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# A Democratic Measure of National Income Growth

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# Democratic National Income

- A measure of income growth which gives equal weight to each household's experience.
- The mean of real growth rates rather than the the growth rate of the mean of real income.
- Requires Prais' (1959) democratic price index as deflator.
- Income accruing to government and company sector must be allocated to households.

- Aitken and Weale (2018) set out a welfare interpretation of the indicator.
- Utility accruing from saving is the marginal utility of consumption multiplied by the amount saved (Sefton and Weale, 2006).
- To a first order approximation, real income is a measure of utility accruing.
- So democratic income growth measures growth in utility accruing per household.

# Primary Household Incomes

## (£m Fin Year 2015)

	National Accounts	LCFS
Wages and Salaries	780,009	721,072
Net Operating Surplus	119,914	8,809
Self-employment Income	144,007	73,439
Employers' Contributions	155,357	Nets out
Interest receipts	24,305	6,668
Dividend receipts	76,674	7,669
Attr. to insurance holders	23,078	Proportional to insurance
Payable on pension rights	54,308	
Less interest paid	-25,943	-28,399
EQUALS Net Primary Income	1,351,709	

# Secondary Redistribution

## (£m Fin Year 2015)

	National Accounts	LCFS
Net Primary Income	1,351,709	
Social benefits in cash	97,364	82,788
Other social benefits	129,223	107,968
Social assistance	121,404	89,926
Misc transfers rcd	8,700	2,813
Hhlds social contributions	-68,752	-60,299
Misc transfers paid	-33,041	-37,539
Taxes on employment	-143,438	-74,923
Other income tax	-24,203	-5,318
Other current taxes	-44,014	
Pensions supplement	-54,308	
Employers' contributions	-155,357	
EQUALS		
Hhld net disposable income	1,185,087	

# National Disposable Income

(£m FY 2015)

	National Accounts	LCFS
Hhld net disposable income (A)	1,185,087	
Employer contributions	64,451	
Household contributions	12,454	21,008
Supplement less service charge	54,308	
LESS Benefits received	-84,725	
EQUALS Pensions adjustment (B)	46,488	
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	
Net National Disposable Income (A+B+C+D+E)	1,595,004	

# Imputation Issues and Approaches

- Scaling widely used (e.g. in ONS work on consumption)
- Scaling preserves zeroes
- Scaling will not work for sources of income omitted from LCFS- e.g. undistributed accruals to pension funds.
- We found a higher proportion of zeros in LCFS than in other sources (e.g. SPI and HBAI)
- Need to model both the probability of a non-zero receipt and the magnitude of the receipt conditional on being non-zero
- In contrast to scaling, this has to be stochastic - there is not going to be any covariate which exactly identifies non-zero recipients in HBAI or SPI
- We categorise our data and then use an ordered probit model to do this



# The Upper Tail

- Reconciliation with the macro data requires appropriate handling of the upper tail
- Use a Pareto type-1 distribution for observations  $x_i > x_m$  of the form:

$$1 - F(x) = (x_m/x)^\alpha \text{ with } \alpha > 0$$

where the expected value conditional on  $x > x_m$  is  $x_m \alpha / (\alpha - 1)$  if  $\alpha > 1$  but infinite otherwise

- The expected value is used for imputed observations in the top category

# Application

- We apply this approach to
  1. Interest receipts (using SPI on an individual basis)
  2. Dividend receipts (using SPI on an individual basis)
  3. Pension rights (using WAS on a household basis) so as to model the pensions supplement.
- We use a separate model of imputed rent based on ONS work

# 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.

# Covariances

- Need to take into account correlation between random components of imputed variables
- Use best source of data for pension wealth (WAS) and investment 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

# Covariances Implementation (iii)

People aged under 65: WAS Wave 4

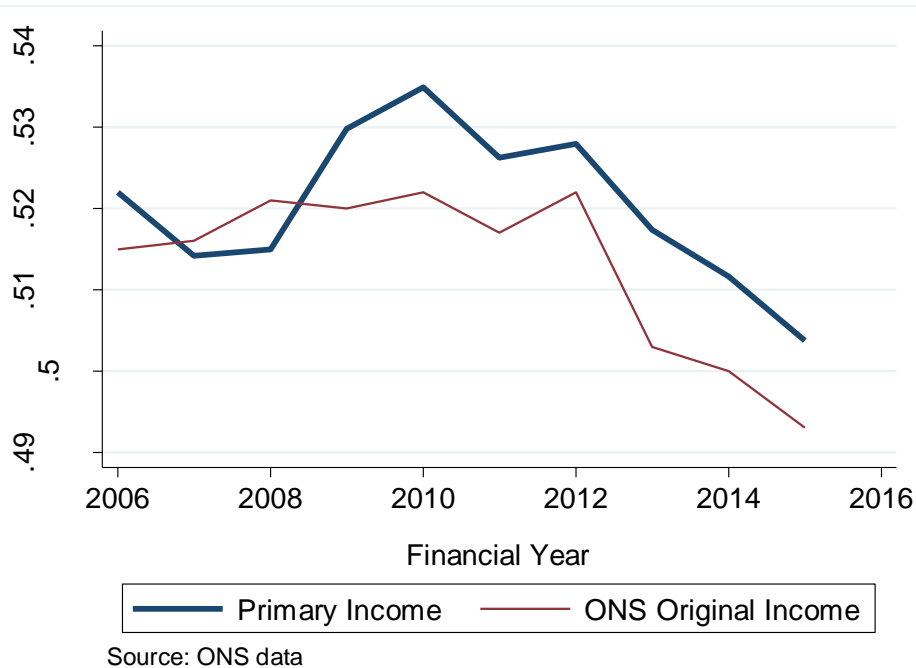
$\rho_{12}$ Interest Inc (1 & 2)	0.71	$\rho_{34}$ Dividend Inc (1 & 2)	0.81
$\rho_{13}$ Int (1) and Divi (1)	0.43	$\rho_{35}$ Int (2) and Pension	0.44
$\rho_{14}$ Int (1) and Divi (2)	0.38	$\rho_{36}$ Int (2) and Imp Rent	0.39
$\rho_{15}$ Int (1) and Pension	0.38	$\rho_{45}$ Div(2) and Pension	0.42
$\rho_{16}$ Int (1) and Imp Rent	0.27	$\rho_{46}$ Div(2) and Imp Rent	0.39
$\rho_{23}$ Int (2) and Divi (1)	0.36	$\rho_{56}$ Pension and Imp Rent	0.41
$\rho_{24}$ Int (2) and Divi (2)	0.41		
$\rho_{25}$ Int (2) and Pension	0.36		
$\rho_{26}$ Int (2) and Imp Rent	0.27		

High correlations across couples for interest (0.71) and dividends (0.81). Otherwise modest.

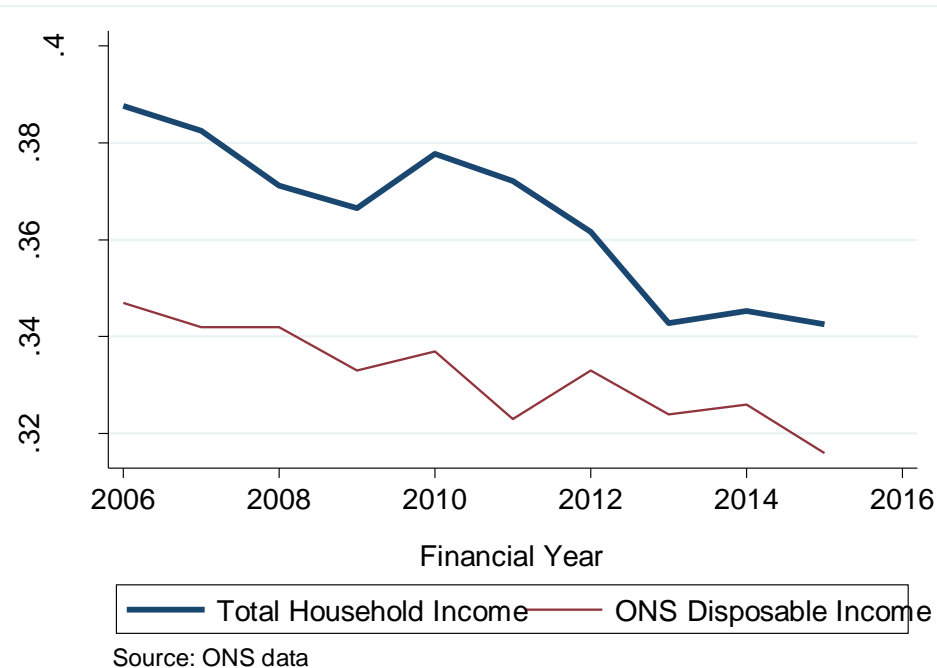
# Simulations

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

# Gini Coefficients: Comparison with Official Data

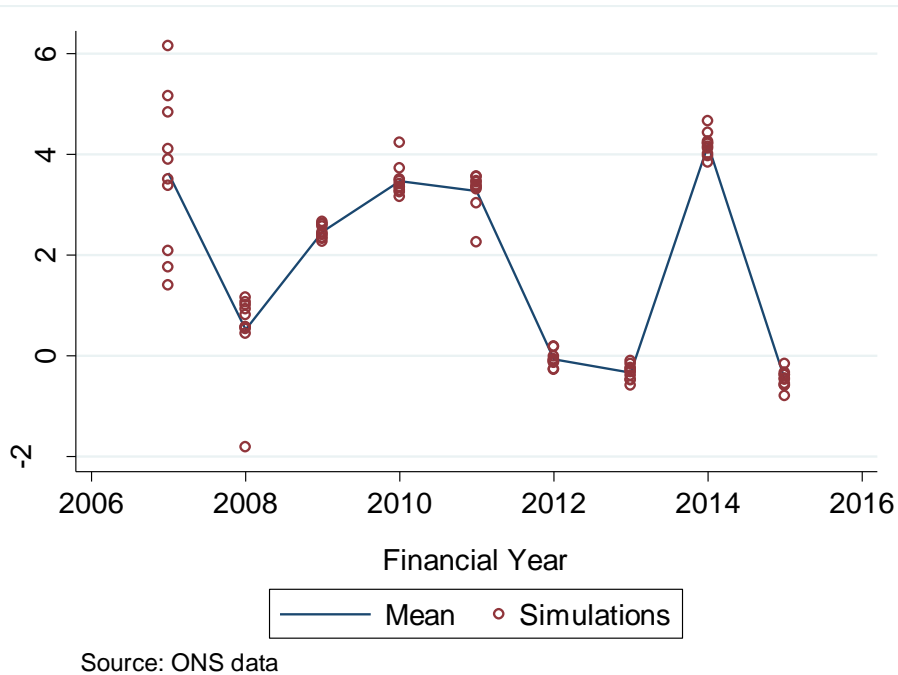


Primary Income

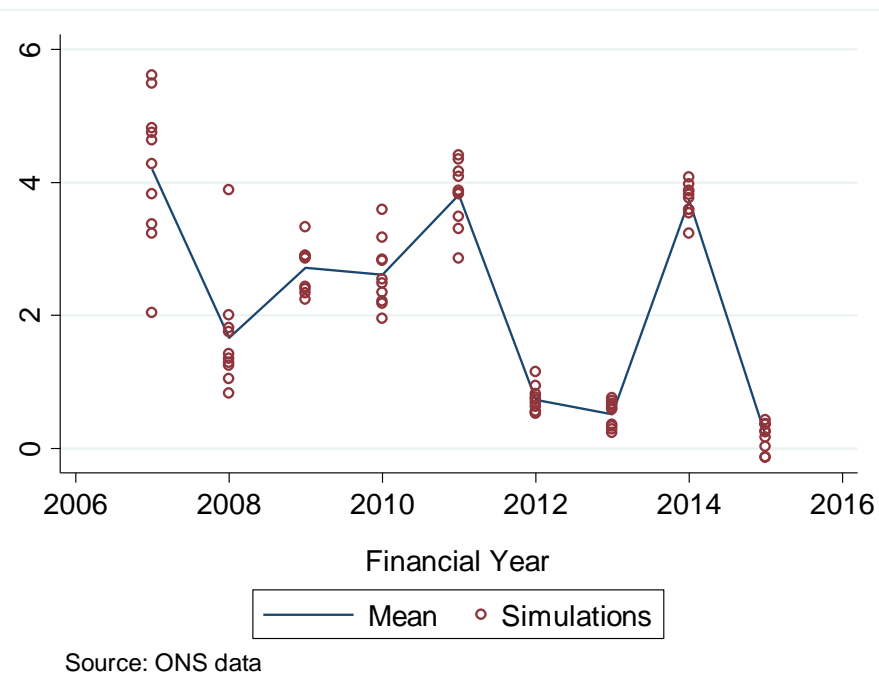


Household Income

# Growth Rates of Income per Household



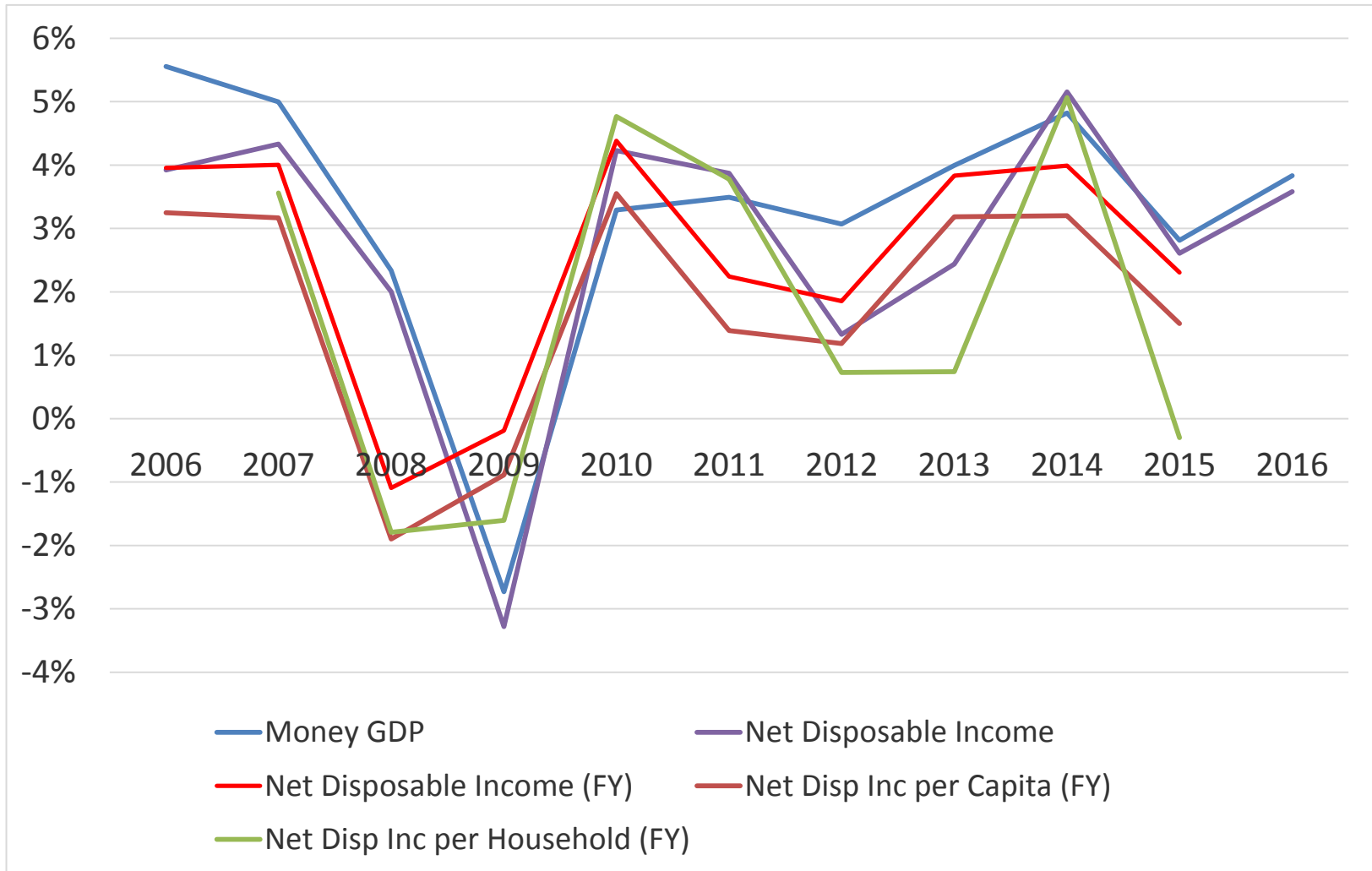
Plutocratic Nominal Income Growth per Household



Democratic Nominal Income Growth per Household

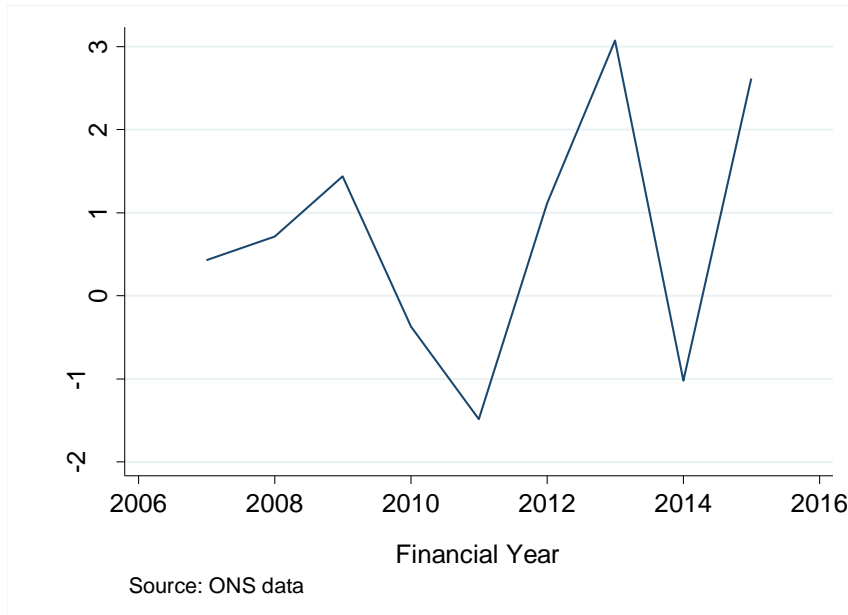


# Nominal Income Growth ( % p.a. Official Data)

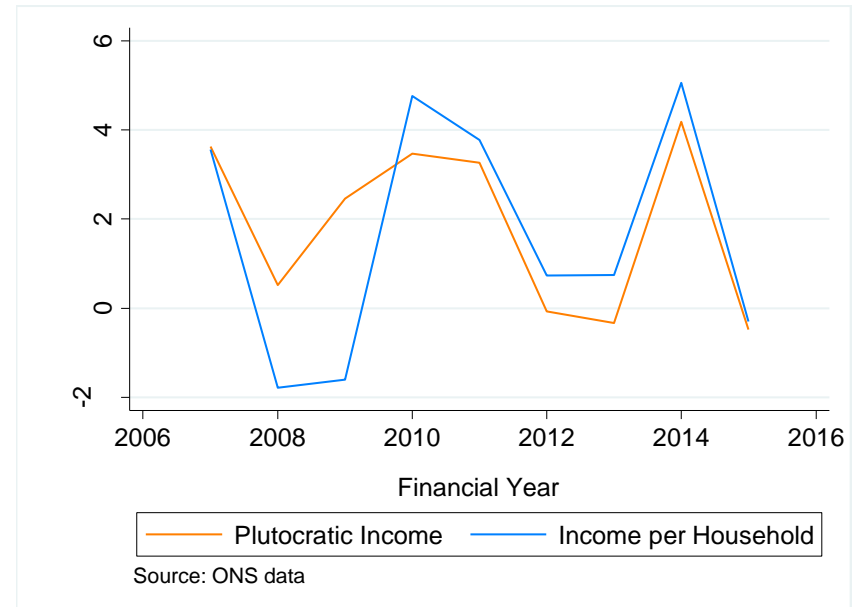


# Net Disposable Income per Household (FY)

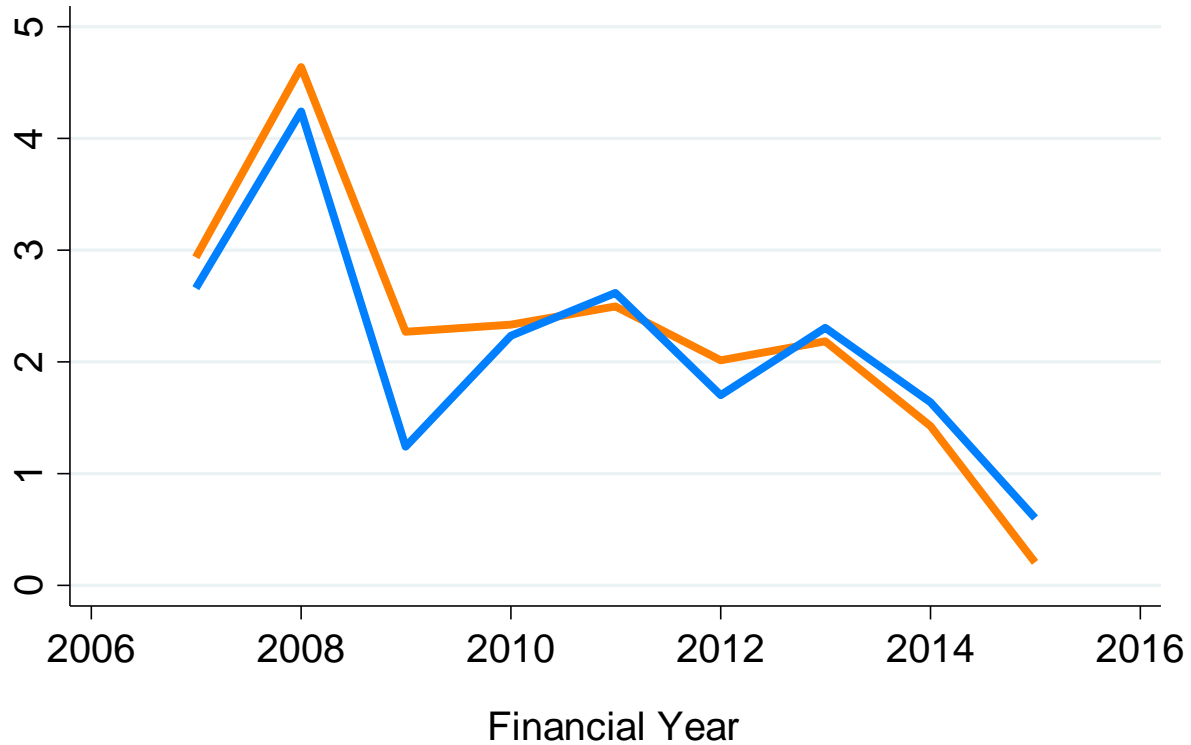
## Growth in Number of Households



## Income Growth per Household

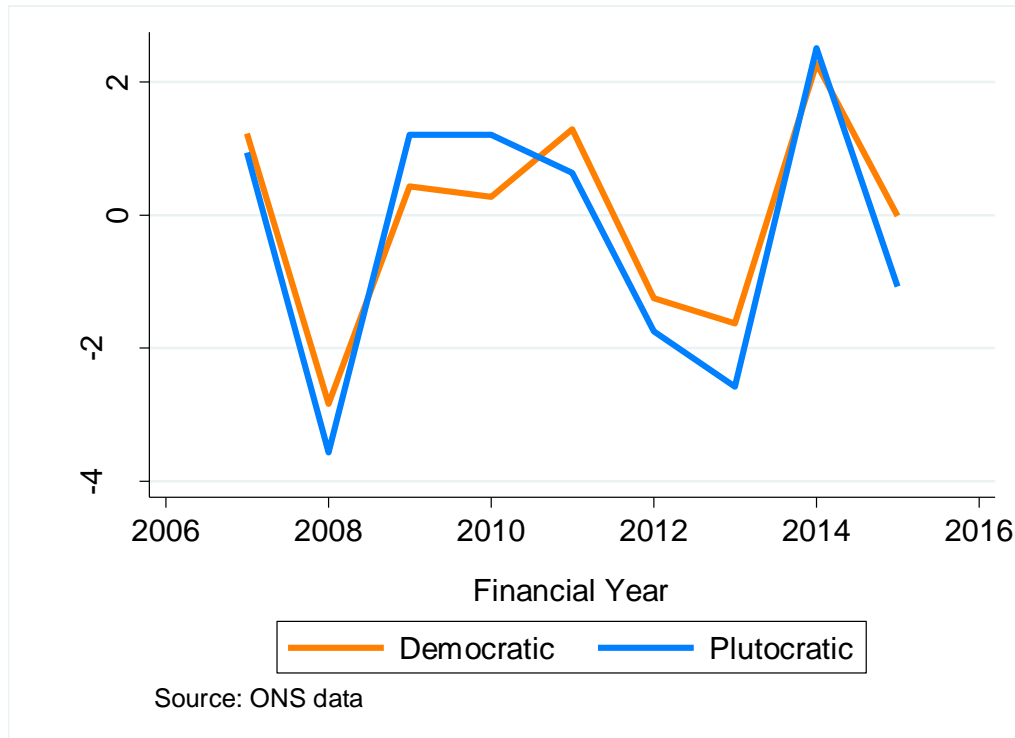


# Deflation



Source: ONS data

# Real Income Growth per Household (adjusted for household size)



## Average Growth Rates 2006-2015

	Plutocratic	Democratic	Difference
Nominal Growth	1.8%	2.2%	0.4%
Growth in Deflator	2.1%	2.3%	0.1%
Growth in Real Income	-0.3%	0.0%	0.2%

# Conclusions

- Drawing on a range of sources, we have allocated national disposable income across households.
- The broad income measure shows declining inequality as do official measures of inequality.
- Nominal democratic income growth is 0.4% p.a. faster over the period 2006-2015.
- In real terms the growth rate is 0.2% higher.

- 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.
- It is also a first-order approximation to the growth in accruing welfare, when utility is logarithmic.