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A Democratic Measure of National Income Growth

Andrew Aitken (OECD and ESCoE)
and

Martin Weale (King's College London and ESCoE)

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The results presented here are preliminary. Please do not quote them.

Democratic Growth

- Sig Prais (1959) developed a democratic price index. It calculates the change in prices based on the spending pattern of an average household. CPI uses total spending, so high spenders have more influence.
- Tony Atkinson (1970) developed “inequality-averse” measures of income.
- We take the geometric mean of household income (A special case of Atkinson’s inequality aversion) and deflate using Prais democratic price index.
- The output is the growth rate in real household income averaged across all households.
- This gives a welfare measure based on logarithmic utility.
- Use democratic CPI produced by Tanya Flower and Philip Wales at ONS and extend this to take account of consumption of public goods and those provided by NPISH to get a democratic deflator for overall consumption.
- We assume uniform *per capita* public consumption except for education and health where we allocate it to households on the basis of their characteristics.

Consumption or Income?

- Immediate welfare comes from consumption.
- Consumption may represent permanent income.
- But saving also adds to welfare and people are often more interested in the distribution of income than the distribution of consumption.
- Aitken and Weale (Economica, 2020) show that a coherent welfare definition can be given to $\log(\text{real income})$ with a democratic deflator used to produce real income from the geometric mean of nominal income.
- Utility from income equals utility from consumption plus (saving \times marginal utility of consumption).
- First order it is fine to apply to utility function to real income per household adjusted for household size.

Household Income or National Income?

- Most distributional work focuses on household income.
- Distributional national accounts (Piketty, Saez, Zucman, 2018). Focus predominantly on individuals rather than households.
- We keep the household as the reference unit and adjust for household size using the OECD equivalence scale.
- But we allocate the whole of net national disposable income to households.

Primary Household Incomes (£m Fin Year 2015)

	National Accounts	LCFS	Modelling
Wages and Salaries	780,009	721,072	S
Net Operating Surplus (Imputed rent)	119,914		M
Self-employment Income	144,007	73,439	S
Employers' Contributions	155,357	Nets out	
Interest receipts	24,305	6,668	M
Dividend receipts	76,674	7,669	M
Attr. to insurance holders	23,078	Proportional to insurance	S
Payable on pension rights	74,068		M
Less interest paid	-25,943	-28,399	S
EQUALS Net Primary Income	1,371,469		

Secondary Redistribution (£m Fin Year 2015)

	National Accounts	LCFS	Modelling
Net Primary Income	1,371,469		
Social benefits in cash	97,364	82,788	S
Other social benefits	129,223	107,968	S
Social assistance	121,404	89,926	S
Misc transfers received	8,700	2,813	S
Hhld social contributions	-68,752	-60,299	S
Misc transfers paid	-33,041	-37,539	S
Taxes on employment	-143,438	-74,923	M
Other income tax	-24,203	-5,318	M
Other current taxes	-44,214		M
Pensions supplement	-54,308		
Employers' contributions	-155,357		
EQUALS			
Hhld net disposable income	1,204,847		

National Disposable Income (£m Fin Year 2015)

	National Accounts	LCFS	Modelling
Hhld net disposable income (A)	1,204,847		
Employer contributions	64,451		S
Household contributions	12,454	21,008	S
Supplement less service charge	54,308		M
LESS Benefits received	-84,725		S
EQUALS Pensions adjustment (B)	46,419		
Retained earnings of companies (C)	-18,894		
Net income of NPISH (D)	50,882		
Consumption of government	363,480		
PLUS Net saving of government	-50,932		
Net income of government (E)	312,548		
Residual income (F)	2,618		
Net National Disposable Income (A+B+C+D+E+F)	1,598,420		

Categorical Imputation using Ordered Probit Models (i)

- We impute components of income where the LCFS data are inadequate and alternative data sources exist.
- We adopt a flexible approach structured round an ordered probit model for everything except imputed rent.
- We convert the data in our source datasets (SPI for interest & dividend income/WAS for pensions) into a large number of categories (89 for interest & dividend income and 32 for pensions) and fit ordered probit models to these
- Covariates have to be variables available both in the source surveys and in LCFS
- Simulating these models provides stochastic categorical estimates which can be imputed into LCFS

Categorical Imputation using Ordered Probit Models (ii)

- Compute a fitted value for each latent variable, and add on random terms from the multivariate normal distribution
- Each latent variable is allocated to the relevant category underpinning the probit model
 - Where it lies between 2 cut points, the distance between 2 categories is interpolated on the basis of the latent variable

The Upper Tail

- Reconciliation with the macro data requires appropriate handling of the upper tail, even though the upper tail has little impact on democratic income.
- Use a Pareto type-1 distribution for observations in the top category

Pension income

- Use ordered probit with waves 3 and 4 of WAS to allocate pension and insurance income to categories
 - Include age, age², No. adults, No. children, tenure type, marital status, labour or pension income
 - Estimate separately for under 65 (with & without labour income) and over 65 (with & without pension income)

Interest & dividend income

- Use ordered probit with SPI to allocate interest & dividend income to categories
 - Include age bands, log labour income, regional dummies
 - Estimate separately for men and women and by year

Taxation

- The LCFS grossly under-records tax payments.
- We calculate the income tax due on the basis of the allowances and rates of the time, and apply this after income figures have been aligned to the national accounts.
- Gives better, but still low figure.
- Likely to omit some allowances and reliefs- e.g. assumes all dividends are taxed while those in shares held in ISAs are not.

Imputed Rent (Operating Surplus)

- Log monthly rent is explained by log income, house type, council tax band, socioeconomic status, time and NUTS1 region.
- The decision to rent or own is explained by the same variables
- The model is identified by the assumption of normality

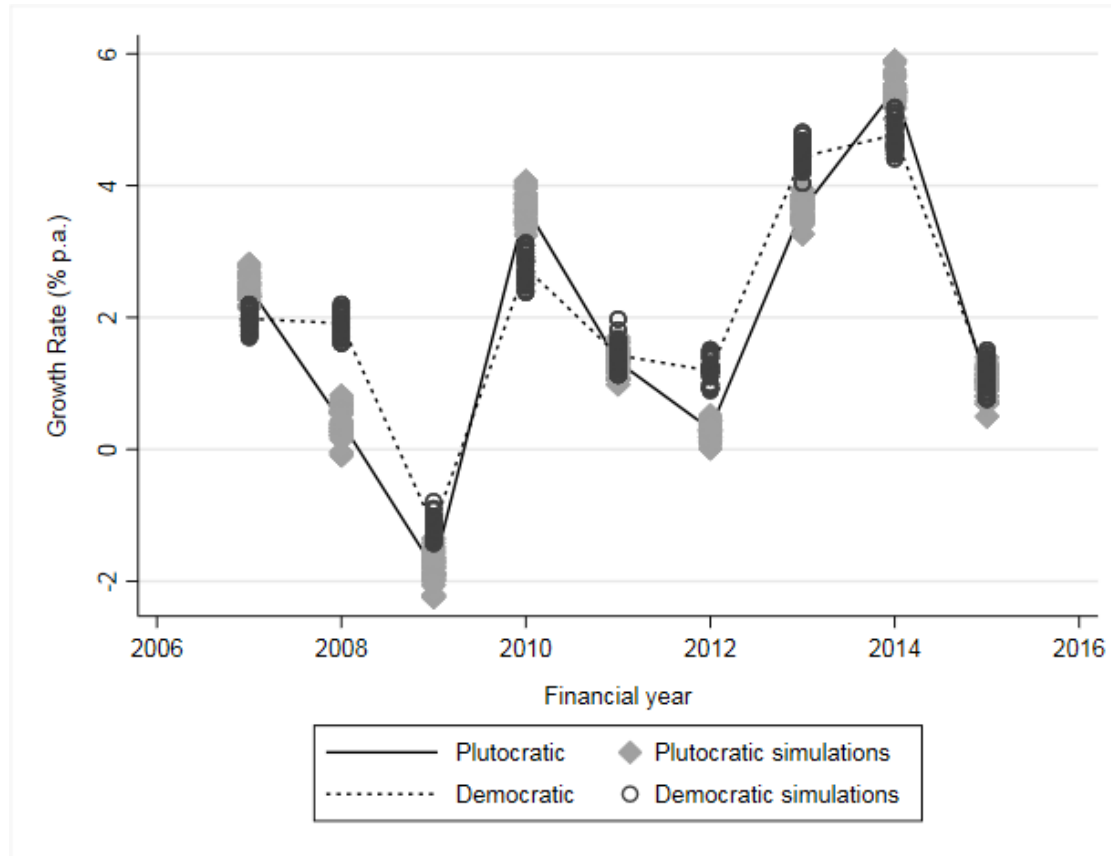
Covariances

- Need to take into account correlation between random components of imputed variables
- Use best source of data for pension wealth (WAS) and interest & dividend income (SPI), therefore not able to jointly estimate our models to estimate correlations simultaneously with parameters
- Estimate a correlation matrix using WAS (which does allow joint estimation but is not the ideal source) for the random components

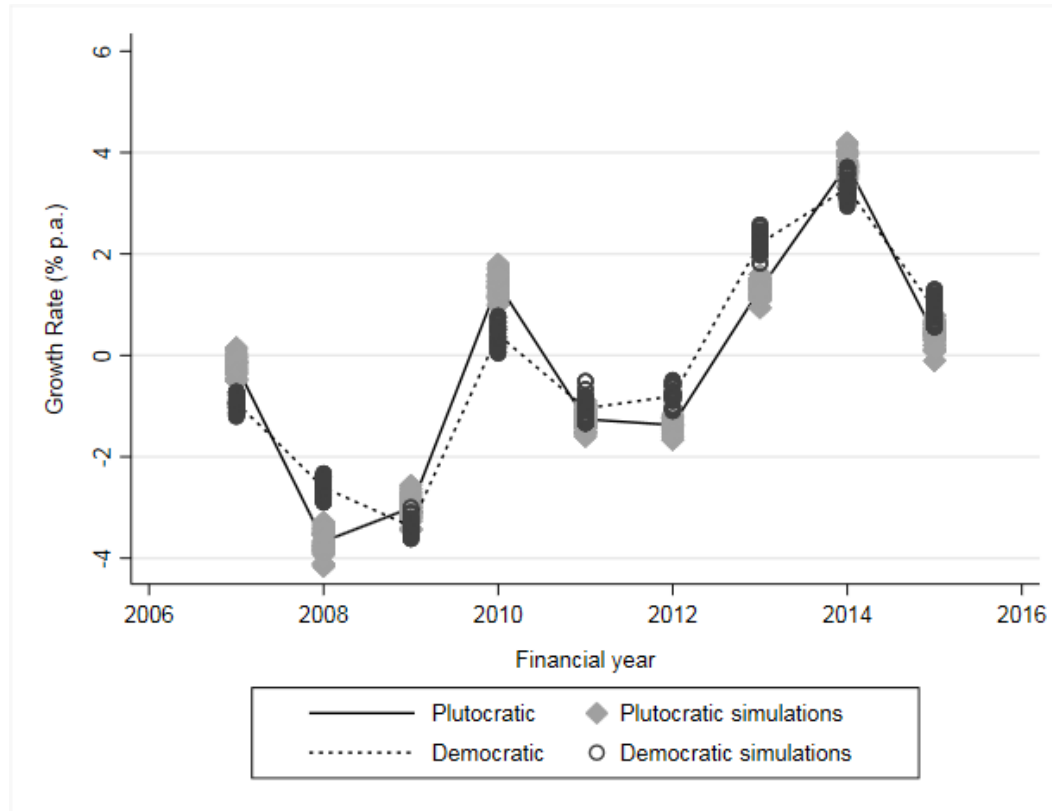
Simulations

- Examine the effect of including imputed pension and investment income on measures of inequality such as Gini & geometric mean of income
- Present indicative results from 100 simulations

Growth Rates of Income per Household



Growth rates of real income per household



Conclusions

- The paper shows a practical means of producing a welfare indicator on a regular basis.
- Democratic growth can be explained to the public as the average of each household's income growth rate.
- Drawing on a range of sources, we have allocated national disposable income across households.
- Over the period we study, 2006-2015, we find that democratic income per household does not diverge very much from plutocratic income per household.