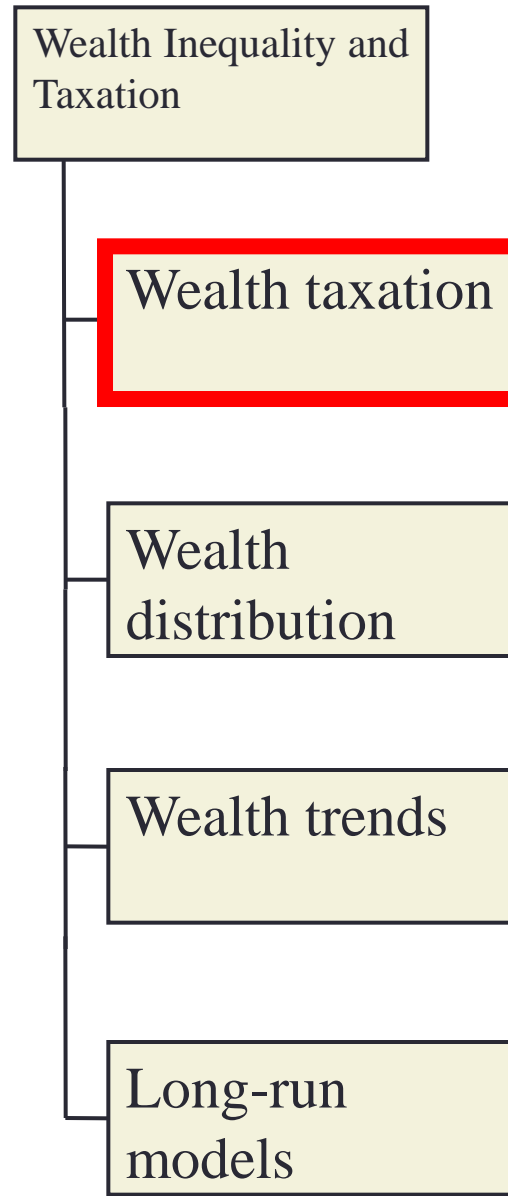# Wealth inequality and the taxation of wealth transfers

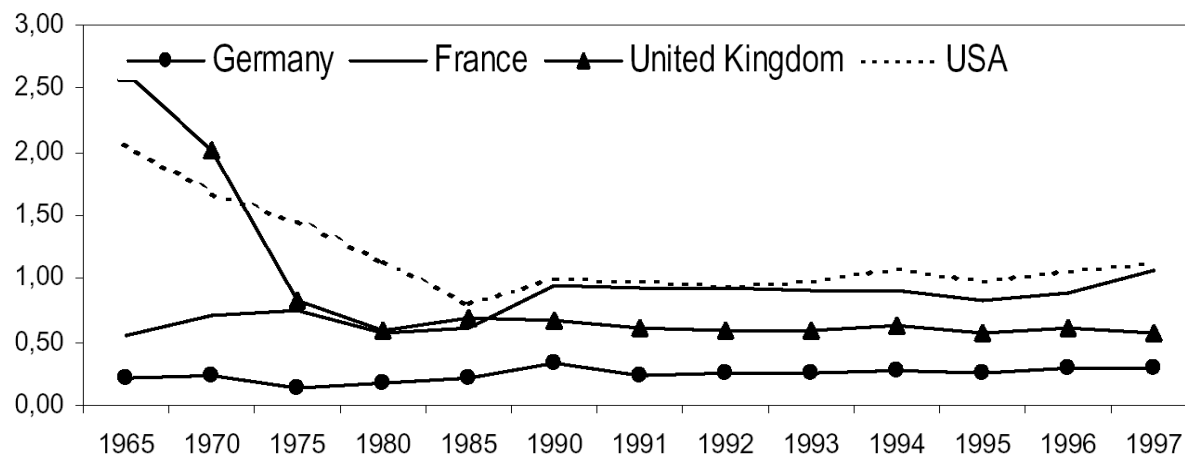Frank Cowell: Winter School, Canazei, January 2012

Overview...

Why wealth taxation?
Types of tax

Wealth Inequality and Taxation

Wealth taxation

Wealth distribution

Wealth trends

Long-run models

# Why wealth taxation?

- <u>Revenue raising</u> is unlikely to be major role
  - revenue raised less than 1% of receipts?
  - see OECD Revenue Statistics (2000)
- <u>Efficiency</u> case for or against wealth taxation is unclear
  - (Cremer and Pestieau 2003)
- <u>Equity</u> case for wealth taxation is more promising
  - direct impact of wealth taxation on redistribution must be small
  - in long run taxes may influence savings and bequest behaviour
  - these influence wealth accumulation and inequality

Wealth taxation and its alternatives

- Annual wealth tax:
  - mostly on an overall measure of net worth
  - some specific wealth taxes (property taxes)
- Inheritance / estate tax:
  - taxes on *transfer* of wealth at death
  - inheritance tax: on the beneficiaries of the estate
  - estate tax: on personal representatives of the deceased
- Transfer tax
  - taxes *transfer* of wealth not necessarily at death
- On other side of balance sheet?
  - "asset-based egalitarianism"
  - start-of-life grants
  - state pension provision

Overview...

Definitions, composition and inequality

Wealth Inequality and Taxation

- Wealth taxation
- **Wealth distribution**
- Wealth trends
- Long-run models
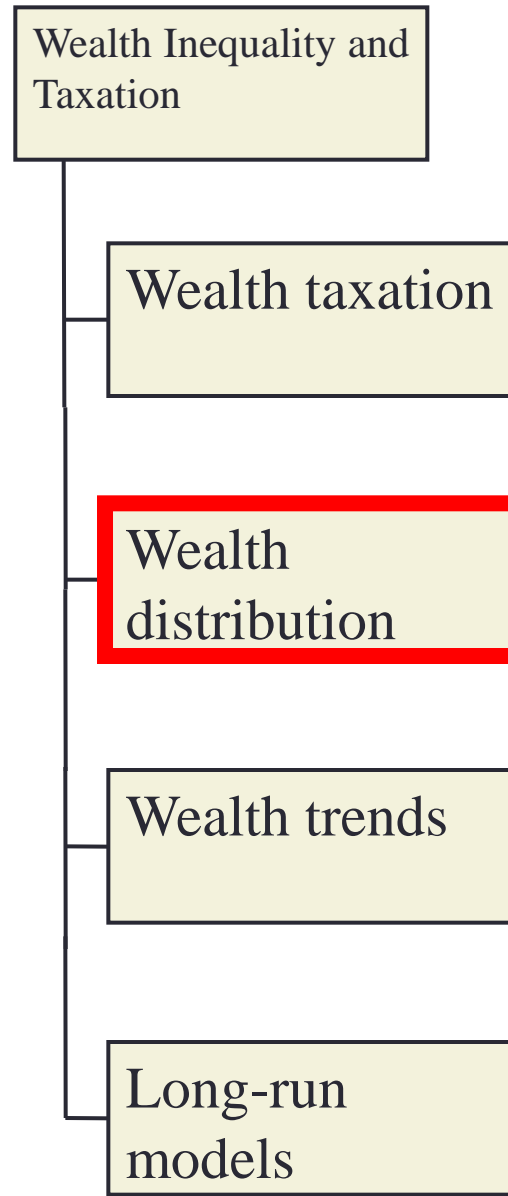
Wealth concepts: UK example

- British Household Panel Survey
  - fairly comprehensive
  - suffers from standard participation / attrition problems
- Wealth and assets survey
  - uses survey and administrative data – comprehensive
  - newly emerged, so no time-series analysis
- HMRC Identified personal wealth
  - emerges directly from the estate multiplier method
  - it is clearly biased (missing wealth, missing persons)
  - differs from balance-sheet concept of wealth
- HMRC Series C: marketable wealth only
  - valuation issues addressed
  - excluded population corrected
- HMRC Series D: includes a valuation of pension rights
- HMRC Series E: includes a valuation of state pension rights

HMRC "Identified wealth" 2003

net capital value of estate	Securities	Cash	Loans, mortgages etc	Policies of insurance	Residential buildings	Other Buildings and Land	Other assets	Net as % gross	Mortgages	Other debts
0 - £50,000	4.6%	22.7%	5.6%	8.9%	47.6%	0.1%	10.5%	61.0%	5.7%	33.4%
£50000 - £100,000	4.5%	16.2%	3.0%	14.6%	55.0%	0.0%	6.8%	83.3%	4.1%	12.6%
£100000 - £150,000	3.9%	14.0%	2.4%	18.6%	55.2%	0.1%	5.8%	84.4%	4.3%	11.3%
£150000 - £200,000	4.5%	14.4%	0.7%	12.1%	59.4%	1.6%	7.5%	89.0%	4.9%	6.1%
£200000 - £500,000	8.5%	12.8%	0.9%	12.6%	54.7%	1.5%	9.0%	89.7%	6.5%	3.8%
£500000 - £1000,000	17.6%	11.2%	1.6%	7.6%	42.5%	5.3%	14.1%	93.8%	3.9%	2.3%
£1,000,000 and over	23.8%	10.8%	1.9%	5.0%	28.1%	8.1%	22.4%	94.2%	2.9%	3.0%

□ *Residential buildings about 50% of net worth, except for £500,000+*

□ *Debts concentrated amongst those with less than £100,000*
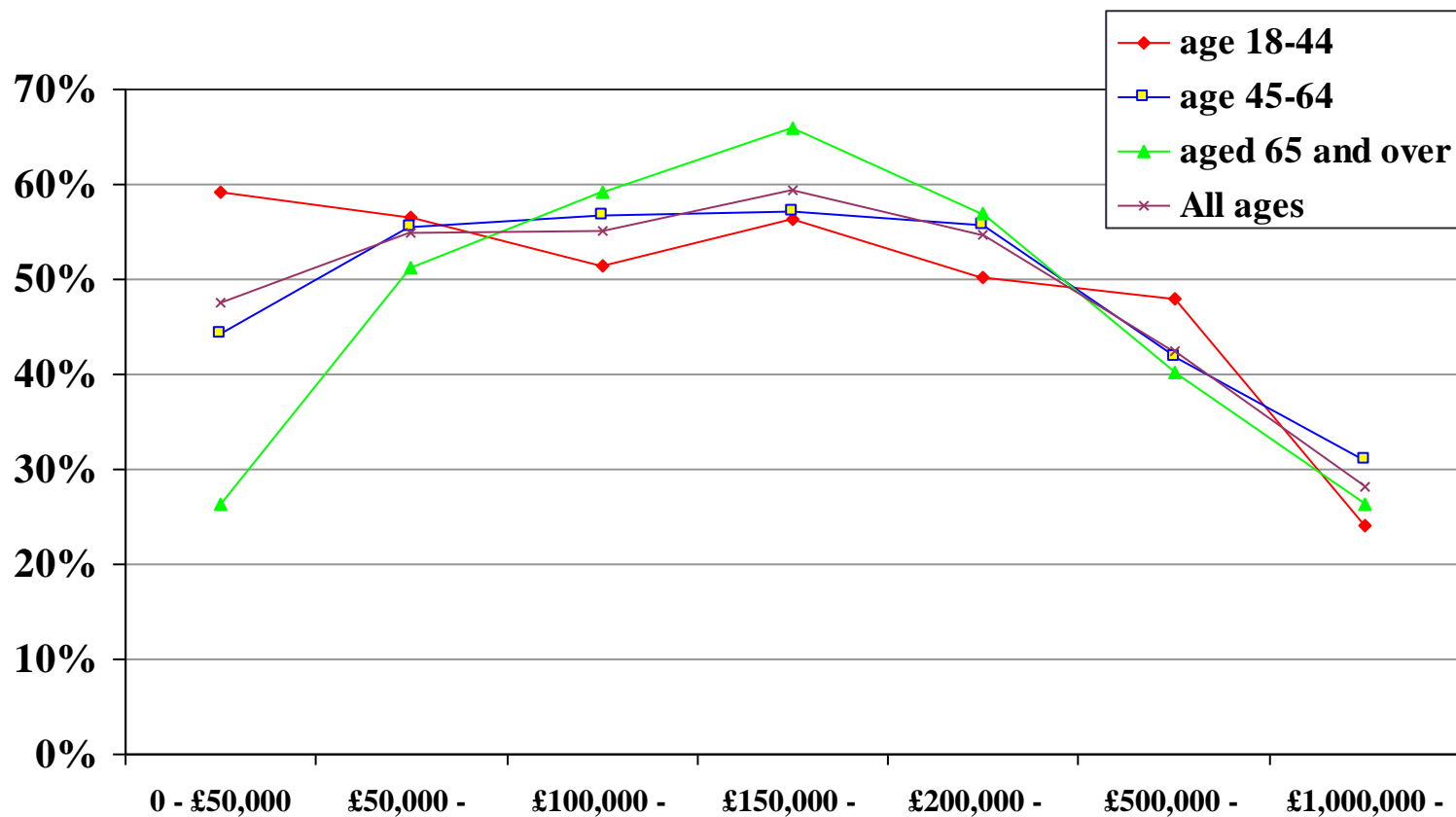
□ *Securities concentrated amongst the rich*

Source: HMRC statistics table 13.2

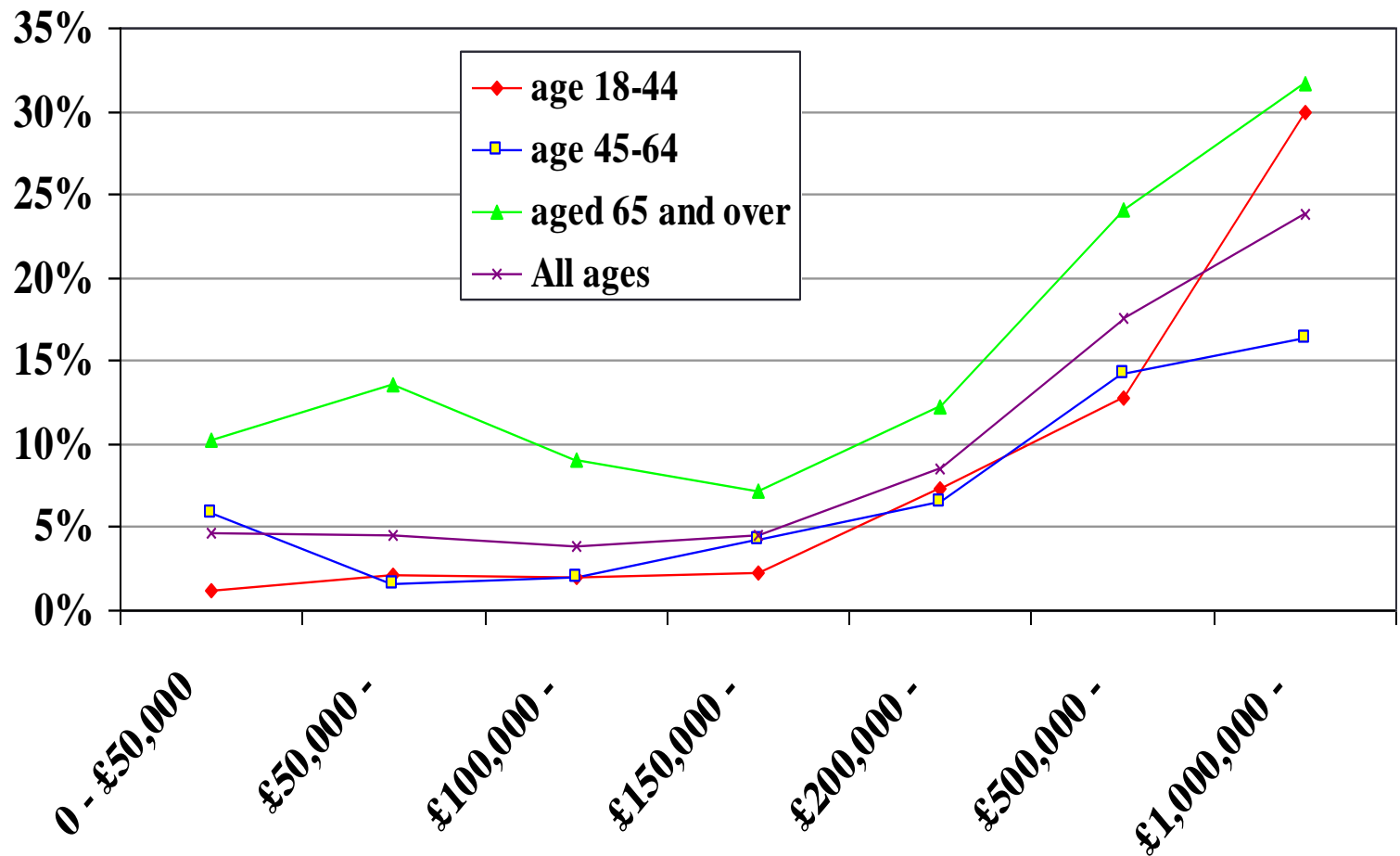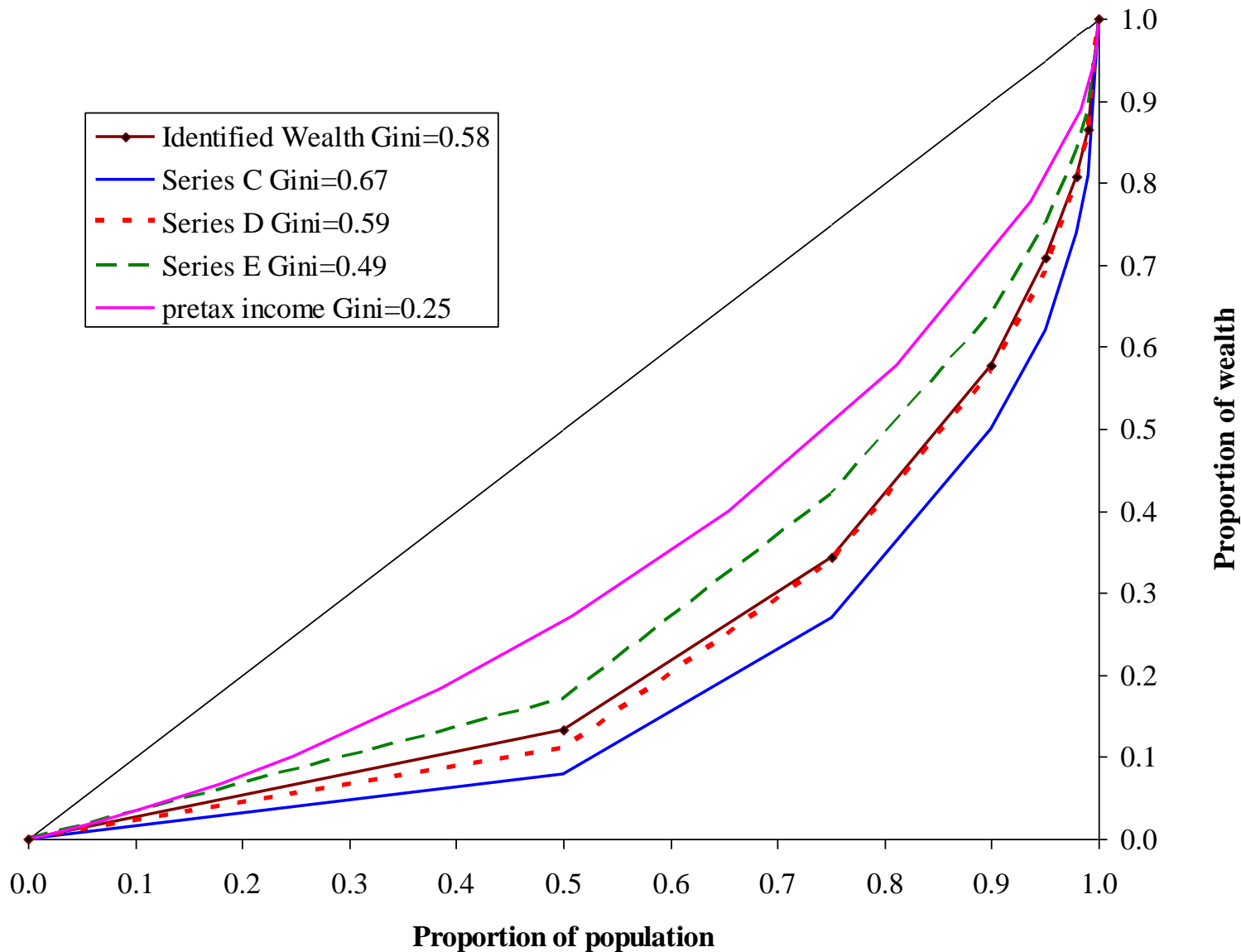# Proportion of wealth in residential buildings. UK 1999
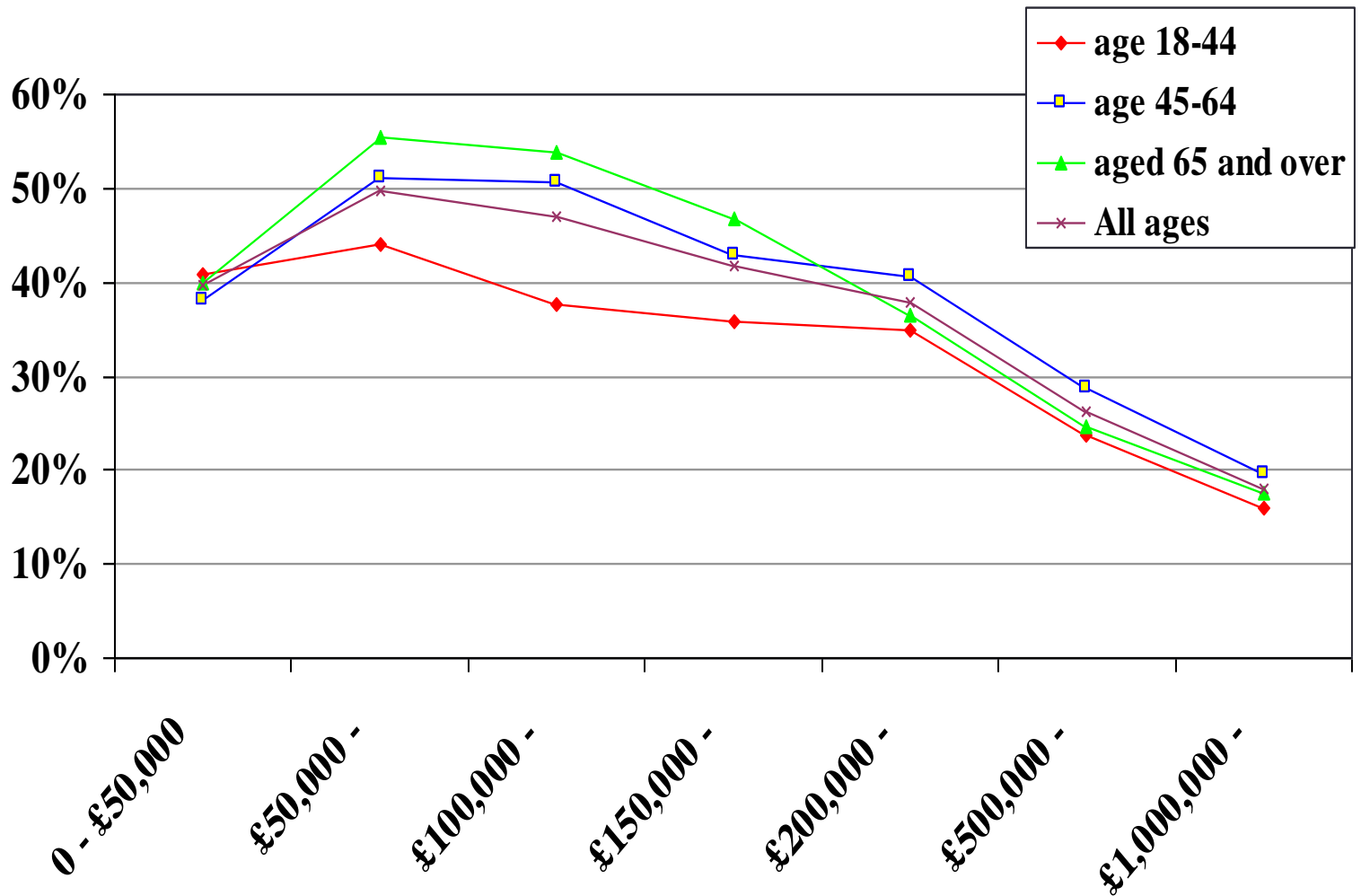
Proportion of wealth in residential buildings. UK 2003

Proportion of wealth in securities. UK 2003

Wealth concepts and inequality

Household portfolio composition – LWS

Wealth components	Canada 1999	Finland 1998	Germany 2002	Italy 2002	Sweden 2002	United Kingdom 2000	US PSID 2001	US SCF 2001
Non-financial assets	78	84	87	85	72	83	67	62
Principal residence	64	64	64	68	61	74	52	45
Real estate	13	20	23	17	11	9	14	17
Financial assets	22	16	13	15	28	17	33	38
Deposit accounts	9	10	n.a.	8	11	9	10	10
Bonds	1	0	n.a.	3	2	n.a.	n.a.	4
Stocks	7	6	n.a.	1	6	n.a.	23	15
Mutual funds	5	1	n.a.	3	9	n.a.	n.a.	9
Total assets	100	100	100	100	100	100	100	100
Total debt	26	16	18	4	35	21	22	21
Home secured	22	11	15	2	n.a.	18	n.a.	18
Total net worth	74	84	82	96	65	79	78	79

Source: Sierminska et al (2006)

UK: WAS 2009

Frank Cowell: Winter School, Canazei
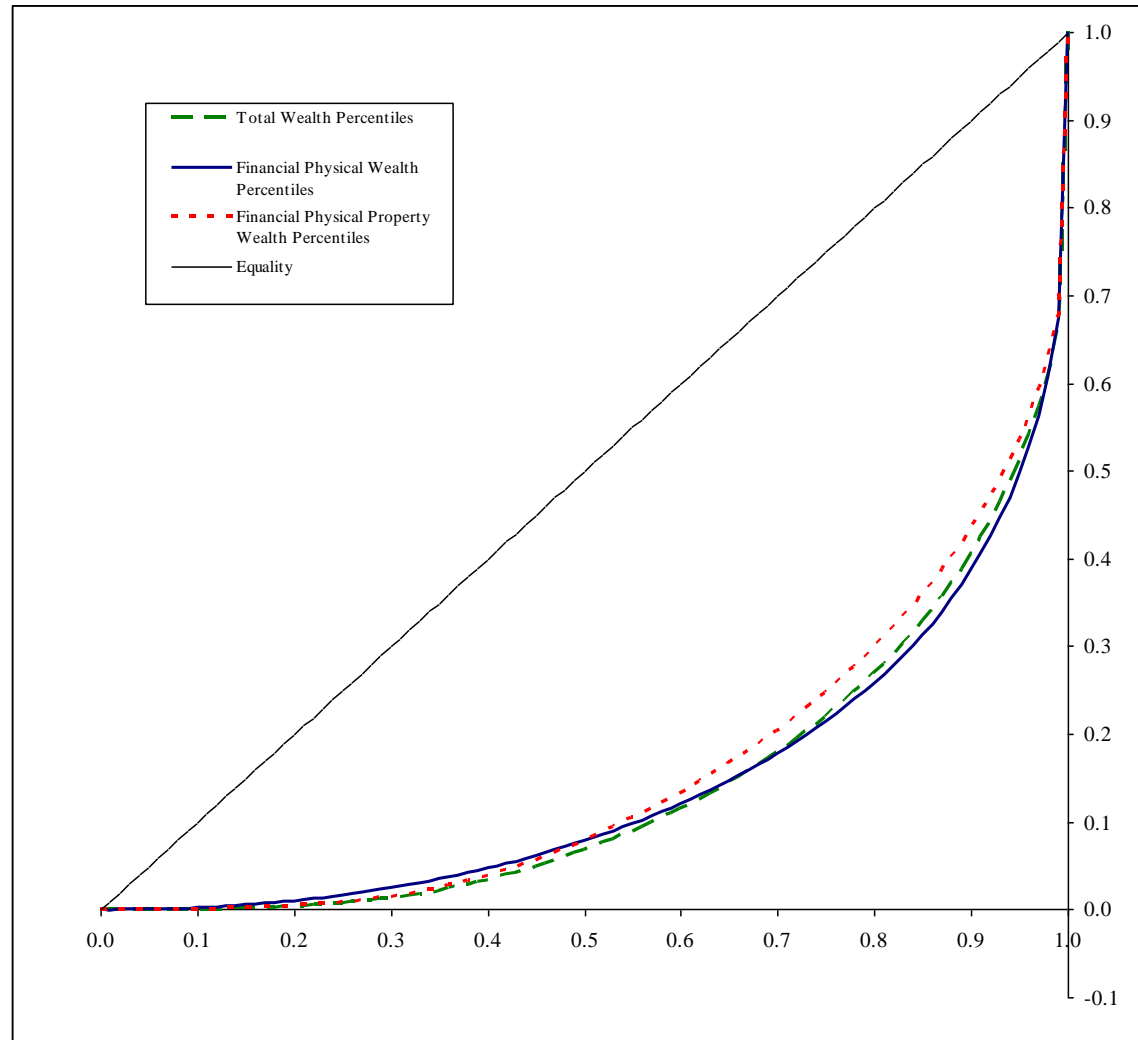
LWS: Wealth inequality in four countries

	Gini	Share Top 10%	Share Top 5%	Share Top 1%
UK	0.665	0.456	0.301	0.101
Sweden	0.893	0.582	0.406	0.175
Canada	0.747	0.532	0.374	0.151
US	0.836	0.705	0.575	0.329

Source: Cowell (2012)

LWS: Net worth

	Gini
Canada 1999 NW1	0.747
US SCF 2000 NW1	0.836
UK 2000 NW1	0.665
Sweden 2002 NW1	0.893
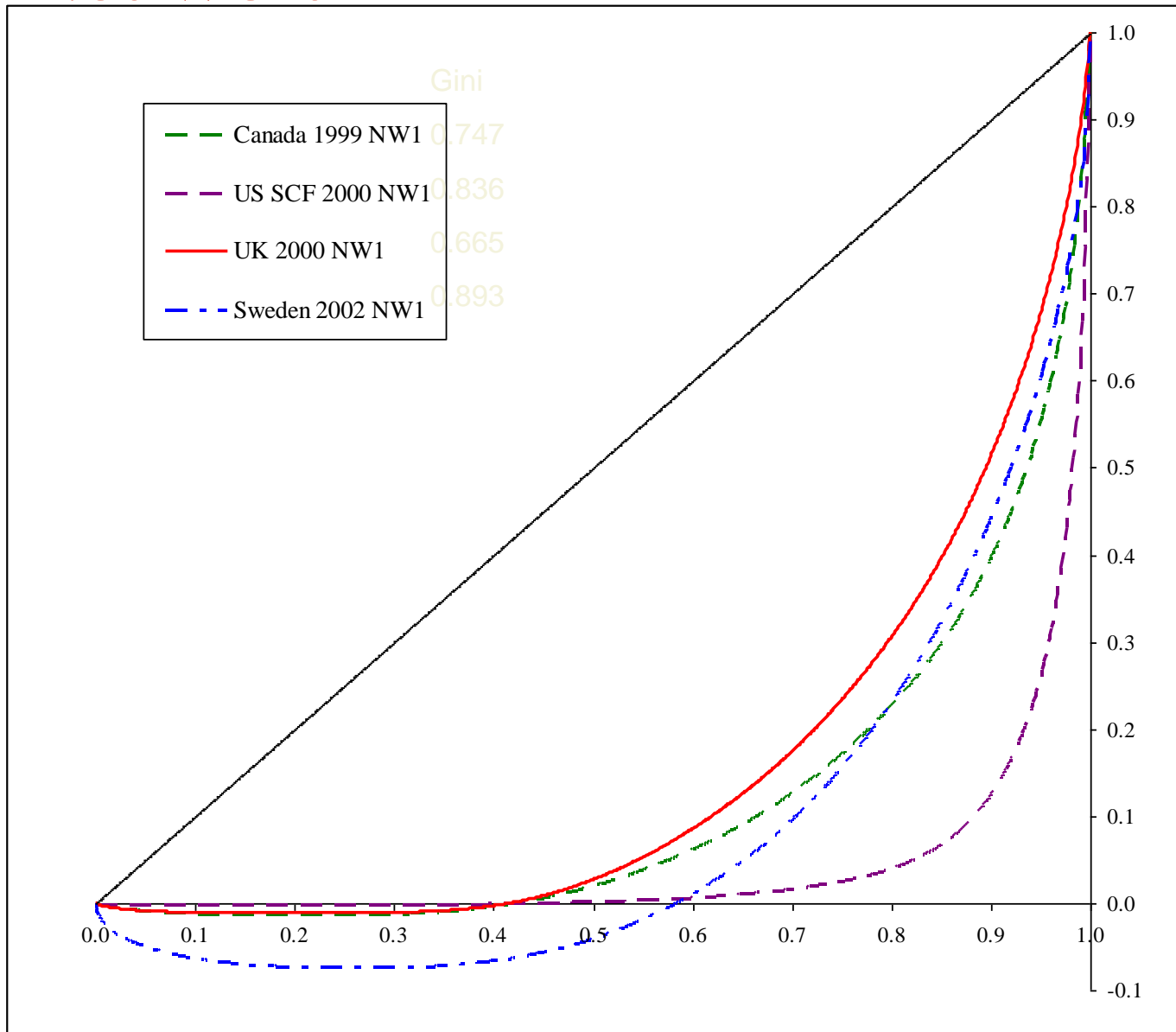
LWS: breakdown by wealth group

	Gini overall	Share rich		rich	Gini non-rich	between
Top 10%						
UK	0.665	0.456		0.260	0.607	0.356
Sweden	0.893	0.582		0.314	1.045	0.482
Canada	0.747	0.532		0.293	0.710	0.432
US	0.836	0.705		0.349	0.779	0.605
Top 5%						
UK		0.301		0.223	0.618	0.251
Sweden		0.406		0.316	0.941	0.356
Canada		0.374		0.261	0.703	0.324
US		0.575		0.318	0.748	0.525
Top 1%						
UK		0.101		0.157	0.644	0.091
Sweden		0.175		0.326	0.891	0.165
Canada		0.151		0.132	0.721	0.141
US		0.329		0.198	0.777	0.319

LWS: Net worth (top 10%)
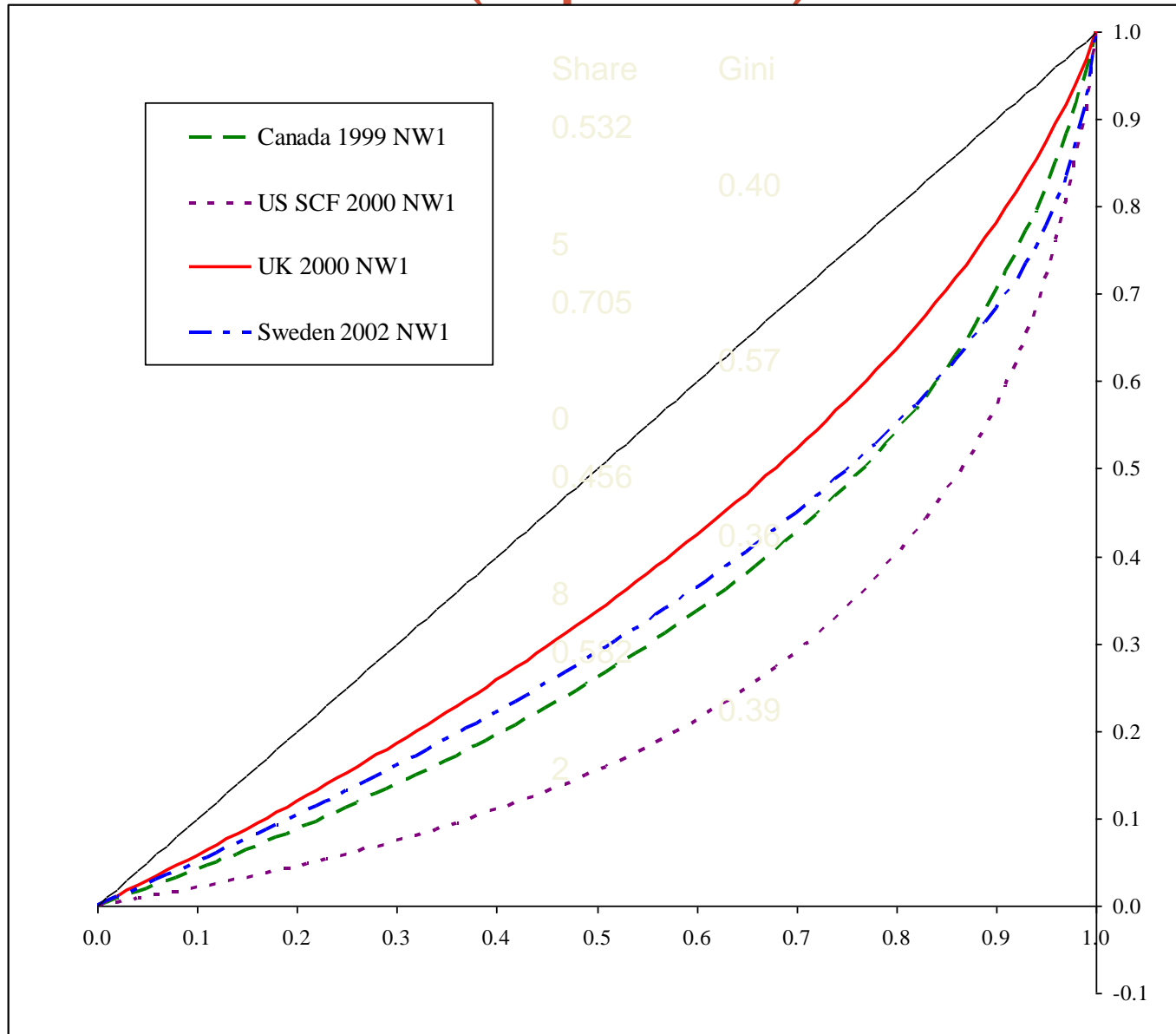
LWS: breakdown by asset type

	Share of…					Gini Coefficient			
	Top 10%	Top 5%	Top 1%			All	Top 10%	Top 5%	Top 1%
	Principal Residence						*Principal Residence*		
UK	0.339	0.201	0.051		UK	0.559	0.274	0.284	0.308
Sweden	0.346	0.209	0.050		Sweden	0.708	0.369	0.355	0.429
Canada	0.269	0.146	0.036		Canada	0.603	0.372	0.435	0.416
US	0.168	0.073	0.024		US	0.645	0.484	0.500	0.449
	Investment Property						*Investment Property*		
UK	0.653	0.540	0.302		UK	0.966	0.860	0.793	0.582
Sweden	0.680	0.579	0.386		Sweden	0.949	0.847	0.839	0.827
Canada	0.645	0.493	0.096		Canada	0.930	0.727	0.672	0.674
US	0.784	0.606	0.415		US	0.959	0.700	0.747	0.750
	Financial Assets						*Financial Assets*		
UK	0.484	0.346	0.120		UK	0.799	0.584	0.548	0.543
Sweden	0.534	0.401	0.213		Sweden	0.778	0.587	0.593	0.509
Canada	0.743	0.609	0.357		Canada	0.860	0.616	0.553	0.195
US	0.977	0.863	0.506		US	0.899	0.510	0.417	0.294

LWS: Total Assets

Frank Cowell: Winter School, Canazei   **19**
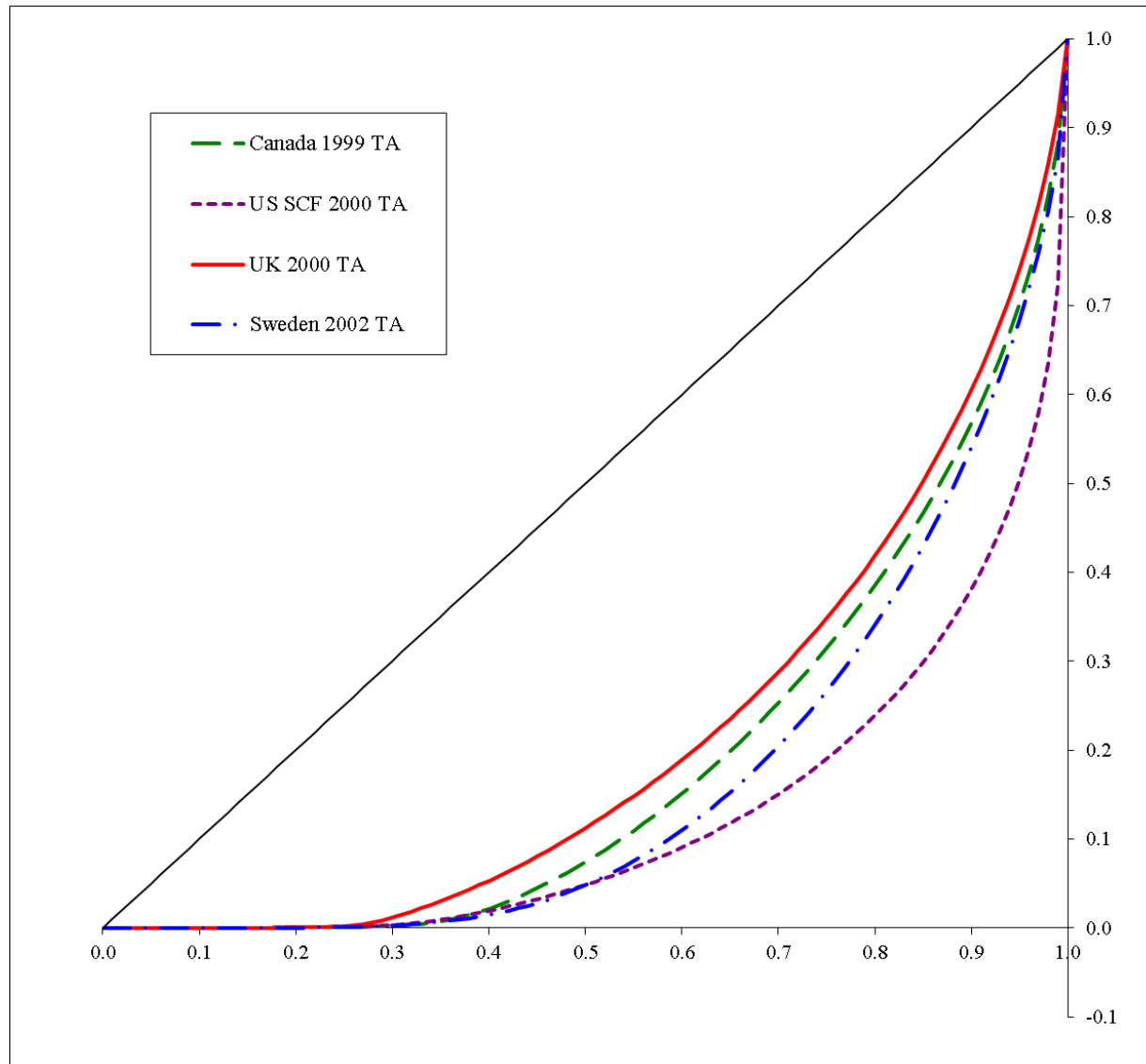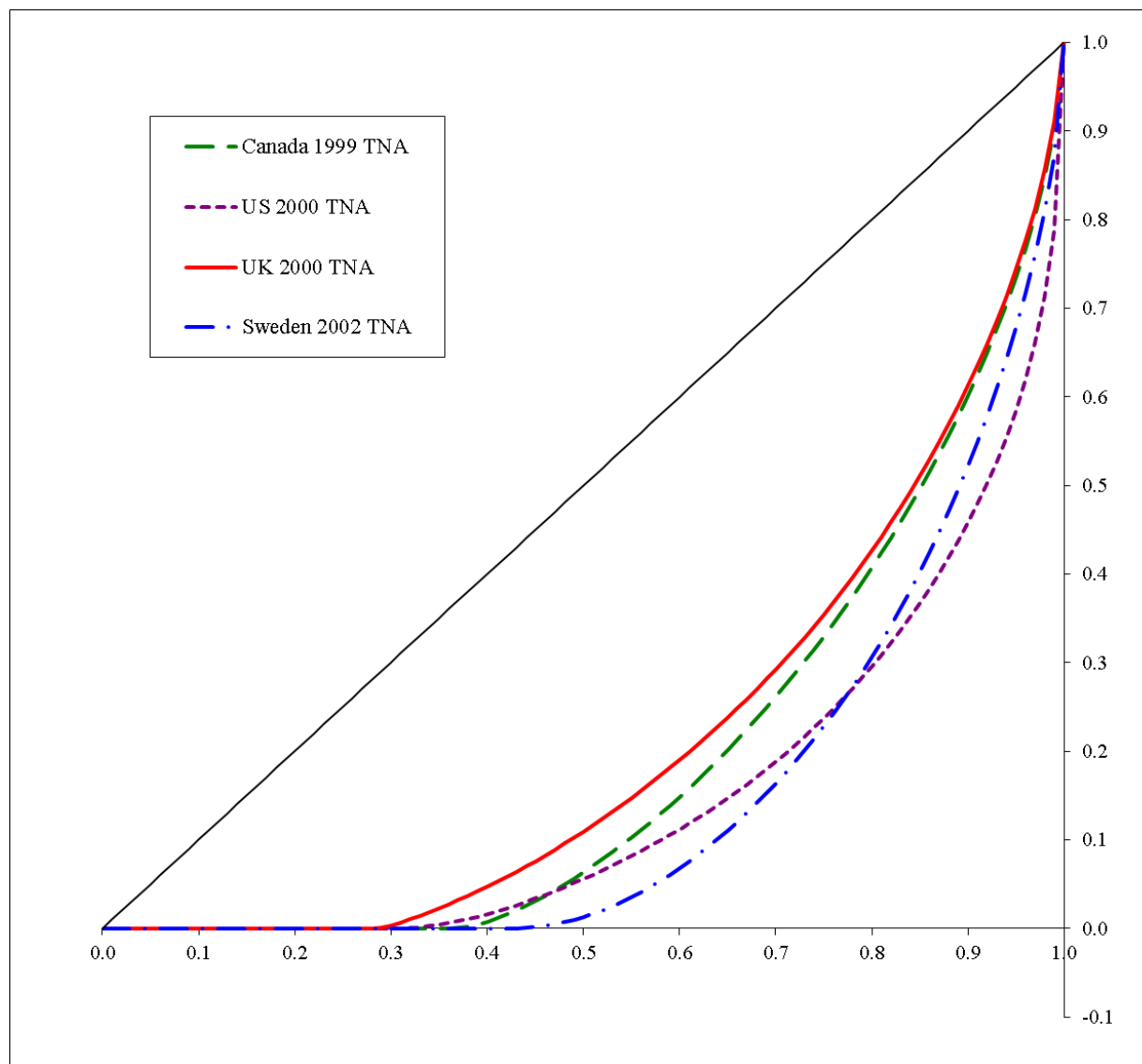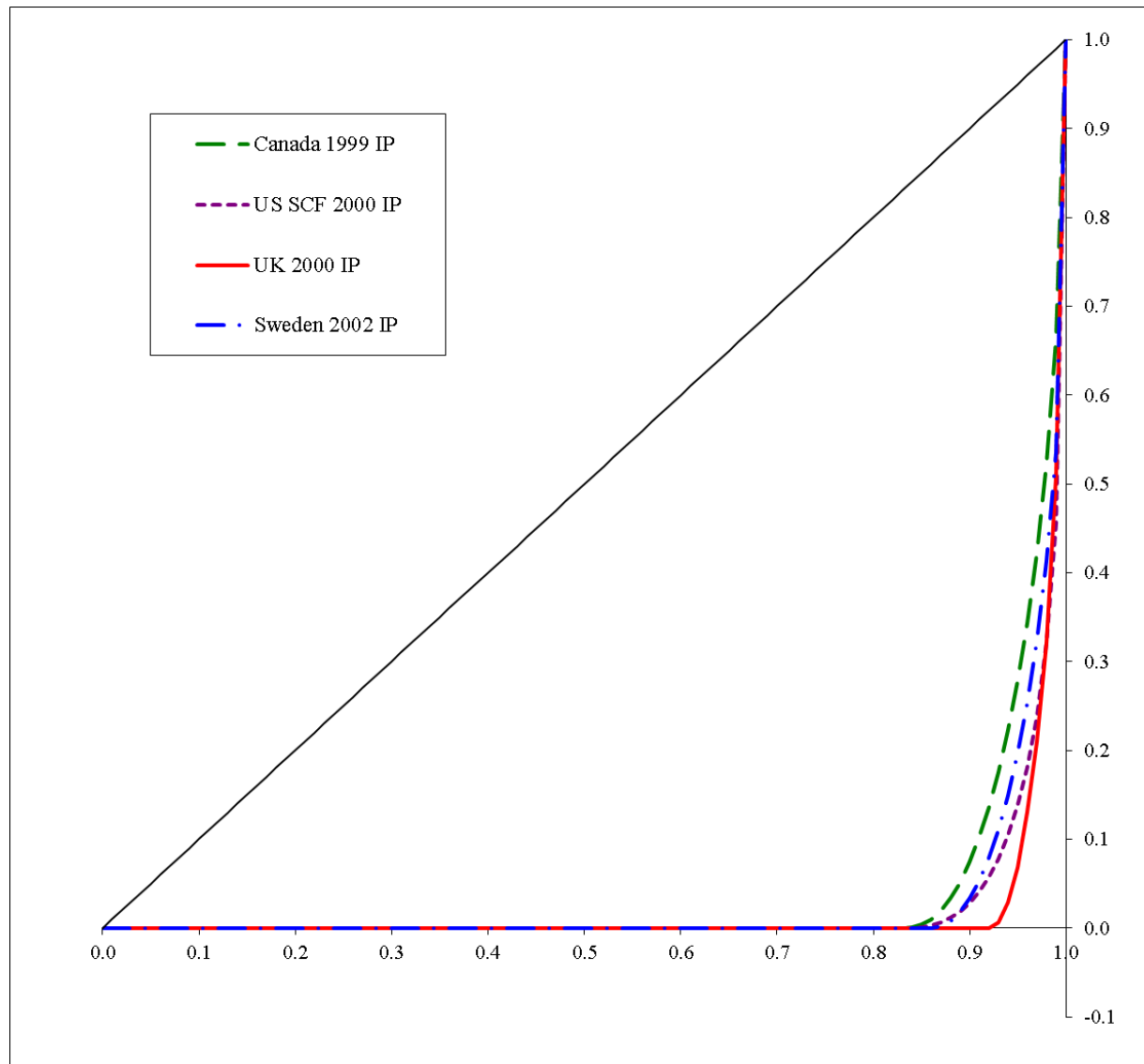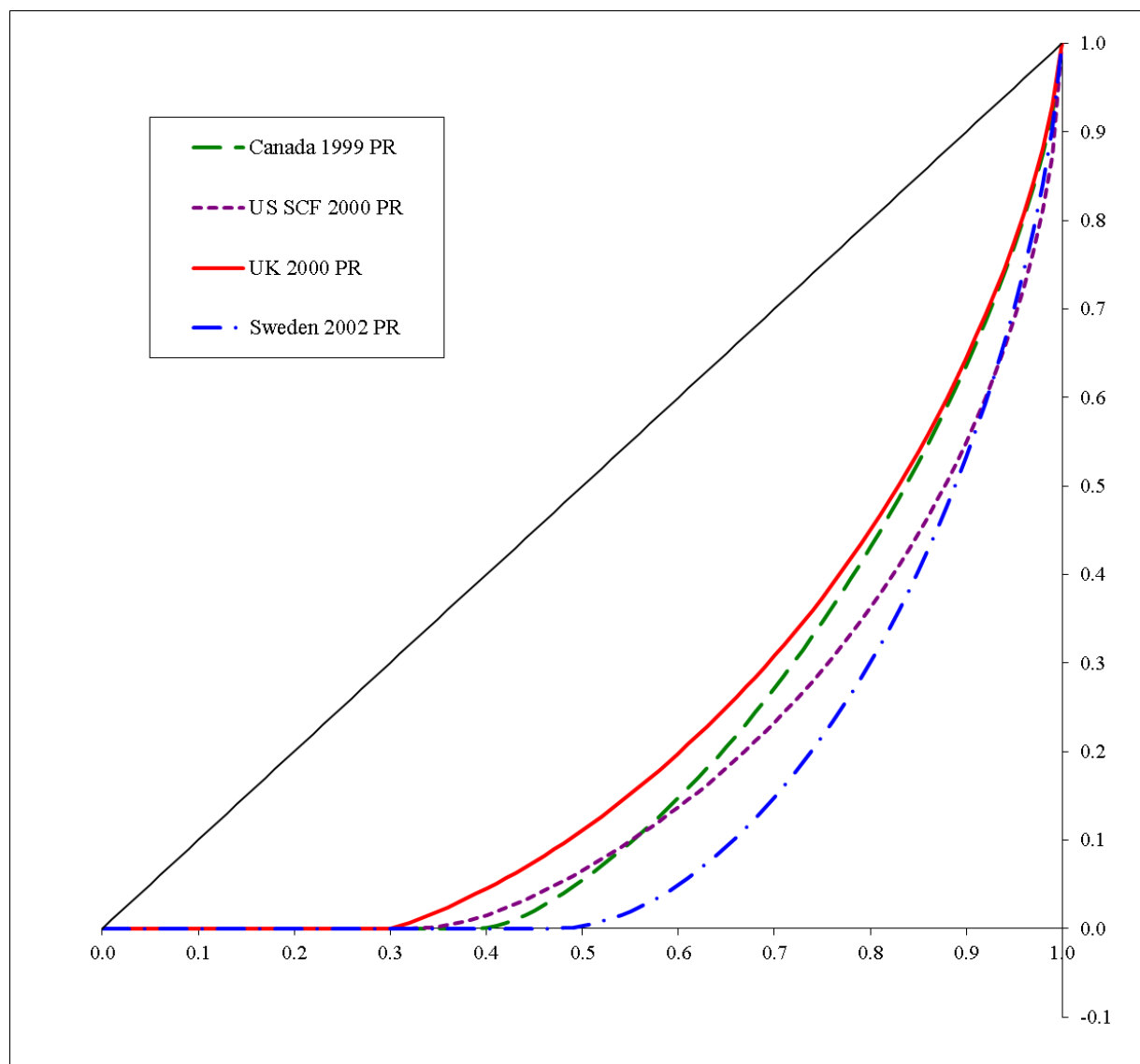
LWS: Total *Financial* Assets
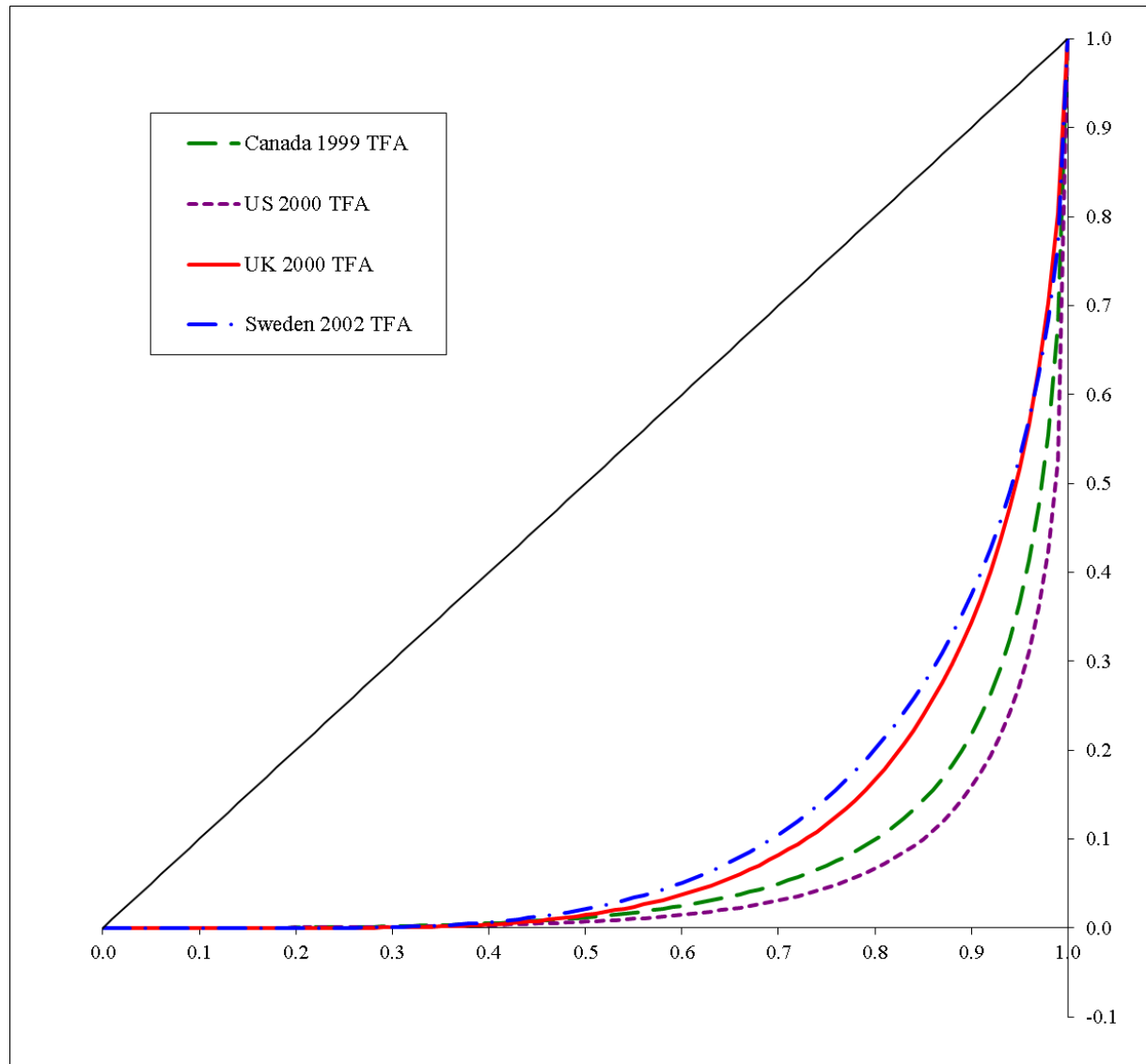
LWS: Total *Nonfinancial* Assets

LWS: Investment property

LWS: Principal residence

Functional form for wealth distribution

- Distinctive shape of empirical wealth distribution
- Upper tail appears to conform to Pareto model
- Pareto distribution
  - $F(x) = 1 - [\, \underline{x} / x \,]^{\alpha}$
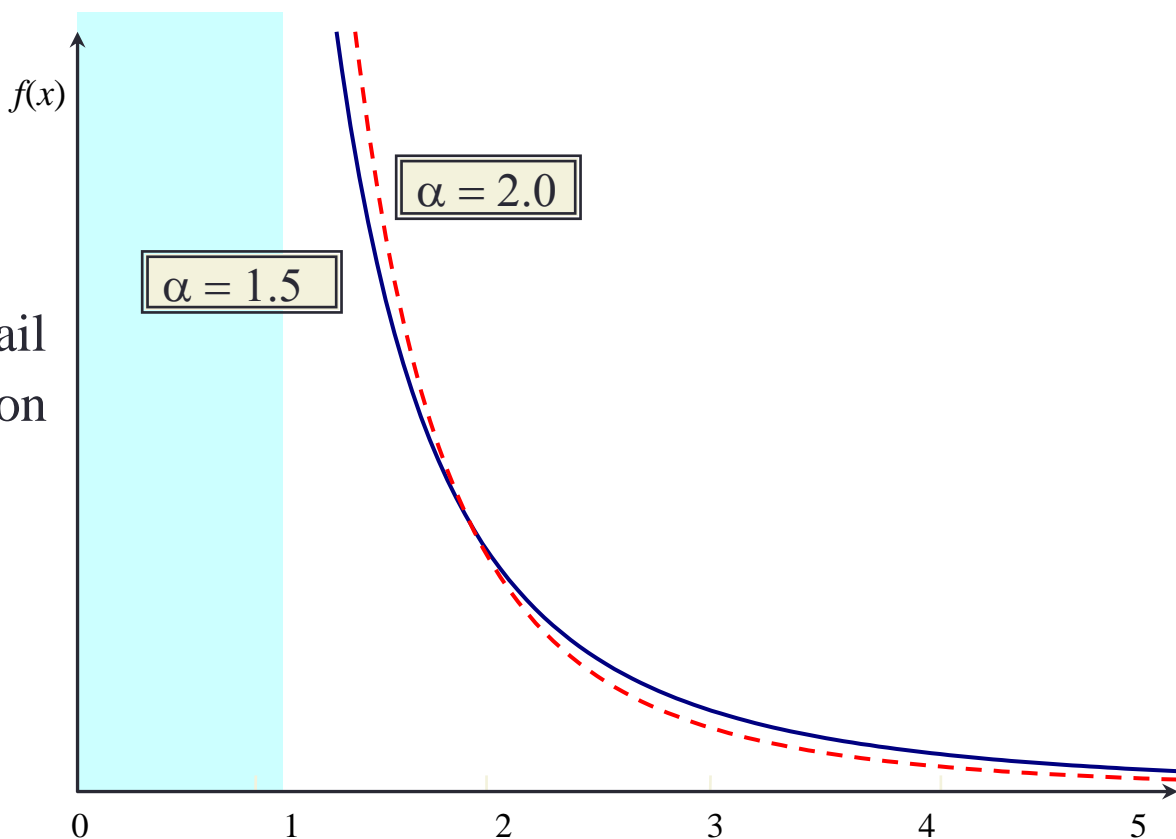 - $f(x) = \alpha \underline{x}^{\alpha} \, x^{-\alpha-1}$
- Simple interpretation
  - α captures "weight" of tail
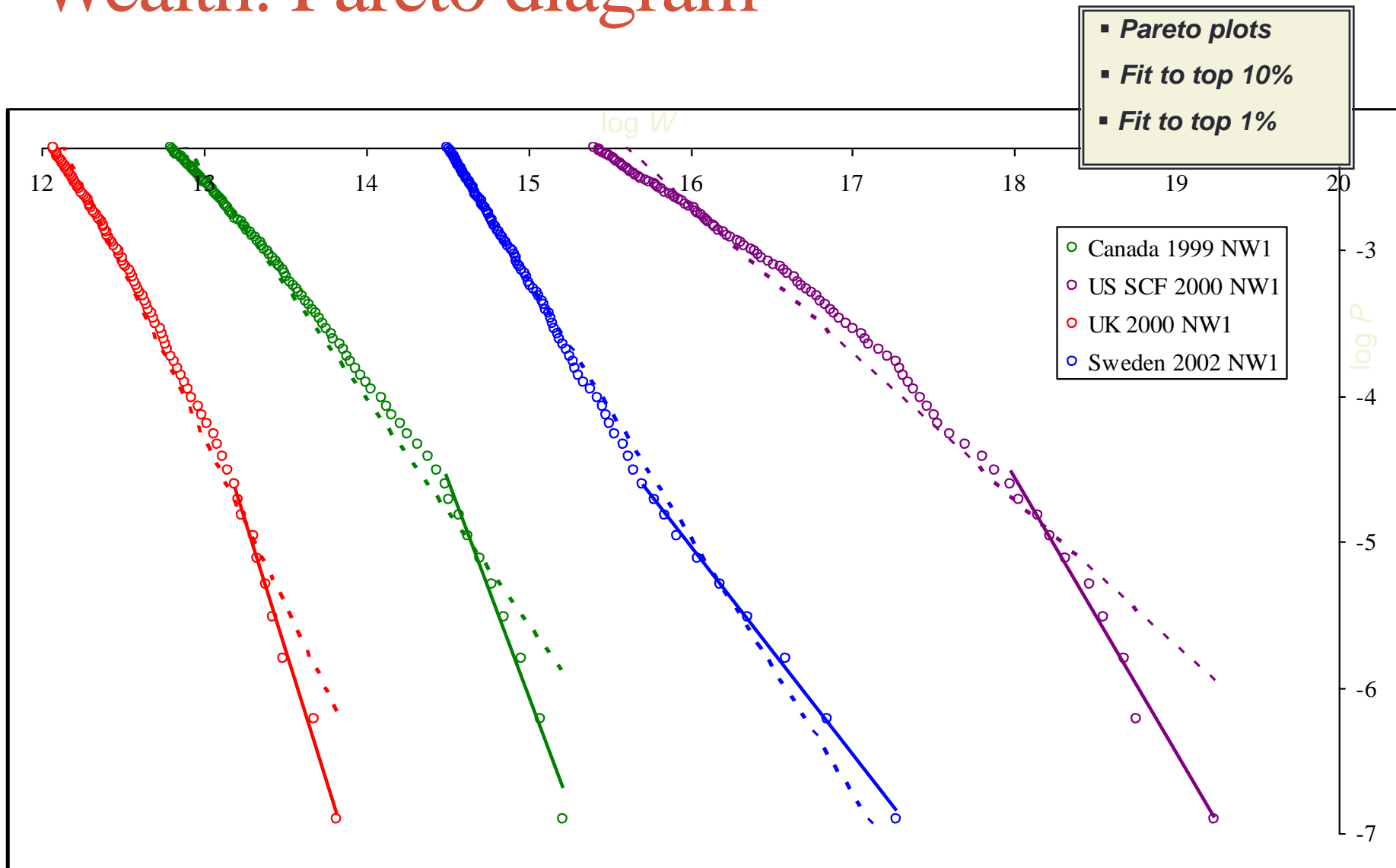 - $\underline{x}$ "locates" the distribution
- Inequality

$$\frac{\text{average}}{\text{base}} = \frac{\alpha}{\alpha - 1}$$

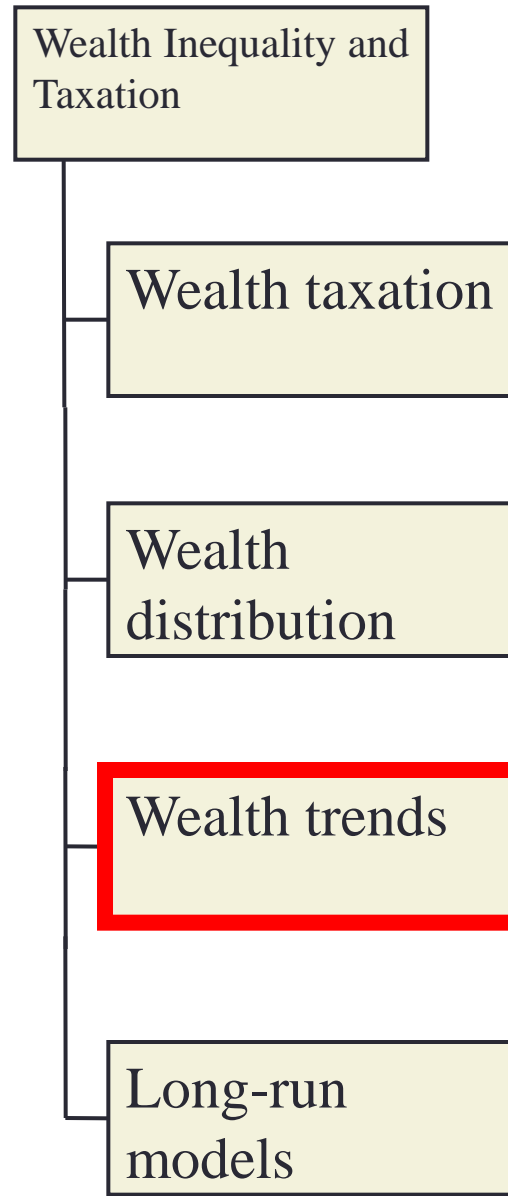$$\text{Gini} = \frac{1}{2\alpha - 1}$$

$f(x)$

$\alpha = 2.0$

$\alpha = 1.5$

0   1   2   3   4   5

Wealth: Pareto diagram

- **Pareto plots**
- **Fit to top 10%**
- **Fit to top 1%**

log W

log P

○ Canada 1999 NW1
○ US SCF 2000 NW1
○ UK 2000 NW1
○ Sweden 2002 NW1

Overview...

Rising inequality or stability?

Wealth Inequality and Taxation

Wealth taxation

Wealth distribution

Wealth trends

Long-run models
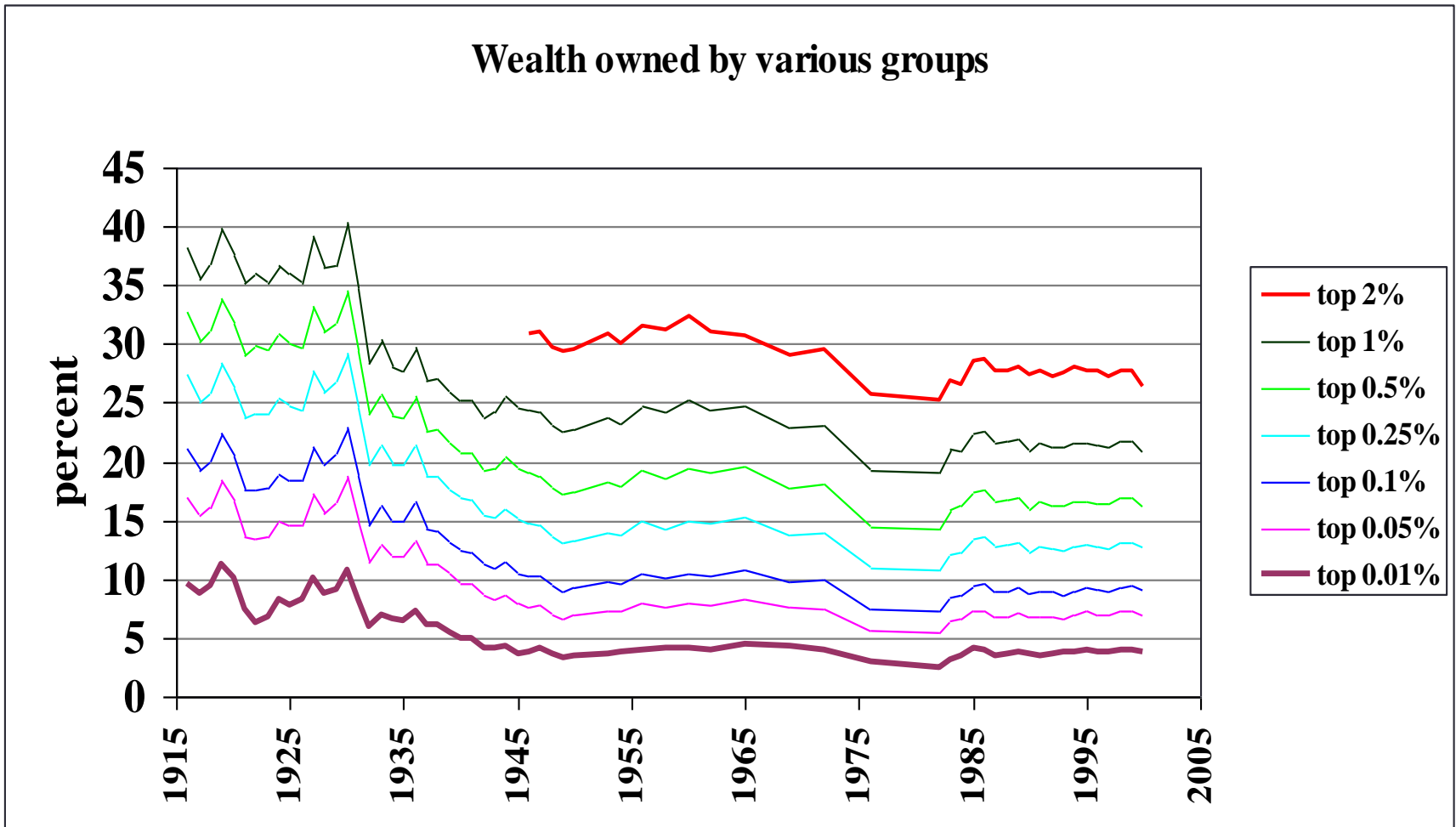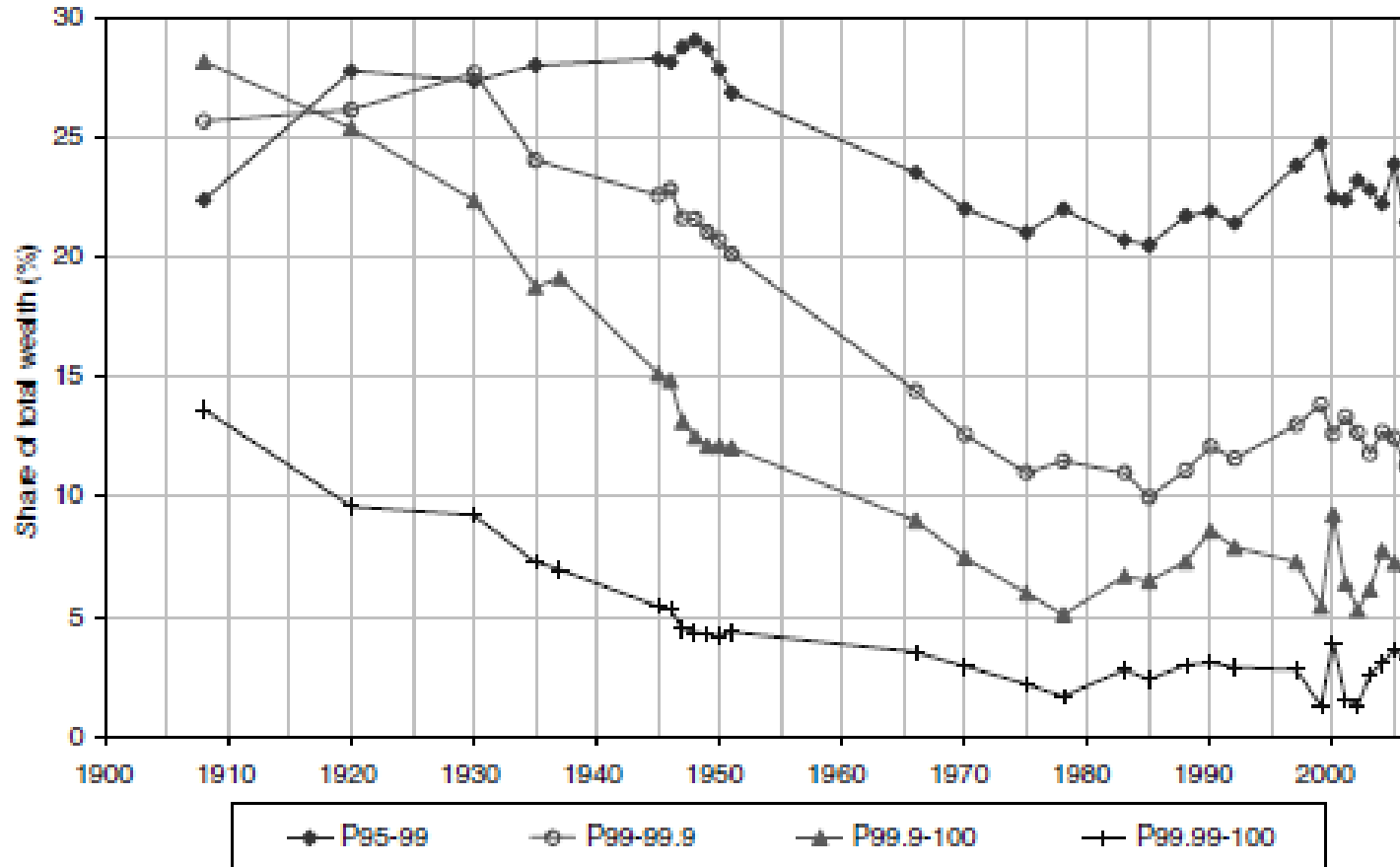
Trends in wealth inequality

- Useful to look at *trends* in distribution
  - what effect of wealth taxation in the past?
  - equalisation?
  - is there a trend toward stability…?
  - ….or divergence?

- For historical and recent wealth trends in US
  - Kopczuk and Saez, (2004)
  - Substantial time coverage:
  - From early 20th century

- For historical wealth trends in UK
  - Atkinson et al. (1989)
  - Similar time coverage…
  - But incomplete series
  - Recent picture from HMRC data

- Recent evidence from Sweden
  - Roine and Waldenström (2009)
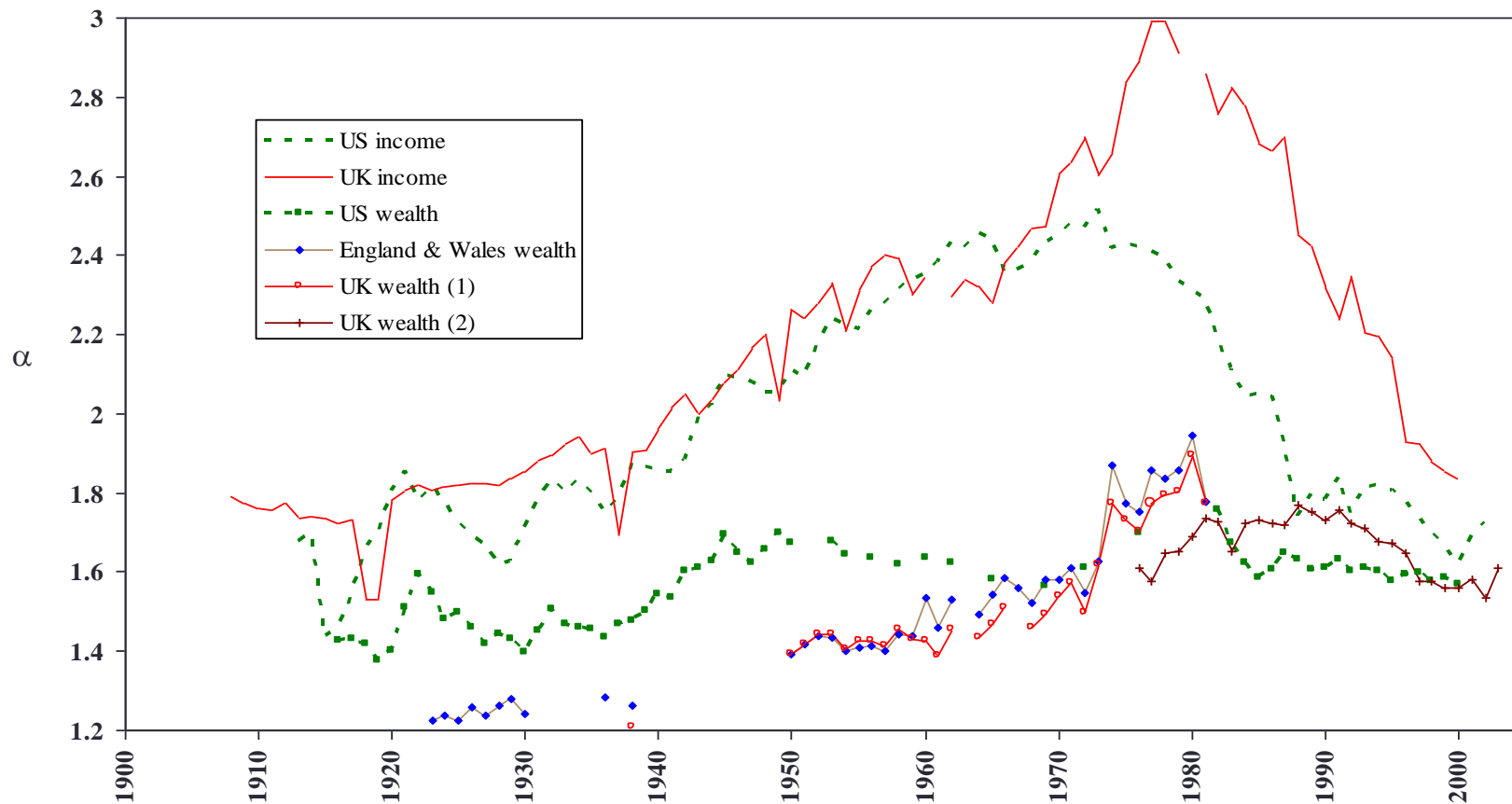
Distribution of wealth US 1916-2000

Wealth owned by various groups

Sweden: top 5 percent

Pareto's α: USA and UK

- Sources: see Cowell (2011) Chapter 4

Wealth trends

- UK Inequality falls in early 20th century
  - roughly from first world war
  - substantive rises in income tax and estate duty

- Reductions in inequality continue through mid-century

- US inequality falls from time of great depression
  - Largely attributable to stock prices
  - Large concentration of corporate stock in wealth of very rich

- But US inequality also carried on falling through to 70s
  - Antitrust legislation?
  - Development of estate tax
  - Changing nature of top groups (Edlund and Kopczuk 2009)

- Sweden
  - From World War I until late 20th century equalisation
  - From around 1980 trend reversed

Overview...

Fairy tales?

Wealth Inequality and Taxation

Wealth taxation

Wealth distribution

Wealth trends
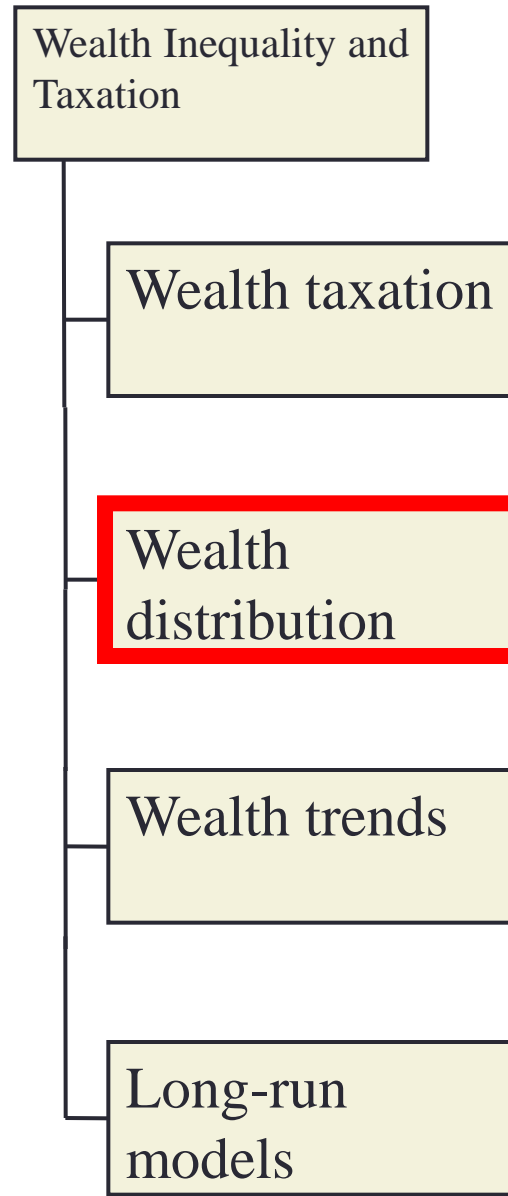
Long-run models

A way forward

- Wealth taxes may work by influencing long-run distribution
  - direct impact of wealth taxes on redistribution will be small
  - small taxes can have big effect on the equilibrium (Kaplow 2000)

- What kind of model?
  - full GE (DeNardi 2004, Cagetti and DeNardi 2008)
  - Piecemeal focus

- Story of wealth distribution in the long run (Piketty 2000):
  - Specify financial constraints
  - Model preferences / tastes / habits
  - Model exogenous resource flow
  - Specify family formation mechanism

- Preferences: what motivates bequests? (Kopczuk 2010)
  - Altruism
  - Exchange
  - Warm-glow
  - Accident and inertia

Outline of model (1)

- Common practice to combine in a neoclassical model
  - Characterise each generation as a fixed time unit
  - [Becker and Tomes (1979)](#)

- Preferences and behaviour
  - Cobb-Douglas preferences (simplified savings behaviour)
  - utility maximisation by parental generation
  - look one generation ahead

- Simplified family characteristics
  - exogenous attributes
  - no "marriage story"
  - no "fertility story"

- Resources and markets
  - "perfect" markets
  - exogenous (labour) earnings and initial endowments

Illustrative model (1)

- Generational budget constraint
  - $C_n + B_n /[1+ r_n] \leq W_n$
- Wealth accumulation equation
  - $\frac{1}{2}k\ W_{n+1} = B_n$
- Prospective resources
  - $W_n + E_n /[1+ r_n]$
- Proportionate savings rate
  - $\frac{1}{2}k\ W_{n+1} = s[1+ r_n]\ W_n +\ sE_{n+1}$
- Equation for wealth accumulation
  - $W_{n+1} = \gamma\ [1+ r_n]\ W_n + \gamma\ E_{n+1}$
- Stochastic "earnings" will give a simple Markov chain.
  - given sensible parameter values get convergence (regression to mean)
  - Initial wealth inequalities will be damped away
- In the long run wealth inequality is determined just by E

Simulation approach

- Common to put a variant of this into a simulation model
- But is it based on optimisation – and of what sort?
  - Type of utility function crucial
  - [Gokhale et al. (2001)](#) strong conclusions based on "accidental bequests"
- What characteristics of the simulation model?
  - representative agent
  - size and length of the run
  - criteria for evaluation
- Type of solution?
  - convergence to equilibrium?
  - an equilibrium distribution?

Illustrative model (2)

- Focus on the role of consumption
  - naïve savings behaviour
  - family features absent
  - ([Champernowne-Cowell 1998](#))
- A model of single person-dynasties
  - person inherits T years after attaining adulthood
  - dies T years after inheritance
  - leaves all his terminal wealth to one descendant
- Wealth left in excess of W^* taxed at rate τ
- During the earnings all get the same earnings, E^*
- Individuals consume:
  - C^* if they have positive wealth
  - otherwise E^*
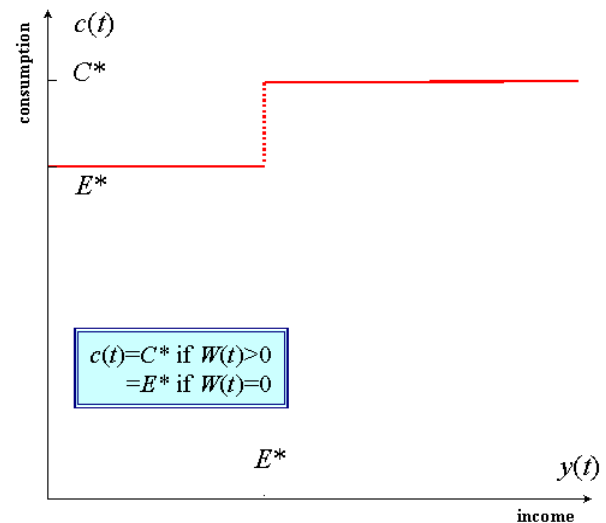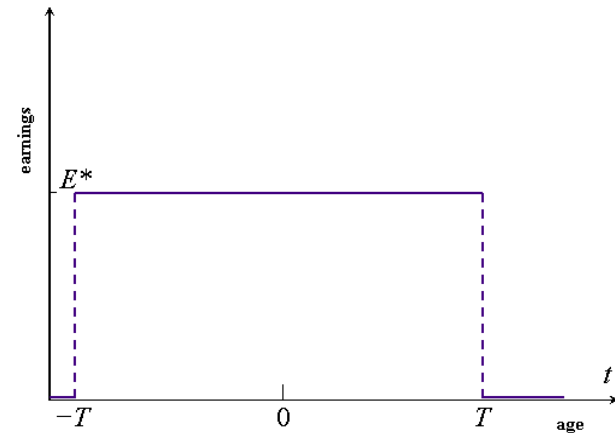
Link between generations

$n = 0$

-T   0   T

$B_0 -$ tax

$n = 1$

-T   0   T

B_1

$n = 2$

-T   0   T

$n = 3$

-T   0   T
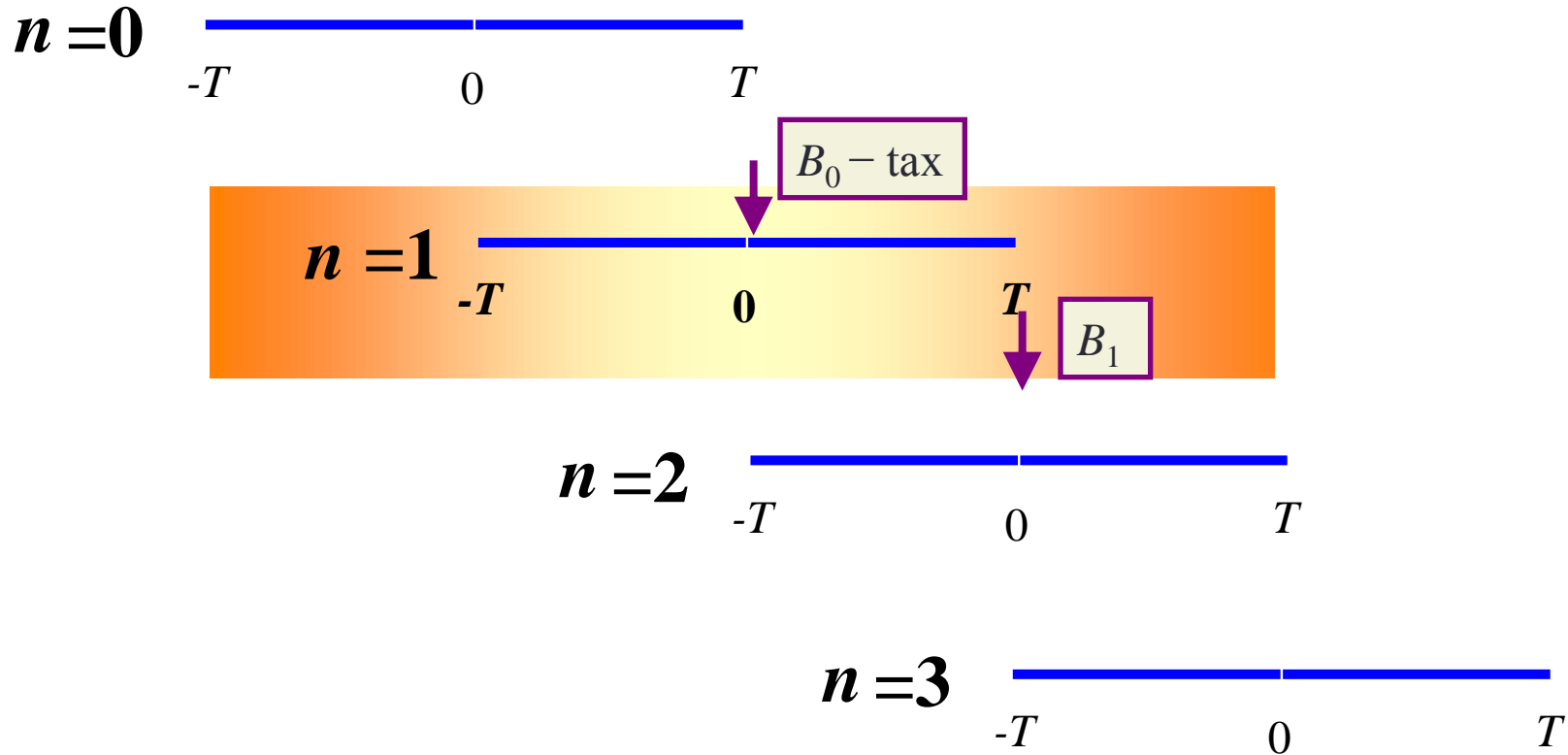
Wealth over the lifetime and bequests

- Given savings rule and inherited wealth $W(0)$ we get

$$W(t) = \max \{\, W(0)\, e^{rt} - \hat{B}\, [e^{rt} - 1],\, 0 \},\quad \hat{B} := [C^* - E^*]/r$$

- Wealth rises/declines according as $W(0) \gtreqless \hat{B}$
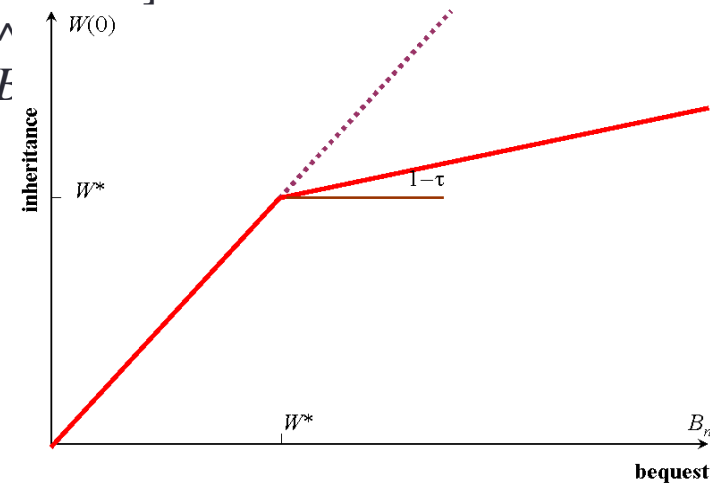- At end of life bequest is $B_n = W(T)$

- But initial wealth for next generation is
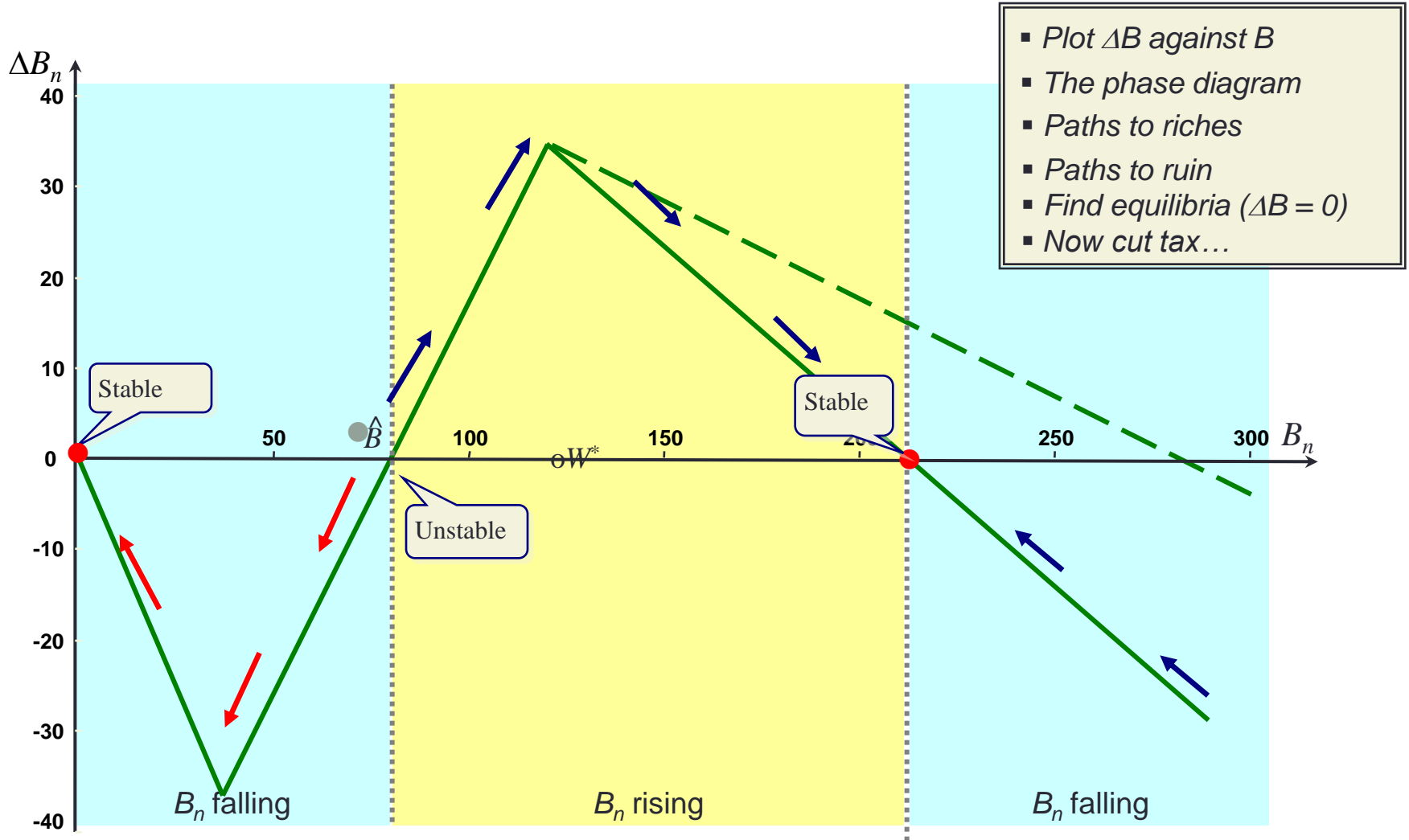
$$W(0) = \min \{\, B_n\, ,\, [1-\tau]B_n + \tau W^* \,\}$$

- Evaluating at end of next generation:

$$B_{n+1} = \max \{\min \{\, B_n\, ,\, [1-\tau]B_n + \tau W^* \,\}\, e^{rT} - \hat{B}\, [e^{rT} - 1],\, 0 \}$$

- Change in bequest $\Delta B_{n+1} = B_{n+1} - B_n$ as a function of B_n
- Get three possible regimes
    1. where $W(t) = 0$
    2. where $W(t) >$ but $B_n < W^*$
    3. where $B_n > W^*$

Bequest Dynamics

- *Plot ∆B against B*
- *The phase diagram*
- *Paths to riches*
- *Paths to ruin*
- *Find equilibria (∆B = 0)*
- *Now cut tax…*
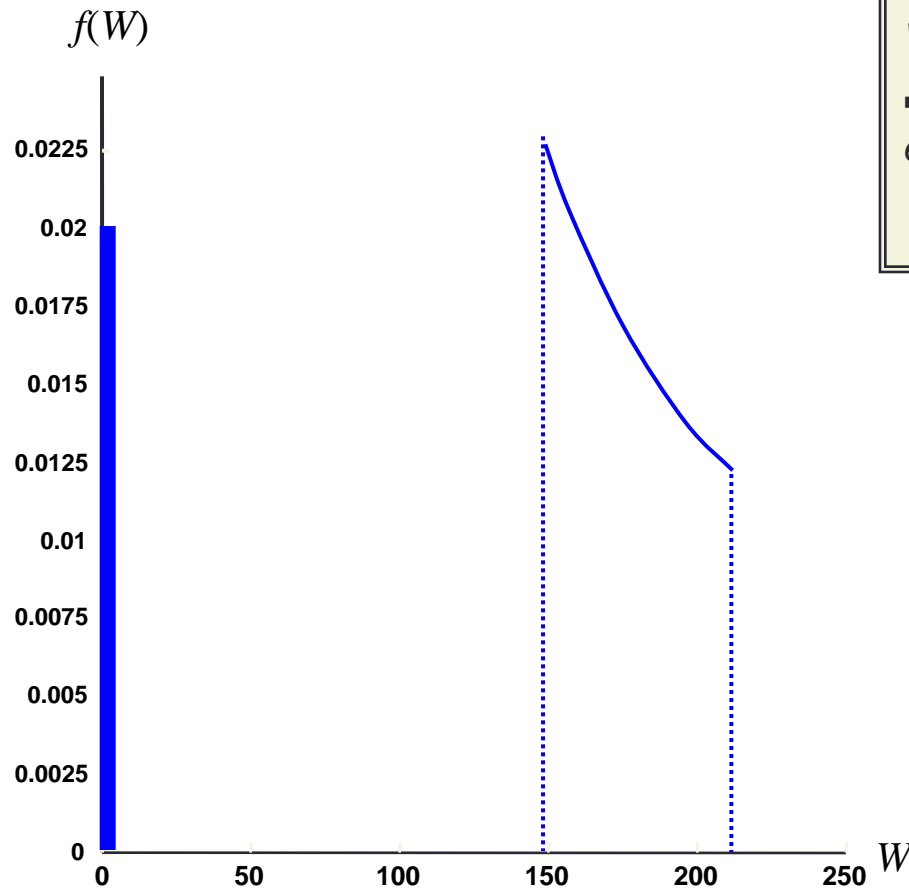
Stable

Stable

Unstable

B_n falling

B_n rising

B_n falling

Wealth distribution overall

- *Distribution of W amongst wealthy*
- *Take into account lower equilibrium*

Illustrative model (3)

- Focus on family formation ([Champernowne-Cowell 1998](#))
  - each generation is a discrete unit
  - pairs always consist of people with equal wealth
  - no-one benefits from more than one bequest
  - bequest is divided equally amongst the k kids (k given)

- Model applies to upper wealth levels − above specified wealth level W^*

- For any $W > W^*$, the proportion of testators with k kids is p_k:
  - independent of W
  - $p_k \geq 0$
  - $\Sigma_k p_k = 1$
  - $\Sigma_k k p_k = 2$
  - two examples:
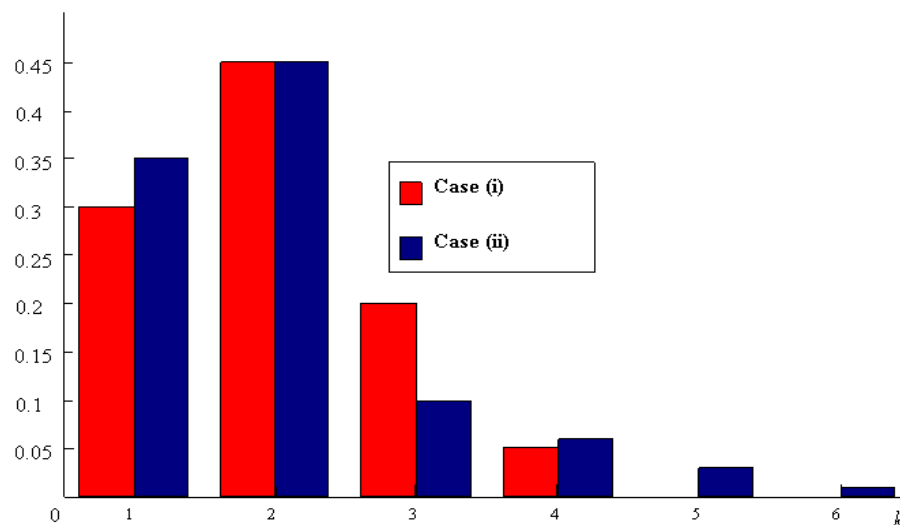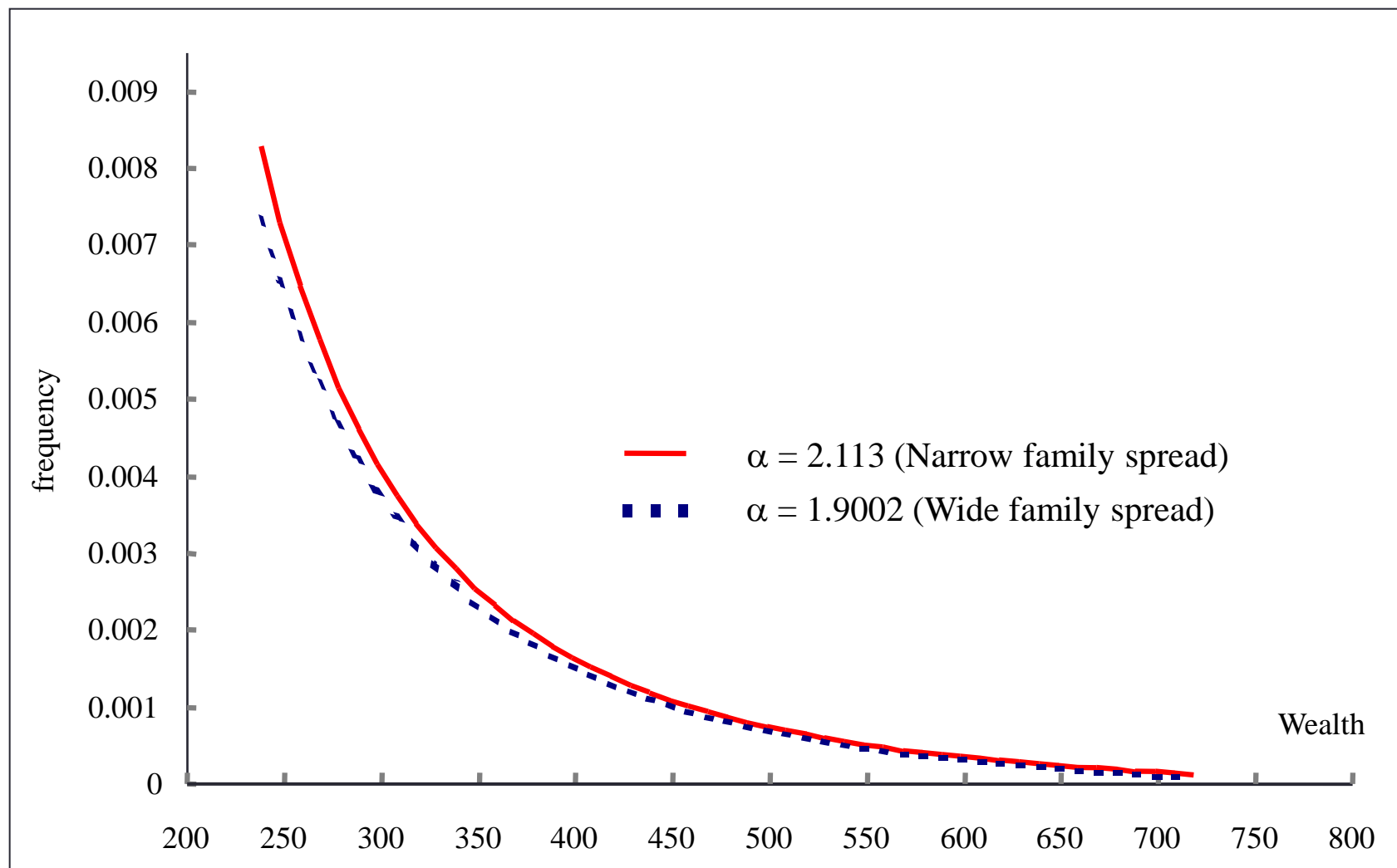
Equilibrium distribution

- Let F_n, F_{n+1} be the wealth distribution in generations n, $n+1$
  - $F_n(W)$ is the proportion of the population in generation n with wealth $\leq W$
  - We have equilibrium if $F_n = F_{n+1} = F$

- Take a person with wealth W in a family where parents had k kids
  - if parental wealth was W' per head bequest must have been $2[1-\tau]W'$
  - so each kid would get $2[1-\tau]W'/k$
  - therefore $W' = kW/2[1-\tau]$
  - given that there are p_k such families: $F_{n+1}(W) = \Sigma_k \, \tfrac{1}{2}k \, p_k \, F_n(kW/2[1-\tau])$

- Equilibrium requires
  $F(W) = \Sigma_k \, \tfrac{1}{2}k \, p_k \, F(kW/2[1-\tau])$

- Only functional form that permits a solution for all W is Paretian
  $F(W) = 1 - AW^{-\alpha}$

- So the equilibrium condition is:
  $$\sum_{k=1}^{K} p_k \left[\frac{k}{2}\right]^{1-\alpha} = [1-\tau]^{-\alpha}$$

Tax: Equilibrium Wealth Distribution

- Higher tax produces lower long-run inequality
- If tax is too low – no long-run equilibrium
- Quite low tax rates produce values similar to actual economies.

$\tau(\%)$	(i) Narrow		(ii) Wide	
	α	*Gini*	α	*Gini*
2	1.22	0.410	-	-
5	1.55	0.323	1.42	0.352
10	2.11	0.237	1.90	0.263
15	2.73	0.183	2.44	0.205
20	3.43	0.146	3.07	0.163
25	4.28	0.117	3.86	0.130

Equilibrium Distribution τ = 10%

Summary

- Dynastic model produces a bifurcation
  - Convergence to equilibrium distribution
  - Inequality within and between groups
  - Source of inequality lies in savings behaviour

- Role of uncertainty captured in savings behaviour

- Family structure affects long-run equilibrium
  - spread out families reduce effectiveness of taxation

- Tweaking the models would modify this a little
  - Variation in income
  - Out-of-class marriage
  - ([Champernowne-Cowell 1998](#))

- Potentially major role for taxation

References (1)

- Atkinson, A. B., Gordon, J. P. F. and Harrison, A. J. (1989) "Trends in the shares of top wealth-holders in Britain 1923-1981," *Oxford Bulletin of Economics and Statistics*, **51**, 315-332.
- Becker, G. S. and Tomes, N. (1979) "An equilibrium theory of the distribution of income and intergenerational mobility," *Journal of Political Economy*, **87**, 1153-1189.
- Cagetti, M. and DeNardi, M. (2008) "Wealth Inequality: Data and Models," *Macroeconomic Dynamics*, **12 S2**, 285–313.
- *Champernowne, D. G. and Cowell, F. A. (1998) *Economic Inequality and Income Distribution*, Cambridge University Press, Cambridge, Chapter 10.
- Cowell, F.A. (2011) *Measuring Inequality*, Oxford University Press
- * Cowell, F.A. (2012) "UK Wealth Inequality in International Context," in J. Hills (ed.) *Wealth in the UK: Distribution and Policy*, Oxford University Press, Oxford , Chapter 4.
- *Cremer, H. and Pestieau, P. (2003) "Wealth Transfer Taxation: A Survey," CESifo Working Paper No. 106DeNardi, M. (2004) "Wealth Inequality and Intergenerational Links," *Review of Economic Studies*, 71, 743–768.

References (2)

- Edlund, L. and Kopczuk, W. (2009) "Women, Wealth and Mobility," *American Economic Review*, **99**, 146–178.
- Gokhale, J. and Kotlikoff, L. J. and Sefton, J. and Weale, M. (2001) "Simulating the Transmission of Wealth Inequality Via Bequests," *Journal of Public Economics*, **79**, 93-128
- Kaplow, L. (2000) "A framework for assessing estate and gift taxation," NBER Working Paper 7775
- Kopczuk, W. (2010) "Economics Of Estate Taxation: A Brief Review of Theory And Evidence," National Bureau Of Economic Research," Working Paper 15741
- * Kopczuk, W. and Saez, E. (2004) "Top Wealth Shares in the United States, 1916-2000: Evidence from Estate Tax Returns," *National Tax Journal*, **57**, 445-487
- OECD (2008) *Growing Unequal? Income Distribution And Poverty In OECD Countries*, Organisation For Economic Co-Operation And Development, Paris
- Piketty, T. (2000) "Theories of persistent inequalities," in Atkinson, A. B. and Bourguignon, F. (eds) *Handbook of Income Distribution*, North Holland, Amsterdam, pp 429-476
- Roine, J. and Waldenström, D. (2009) "Wealth Concentration over the Path of Development: Sweden, 1873–2006," *Scandinavian Journal of Economics*, 111, 151–187.
- Sierminska, E., Brandolini, A. and Smeeding, T. M. (2006) "Comparing Wealth Distribution Across Rich Countries: First Results from the Luxembourg Wealth Study, Luxembourg Wealth Study Working Paper 1