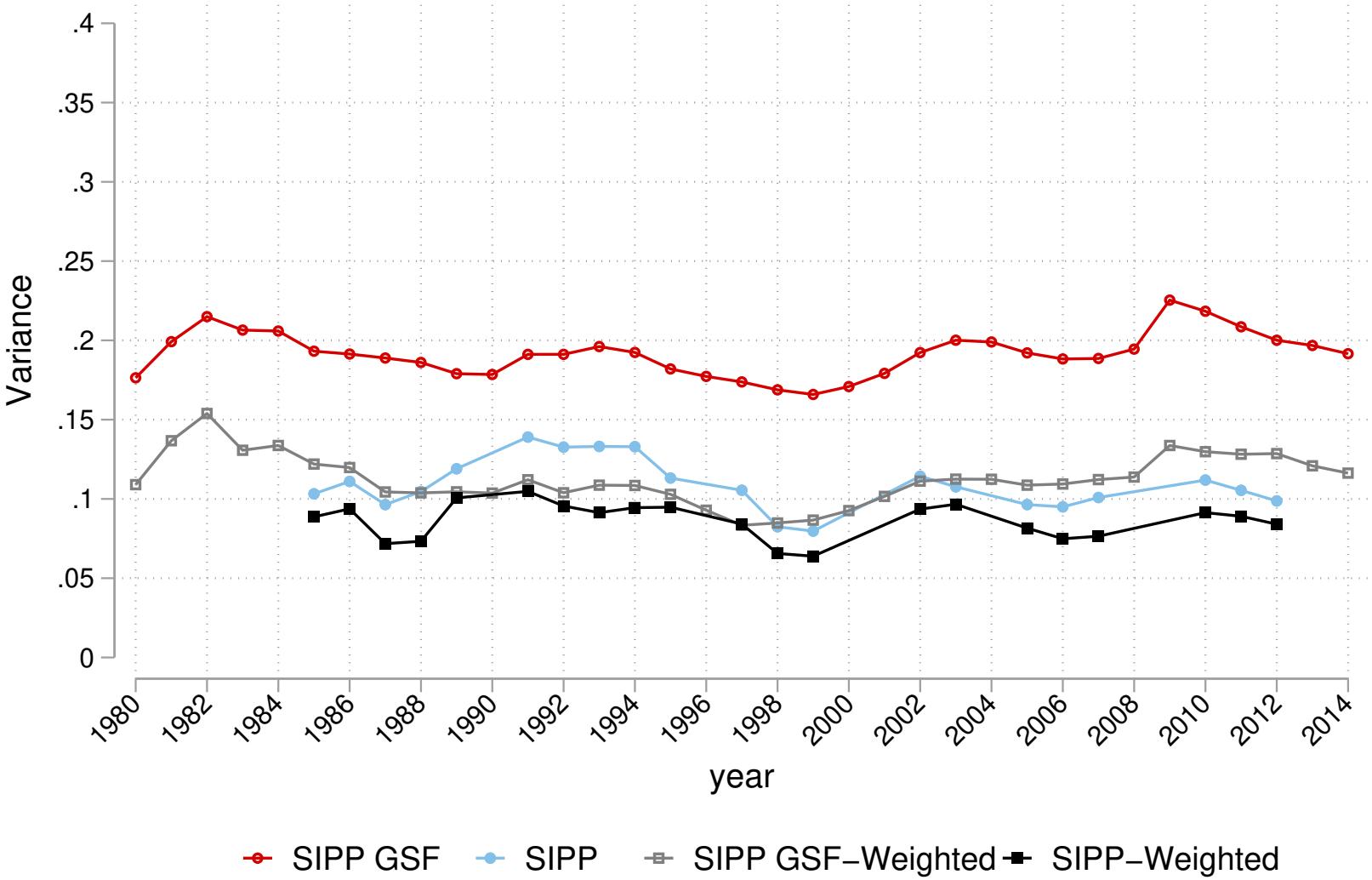
Table 2: Selected Earnings Percentile Points: SIPP GSF and SIPP Survey Data

Year	P1	P5	P10	P25	P50	P75	P90	P95	P99	N
SIPP										
1984	1,398	8,379	14,909	26,307	39,411	55,455	76,738	94,568	155,647	6,131
1990	944	7,492	13,444	23,669	37,827	55,669	77,797	98,054	149,043	8,424
1996	1,461	8,268	14,906	24,750	39,483	58,912	86,289	110,306	236,896	5,298
2001	1,608	9,696	16,503	27,005	42,538	64,624	95,877	123,628	303,540	7,346
2004	1,888	8,820	15,535	27,088	43,764	67,592	100,150	129,402	309,243	12,522
2009	1,373	6,448	12,540	24,410	42,076	67,951	103,258	132,221	368,604	10,418
GSF										
1980	951	5,693	12,020	25,770	42,550	60,070	80,420	100,700	165,900	82,000
1990	705	4,523	9,618	22,020	38,510	58,480	79,170	100,900	202,900	109,000
1996	606	4,332	9,364	21,690	38,260	60,130	88,610	117,900	265,600	119,000
2001	605	4,780	10,450	24,740	42,940	67,550	103,200	141,900	318,100	124,000
2004	516	4,142	9,503	23,940	42,770	68,610	105,300	143,900	328,000	122,000
2009	387	3,325	7,749	21,340	41,190	68,650	108,600	148,600	337,500	118,000

Notes: Authors calculations on SIPP survey and SIPP GSF. Sample is men age 25 to 59 with positive earnings in year t. SIPP is limited to men with non-imputed earnings. Constant 2010 dollars deflated using the PCE.

Adjusting for Differences in the Distribution of Earnings

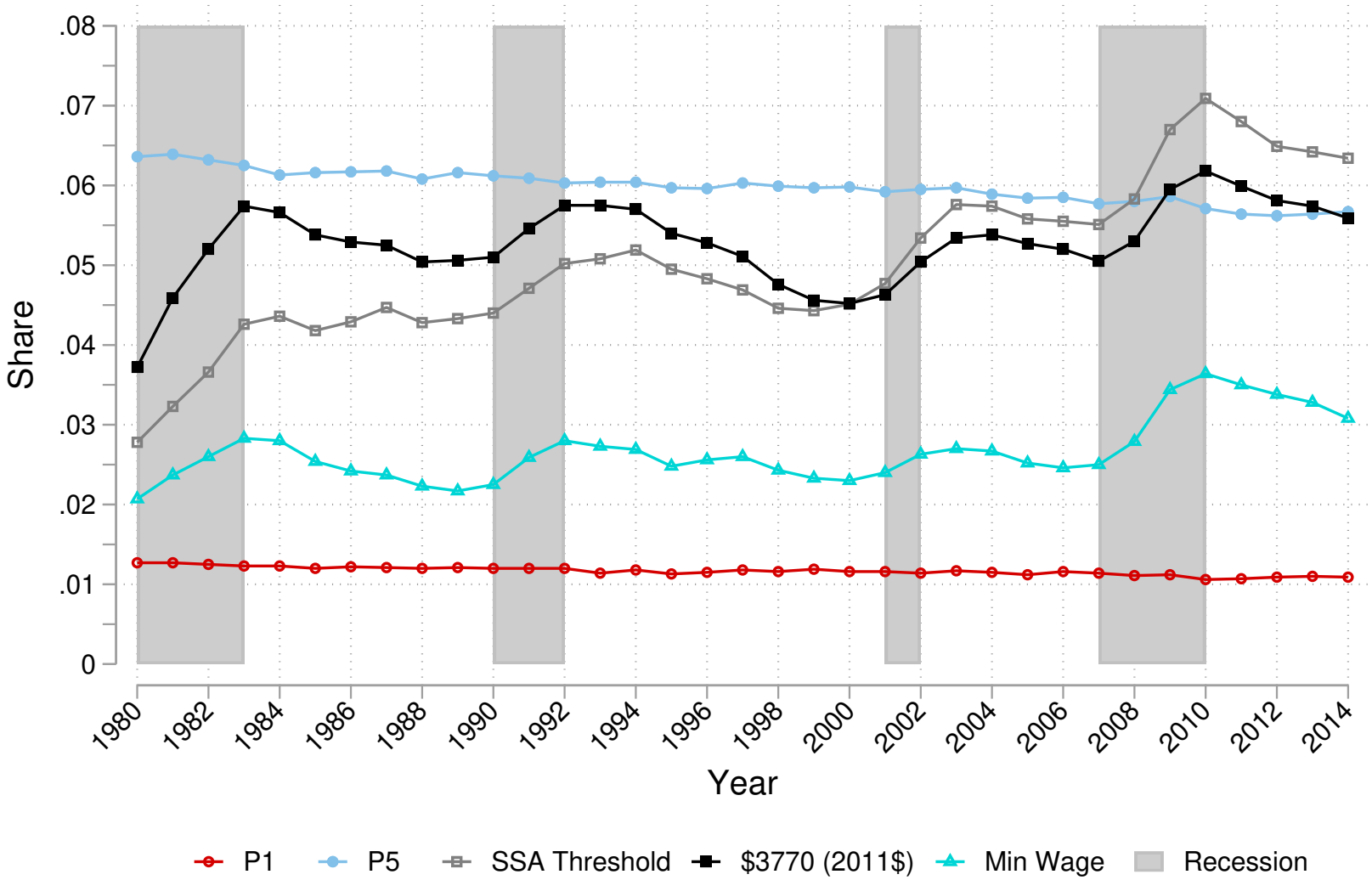
Figure 3: Trends in Male Earnings Volatility, Weighted to PSID



Notes: Authors' calculations based on SIPP. SIPP earnings are trimmed at the PSID top and botttom 1%, and at the min/max of two-year average earnings, separately by year. SIPP trends are weighted using inverse share of individuals in each PSID ventile and are weighted using annual weights and not age-adjusted. Earnings volatility is measured in arc percent change.

Role of Low Earnings in Estimates of Volatility

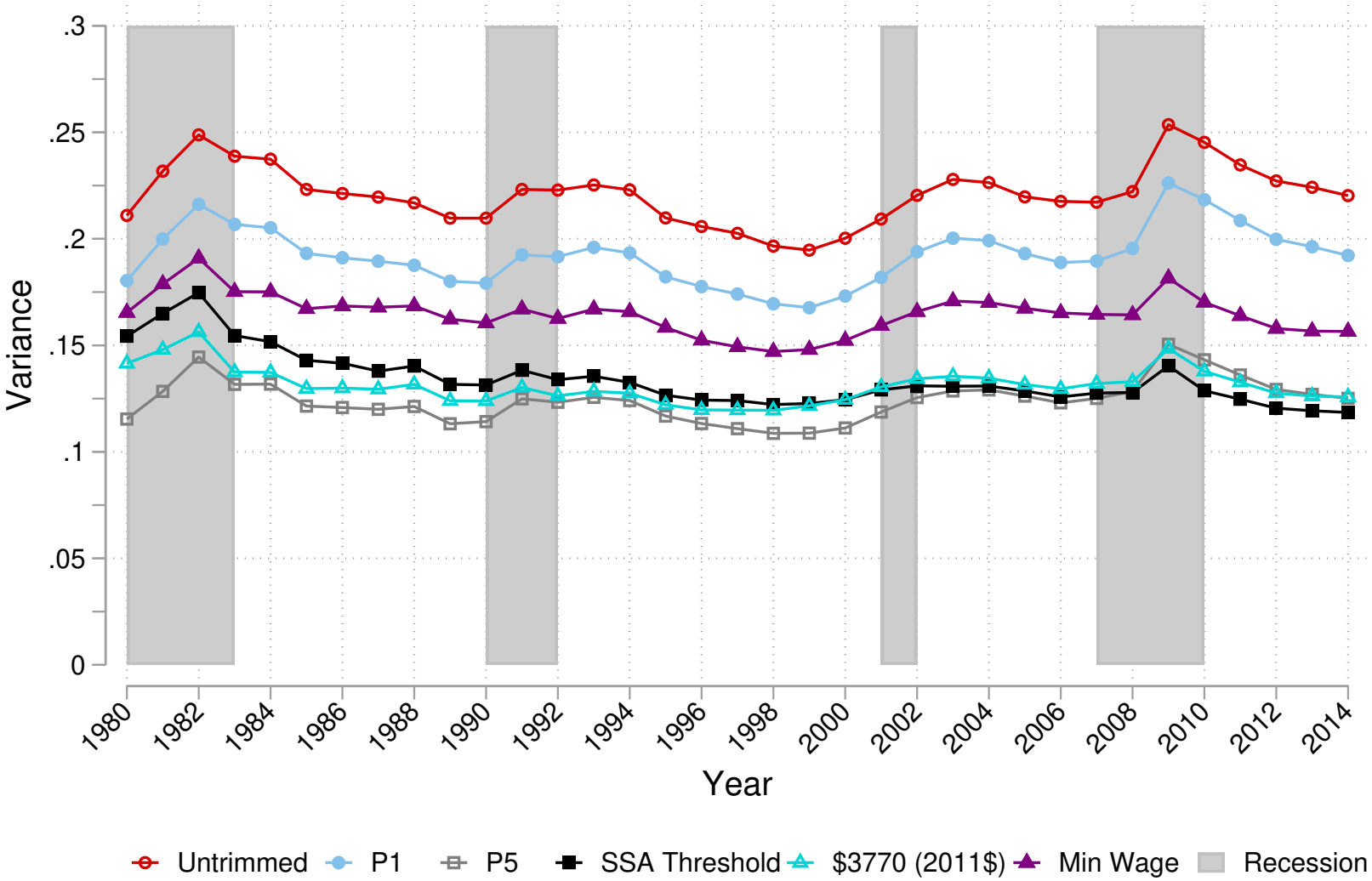
Figure 4: Share Trimmed by Threshold



Notes: Author's calculations using SIPP-DER for 1979 to 2014.

Role of Low Earnings in Estimates of Volatility

Figure 5: Volatility by Trim



Notes: Author's calculations using SIPP-DER for 1979 to 2014.

Conclusions

1. Trends in SIPP survey and SIPP GSF are similar
2. Volatility increases modestly in the SIPP GSF and declines modestly in the SIPP survey data between mid-1980s and early 2010s
3. Levels in the SIPP GSF are higher than in the SIPP survey
4. Differences in the underlying cross-sectional earnings distribution explain difference in level of volatility and minor differences in trends
5. Imputations pose a problem in consistent series of volatility in SIPP survey data

Czaka, John L. and Gabrielle Denmead. 2008. "Income Data for Policy Analysis: A Comparative Assessment of Eight Surveys." Final Report to the U.S. Department of Health and Human Services, Mathematica Policy Research.

Dahl, Molly, Thomas DeLeire, and Jonathan A Schwabish. 2008. "Trends in Earnings Variability over the Past 20 Years." Tech. rep., Congression Budget Office.