EITM Lectures

Guillermina Jasso
New York University

University of Houston
Hobby Center for Public Policy
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Overview

- **Social Science Analysis**
- **Basic Building Blocks**
- **New Unified Theory**
- **New Explorations, Theoretical & Empirical**

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First Principles -- 1

- **Objective**
  - **To accumulate reliable knowledge about behavioral and social phenomena**
- **Strategy**
  - **Develop framework**
  - **Theoretical analysis**
  - **Empirical analysis**

Social Science Analysis

Theoretical Analysis	Framework	Empirical Analysis
Deductive	Questions	Measure/ estimate terms/relations
Postulates Predictions	Actors	
	Quantities	--------------------
--------------------	Functions	Test deduced predictions
Hierarchical	Distributions	
	Matrices	--------------------
Postulates Propositions	Contexts	Test propositions

Social Science Analysis

Theoretical Analysis	Framework	Empirical Analysis
Deductive Postulates Predictions -------------------- *Hierarchical* Postulates Propositions	Questions Actors Quantities Functions Distributions Matrices Contexts	Measure/ estimate terms/relations -------------------- Test deduced predictions -------------------- Test propositions

Fundamental Questions

1. **What do individuals and collectivities think is just, and why?**

2. **How do ideas of justice shape determination of actual situations?**

3. **What is the magnitude of the perceived injustice associated with given departures from perfect justice?**

4. **What are the behavioral and social consequences of perceived injustice?**

Fundamental Questions

- **Worked out with Bernd Wegener, Humboldt University**

- *Social Justice Research*, **1997**

Central Questions

Justice

1. What do individuals and societies think is just, and why?

2. How do ideas of justice shape actual situations?

3. What is the magnitude of the injustice associated with departures from perfect justice?

4. What are the behavioral and social consequences of injustice?

Status

1. What do individuals and societies think is worthy of status, and why?

2. How do ideas of status shape actual attainments?

3. What is the magnitude of the status accorded to/ expected from another?

4. What are the behavioral & social consequences of giving/receiving status and of discrepancies?

Justice Evaluation Function

$$J = \theta \ln\left(\frac{A}{C}\right)$$

Justice Evaluation Function

- **where θ is the Signature Constant**
  - whose sign indicates observer framing
    - positive for goods
    - negative for bads
  - whose absolute magnitude indicates observer expressiveness

Status Function

$$S = \ln\left(\frac{1}{1-r}\right)$$

First Principles -- 2

- **All observed phenomena are the joint product of the operation of several forces (Newton's insight)**

- **Fundamental Drivers**

- **Basic (or MidLevel) Drivers**

Fundamental Drivers of Human Behavior

- **To know the causes of things**
- **To judge the goodness of things**
- **To be perfect**
- **To be free**

Remarks about the Four Fundamental Drivers

- **Ascribed to humans**

- **Ascribed to deities**

- **Appear in discourse between humans and deities**

- **Appear in both**
  - **what humans pray for**
  - **what human renounce in spirit of sacrifice**

MidLevel Drivers of Human Behavior

- **Justice, self-esteem, and other comparison processes**

- **Status**

- **Power**

- **Identity**

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Basic Building Blocks

- **What does a theory look like?**

- **Types of theories**

- **Models and theories**

- **Theoretical unification**

- **Probability distributions**

Basic Building Blocks

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What Does a Theory Look Like?

- **What does a theory look like?**
  - two parts
    - assumptions
    - testable propositions

Basic Building Blocks

- **What does a theory look like?**

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Assumptions

- **Two kinds of assumptions**
  - **guesses about the nature of the world (Newton; Popper) – called postulates**
  - **known to be true, or subject to human control**

Testable Propositions

- **Two kinds of propositions**

  – **deduced from assumptions (classical) – called predictions**

  – **constructed by combining terms from assumptions and observables (Toulmin)**

Gold-Standard Theory - 1

- **Hypothetico-deductive theory (invented by Newton)**

- **Postulates are "genuine guesses about the structure of the world" (Popper)**

- **Predictions display the "marvellous deductive unfolding" of the theory (Popper)**

Gold-Standard Theory - 2

- **Goal is a theory with**
  - minimum of **postulates**
  - maximum of **predictions**, including **novel predictions**

- **Postulates**' fruitfulness is evident in the "**derivations** far afield from its original domain" which "permit an increasingly broad and diversified basis for **testing** the **theory**" (Danto)

Other Types of Theories

- **Hierarchical (identified by Toulmin)**
  - **testable propositions constructed by linking postulates with observable terms**

Summary of Theory Types

- **Deductive**
  - **gold-standard hypothetico-deductive theory in which assumptions are guesses**
  - **assumptions are true or subject to human control**

- **Nondeductive**
  - **hierarchical**

- **Hybrid deductive/nondeductive**

Figure 3.3. Three Kinds of Theories

Deductive	Hierarchical	Deductive-Hierarchi
Postulates	**Postulates**	**Postulates**
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
Predictions	**Propositions**	**Predictions** **Propo**
_____	_____	_____ _____
_____	_____	_____ _____
_____	_____	_____ _____
_____	_____	_____ _____
_____	_____	_____ _____
_____	_____	_____ _____
_____	_____	_____ _____

Testing Theoretical Predictions

- **New explicit tests, including experiments**
- **Tests not designed to test the theory**
- **Predictions consistent with known facts**
- **Predictions consistent with conjectures**

Theory Is the Social Scientist's Best Friend

How **Theory** Shows Its **Friendship**

- **Suggests questions to study**
- **Identifies factors producing outcomes**
- **Provides new ways to measure variables**
- **Guides choice of statistical procedures**
- **Guides interpretation of results**
- **Provides interpretation of non-recurring or rare events**
- **Yields fundamental constants**

Theory Suggests Questions

- **via deduced testable predictions**
  - Posttraumatic stress is greater for veterans of wars fought away from home
  - The death of a child is mourned more than the death of a parent
  - Subgroup conflict is greater, the greater the income inequality.
- **via constructed testable propositions**
  - What is the effect of the proportion underrewarded on a society's cohesion?
  - How much does felt injustice affect health?

Theory Identifies Factors

- **valued goods**
  - **what are they and how many**
  - **whether attributes or possessions**
  - **distributional form and inequality**
- **framing coefficient**
  - **whether things are framed as goods or bads**
- **expressiveness**
  - **style of expressing justice evaluations**

Theory Provides Measures

- **just reward**
  - **indirect measure to avoid bias**

- **group solidarity**
  - **in dyads and small groups**
  - **in large societies**

- **justice index & injustice decompositions**
  - **injustice due to poverty and inequality**
  - **injustice due to reality and ideology**

Theory Guides Statistical Analysis

- **empirical model**
  - **which elements require separate equation**
  - **single-equation or multi-equation**
- **specification of each equation in model**
  - **regressors to include**
  - **functional form**
  - **assumptions about error term**
- **hypothesis tests**
  - **one-tailed vs two-tailed**
  - **joint tests**
- **choice of estimation technique**

Theory Guides Statistical Analysis

- **justice model has three equations**
  - *justice evaluation equation -- J*
  - *actual reward equation – A*
  - *just reward equation -- C*
- **specification of each equation in model**
  - $J = \theta \ln(A/C)$
  - $\ln(A) = \Sigma\beta X + \Sigma\gamma Y + \varepsilon$
  - $\ln(C) = \Sigma\delta X + \Sigma\lambda Q + \upsilon$
- **estimation and testing procedures depend on specified behaviors and type of data**
  - θ and *C* can be estimated from *J* and *A*
  - form of *A* and *C* equations depends on the reward

Theory Guides Interpretation of Empirical Results

- **correctly-specified equations**
- **incorrectly-specified equations**

Theory Guides Interpretation of Empirical Results -- I

- **correctly-specified equations**
  - θ in J equation is signature constant
  - R-squared in regression of J on $\ln(A)$ indicates whether actual or just inequality is larger
  - β indicates effect of X on $\ln(A)$
  - γ indicates effect of Y on $\ln(A)$
  - δ indicates effect of X on $\ln(C)$
  - λ indicates effect of Q on $\ln(C)$

Theory Guides Interpretation of Empirical Results -- II

- **incorrectly-specified equations – example:**

$$J = \Sigma bX + \Sigma cY + \Sigma dQ + e$$

  - $b = \beta - \delta$
  - $c = \gamma$
  - $d = -\lambda$
  - **R-squared** has no theoretical interpretation

Theory Guides Interpretation of Non-Recurring or Rare Events

- **invention of mendicant institutions in 12th century was a response to switch from valuing attributes (birth, nobility, rank) to valuing possessions (wealth)**

- **invention of mystery novel in 19th century the same**

Some **Predictions** for **Fundamental Constants**

- **Critical inequality level occurs when Atkinson's inequality equals $1-(2/e)$, or approx .264**
  - about when Gini's inequality equals .42
  - switches between cardinal and ordinal goods
- **Societal mainstream lies in the region between $J = -1$ and $J = +1$**
  - relative ratios/ranks between $1/e$ and e, or approx between .368 and 2.72
  - ordinal-good societies have no "top"
  - cardinal-good societies can have neither "top" nor "bottom"

Hypothesis Tests

- **one-tailed**
  - **prior theoretical reasoning, AND**
  - **effects predicted by all theories are in the same direction**

- **two-tailed**
  - **no prior theoretical reasoning, OR**
  - **prior theoretical reasoning AND opposite effects predicted**

Theory Is
the Social Scientist's
Best Friend

Basic Building Blocks

- **What does a theory look like?**

- **Types of theories**

- **Models and theories**

- **Theoretical unification**

- **Probability distributions**

Models and Theories - 1

- A model can be derived from a theory
  - applied theoretical model
  - theory-derived description of a class of phenomena

Models and Theories - 2

- **Ad hoc models can become linked to theories**

- **A model can become the postulate of a theory**

- **A model can become the prediction of a theory**

Model Becomes Postulate

- **Justice evaluation model**
  - model of the process by which an observer judges the fairness or unfairness of the actual reward received by a rewardee (1978)
  - became a theory in 1980 when its fruitfulness as a postulate became apparent

- **Status model**
  - model of the process of giving and receiving status (1979)
  - became a theory in 2001 when its fruitfulness as a postulate became apparent

Model Becomes Prediction

- **Kepler's laws of planetary motion**
  - model of planetary motion
  - derived by Newton fifty years later from his laws of motion and universal gravitation

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Theoretical Unification

- Goal of scientific work is to understand more and more by less and less

- Theoretical unification plays large part

Theoretical Unification – of What?

- **Different theories of the same field of phenomena**

- **Theories of different fields of phenomena**

- **In both, unification may be of entire theories or of elements of theories**

Theoretical Unification – How?

- **Linking *postulates* from two or more theories**

- **Linking *predictions* from two or more theories**

- **Linking *postulates* from one or more theories to *predictions* from different theories**

Theoretical Unification – Visualization

- **Figure 1 in "Theoretical Unification in Justice and Beyond"**

Theoretical Unification – Metaphysics

- **Theoretical unification is usually a surprise**

- **Ex. "Theoretical Unification . . ." lists 21 unification surprises, 16 in the study of justice and 5 in the unification of justice, status, and power and their subsequent unification with identity and partial unification with happiness**

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Choose Modeling Distributions

- **Work with mathematically-specified, continuous univariate two-parameter distributions**

  - **location parameter**

  - **second parameter c, which has been proposed as a general inequality parameter (Jasso and Kotz, *Sociological Methods and Research*, 2008)**

Three Special Distributions

- **Three distributions widely used to model size distributions in the social sciences**
  - **lognormal**
  - **Pareto**
  - **power-function**

Figure 1. PDF, CDF, and QF in the Lognormal, Pareto, and Power-Function
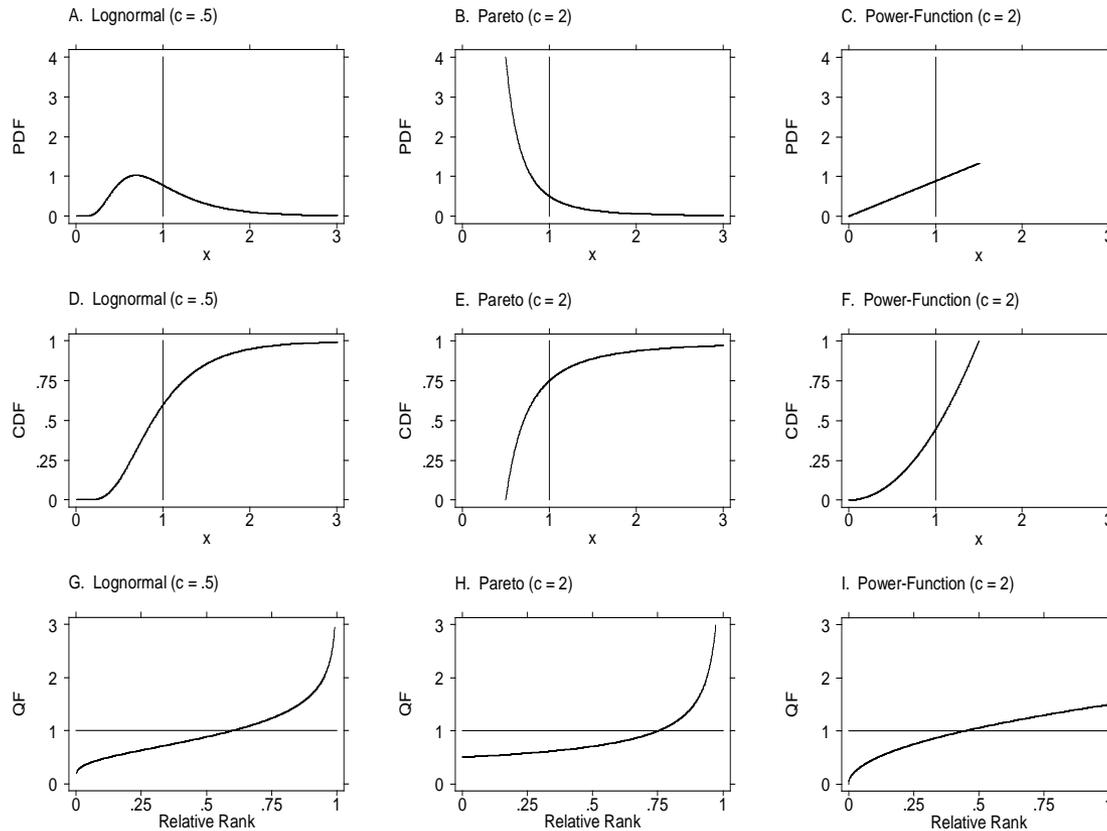
Overview

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A New Unified Theory of Sociobehavioral Forces

A place for everything, and everything in its place.

-- Samuel Smiles, 1875

The NUT Is Founded on Classical Insights

- Plato (*Republic*): "Governments vary as the dispositions of men vary. . . . There must be as many of one as of the other. . . . If the constitutions of States are five, the dispositions of individual minds will also be five."

- Aristotle (*Politics*): "Different men seek after happiness in different ways and by different means, and so make for themselves different modes of life and forms of government."

New Unified Theory -- I

- **Attempt to integrate theories of five sociobehavioral processes (*ESR* 2008)**
  - **comparison (including justice & self-esteem)**
  - **status**
  - **power**
  - **identity**
  - **happiness (partially)**

Requirements for Integration

- **Highly developed theories**
  - **great precision and clarity**
  - **example: ratio & difference conceptions of the justice evaluation function**
- **Similarity in the internal core of the theories**
  - **in all of them, a quantitative characteristic generates an outcome**

Justice Evaluation Function

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Properties of the
Justice Evaluation Function

- **Original three noticed (*AJS* 1978)**
  - Mapping onto justice evaluation scale
  - Integrates rival ratio-difference views
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- **Theorem and proof (*SM* 1990)**
  - Scale-invariance (homogeneity of degree zero)
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- **Two more properties (*SMR* 1996)**
  - Symmetry
  - Limiting form of difference between two power functions
- **New -- Links loss aversion and the Golden Number**
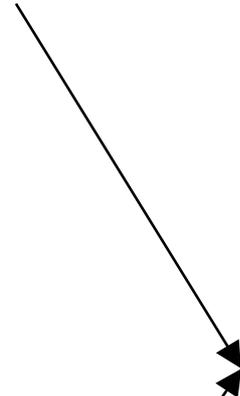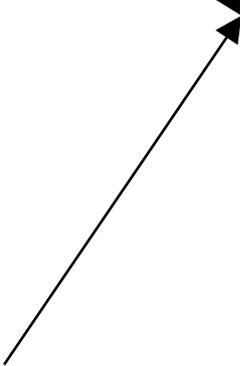
The World of Distributive Justice

Fundamental Justice Matrices

$$A' \begin{bmatrix} a_{11} & a_{12} & a_{13} & \ddot{y} & a_{1R} \\ a_{21} & a_{22} & a_{23} & \ddot{y} & a_{2R} \\ a_{31} & a_{32} & a_{33} & \ddot{y} & a_{3R} \\ ! & ! & ! & " & ! \\ a_{NI} & a_{N2} & a_{N3} & \ddot{y} & a_{NR} \end{bmatrix}$$

$$C' \begin{bmatrix} c_{11} & c_{12} & c_{13} & \ddot{y} & c_{1R} \\ c_{21} & c_{22} & c_{23} & \ddot{y} & c_{2R} \\ c_{31} & c_{32} & c_{33} & \ddot{y} & c_{3R} \\ ! & ! & ! & " & ! \\ c_{NI} & c_{N2} & c_{N3} & \ddot{y} & c_{NR} \end{bmatrix}$$

$$\ln\frac{A}{C}' \begin{bmatrix} \ln\frac{a_{.1}}{c_{11}} & \ln\frac{a_{.2}}{c_{12}} & \ln\frac{a_{.3}}{c_{13}} & \ddot{y} & \ln\frac{a_{.R}}{c_{1R}} \\ \ln\frac{a_{.1}}{c_{21}} & \ln\frac{a_{.2}}{c_{22}} & \ln\frac{a_{.3}}{c_{23}} & \ddot{y} & \ln\frac{a_{.R}}{c_{2R}} \\ \ln\frac{a_{.1}}{c_{31}} & \ln\frac{a_{.2}}{c_{32}} & \ln\frac{a_{.3}}{c_{33}} & \ddot{y} & \ln\frac{a_{.R}}{c_{3R}} \\ ! & ! & ! & " & ! \\ \ln\frac{a_{.1}}{c_{N1}} & \ln\frac{a_{.2}}{c_{N2}} & \ln\frac{a_{.3}}{c_{N3}} & \ddot{y} & \ln\frac{a_{.R}}{c_{NR}} \end{bmatrix}$$

Justice Index JI1

$$E(J) = E\left[\ln\left(\frac{A}{C}\right)\right]$$

Unification Surprises

- **Already a history of unification surprises in justice theory**

- **Listed in "Theoretical Unification . . ."**

Surprise 3
Unification of Goods and Bads

- **All goods and bads are quantitative variables, things of which there can be more or less, or on which entities can rank higher or lower.**

- **Goods are quantitative things of which more is preferred to less**

- **Bads are quantitative things of which less is preferred to more.**

- **The same theoretical and empirical apparatus can be used for both goods and bads.**

Surprise 4
Unification of Distributive and Retributive Justice

- **Punishments are bads, and there can be more or less of them.**

- **The same theoretical and empirical apparatus can be used for both the burdens of distributive justice and the punishments of retributive justice.**

Surprise 5
Unification of Justice for Self and Justice for Others

- Self and Other are both rewardees.

- The same theoretical and empirical apparatus can be used for both justice for self and justice for others.

Surprise 6
Unification of Ideas of Justice and Reactions to Injustice

- **The justice evaluation forms a bridge between ideas of justice and reactions to injustice.**

- **The justice evaluation is produced by the comparison of actual situations and ideas of justice.**

- **The justice evaluation sets in motion a train of individual and social consequences of injustice.**

Surprise 7
Partial Unification of Distributive/Retributive and Procedural Justice

- **Some procedures are quantitative variables.**
  - **Ex. Number of persons consulted 7, time spent in deliberation, weights given to different opinions**
- **The same theoretical and empirical apparatus can be used for both distributive-justice and the quantitative subset of procedural justice.**

Surprise 8
Unification of Ratio and Difference Conceptions of the Justice Evaluation

- **Achieved via properties of logarithms**
  - $J = \theta \ln(A/C)$

    $= \theta \ln(A) - \theta \ln(C)$

Surprise 9
Unification of Logarithmic and Power-Function Functional Forms for the Justice Evaluation

$$\lim_{k \to 0} \frac{A^k - C^k}{k} = \ln\left(\frac{A}{C}\right)$$

Surprise 10
Unification
of Micro and Macro Levels

- **The same theoretical and empirical apparatus of distributive justice can be used for both characteristics of persons and properties of groups.**
  - **Ex. Earnings, country resource endowment, inequality**
- **Predictions span all levels.**
  - **Ex. Parents and gifts; a thing changes value; proportions Selfistas, Subgroupistas, and Groupistas.**

Surprise 12
Partial Unification
of Poverty and Inequality

- **The justice index JI1 – the arithmetic mean of *J* – yields a decomposition of overall injustice into injustice due to poverty and injustice due to inequality.**

$$\ln\left[\frac{actual\ mean}{just\ mean}\right] - \ln\left[\frac{f(actual\ inequality)}{f(just\ inequality)}\right]$$

Surprise 14
Partial Unification
of Reality and Ideology

- **The justice index JI1 – the arithmetic mean of *J* – yields a decomposition of overall injustice into a portion due to reality and a portion due to ideology.**

$$\ln\left[\frac{actual\ mean}{f(actual\ inequality)}\right] - \ln\left[\frac{just\ mean}{f(just\ inequality)}\right]$$

Surprise 15
Partial Unification
of Justice and Impartiality

- **The theoretical and empirical apparatus of distributive justice enables assessment of impartiality in:**
  - **ideas of justice**
  - **framing**
  - **expressiveness**

New Unified Theory -- 2

- **Identity is a combination of three elements**
    - **PSO (****justice****,** **status****,** **power****)**
    - **quantitative characteristic**
    - **qualitative characteristic**
- **Person is a collection of identities**
- **Society is a collection of persons**

Quantitative Characteristics

- **Cardinal**
  - **wealth**
  - **land**
  - **animals**
- **Ordinal**
  - **beauty**
  - **intelligence**
  - **skills of all kinds**

Goods and Bads

- **In the eyes of an observer, a thing is a good if and only if more is preferred to less.**

- **In the eyes of an observer, a thing is a bad if and only if less is preferred to more.**

Qualitative Characteristics

- **Sex**
- **Race**
- **Ethnicity**
- **Language**
- **Nativity**
- **Religion**

Sociobehavioral Forces

- **Primordial sociobehavioral outcomes (PSO)**

- **Generated by quantitative characteristics**

- **In groups formed by categories of qualitative characteristics**

Key Idea of the NUT

- **There are three basic sociobehavioral forces, each with a distinctive mathematical form (idea of 3 forces based on Homans)**
  - **In nature there are three possible rates of change: increasing, decreasing, constant**
  - **What distinguishes the forces is the rate of change**
    - **comparison decreasing**
    - **status increasing**
    - **power constant**

Z Increases
at a Decreasing Rate
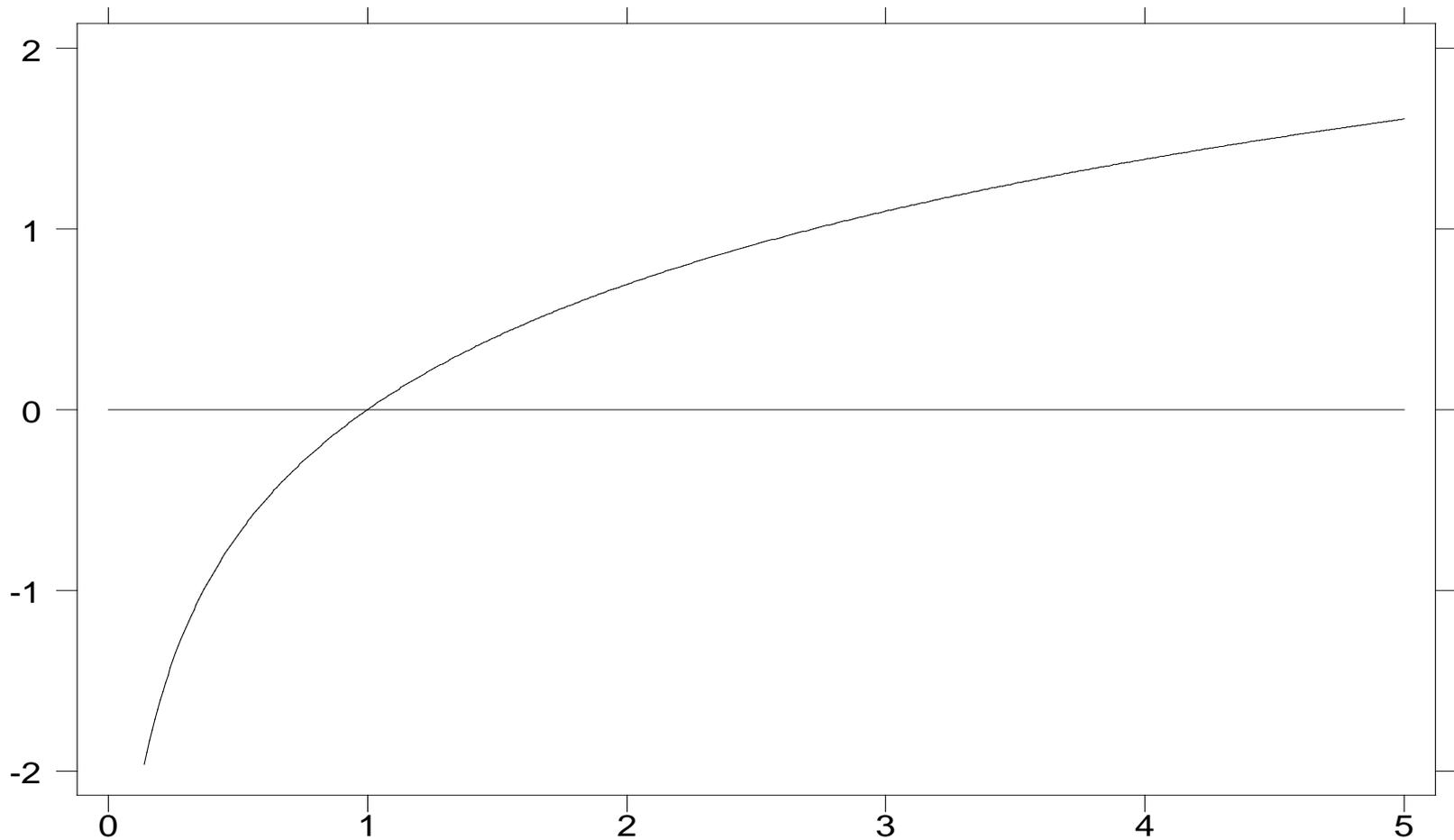
Z Increases
at an Increasing Rate
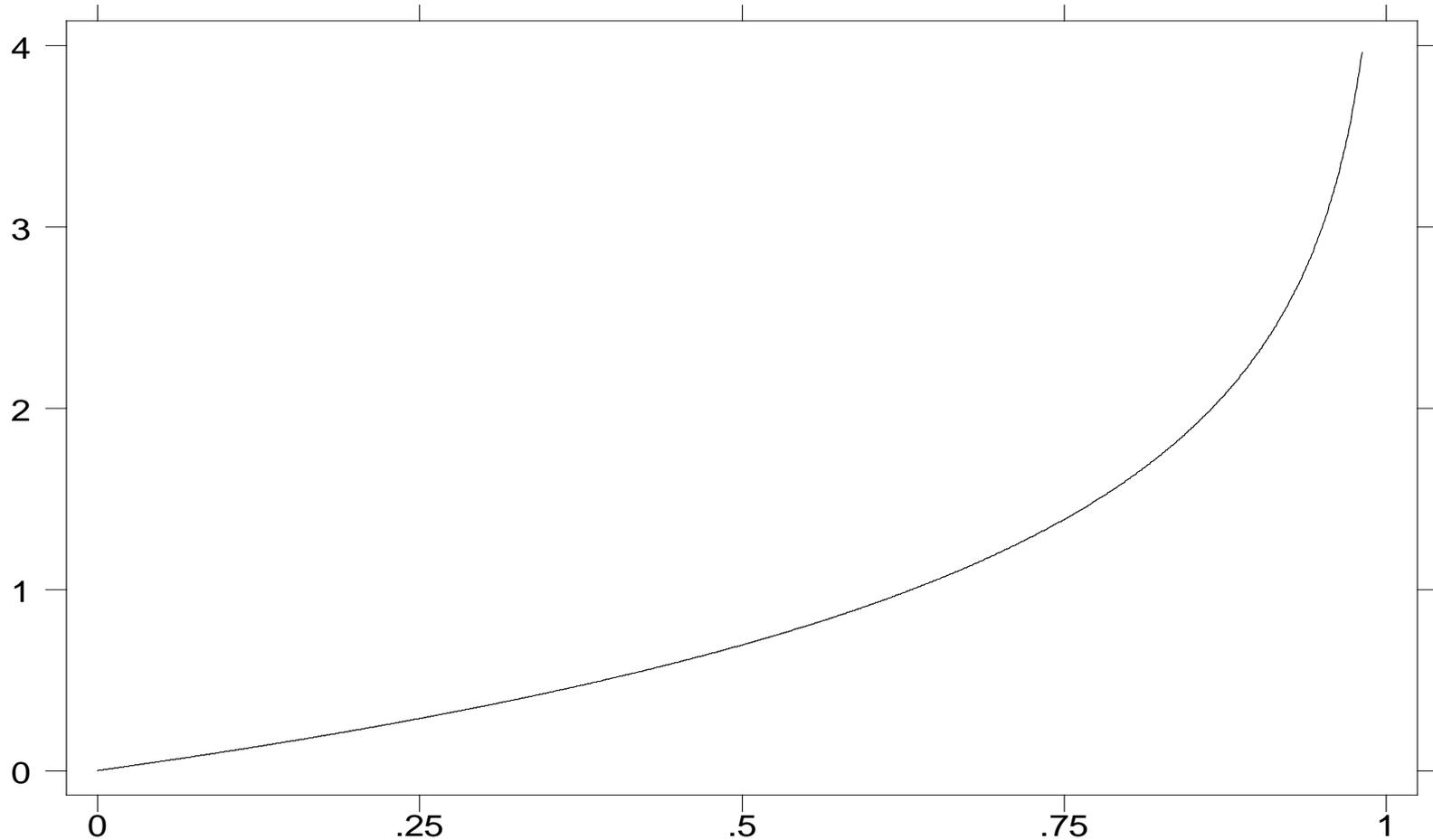
Z Increases
at a Constant Rate
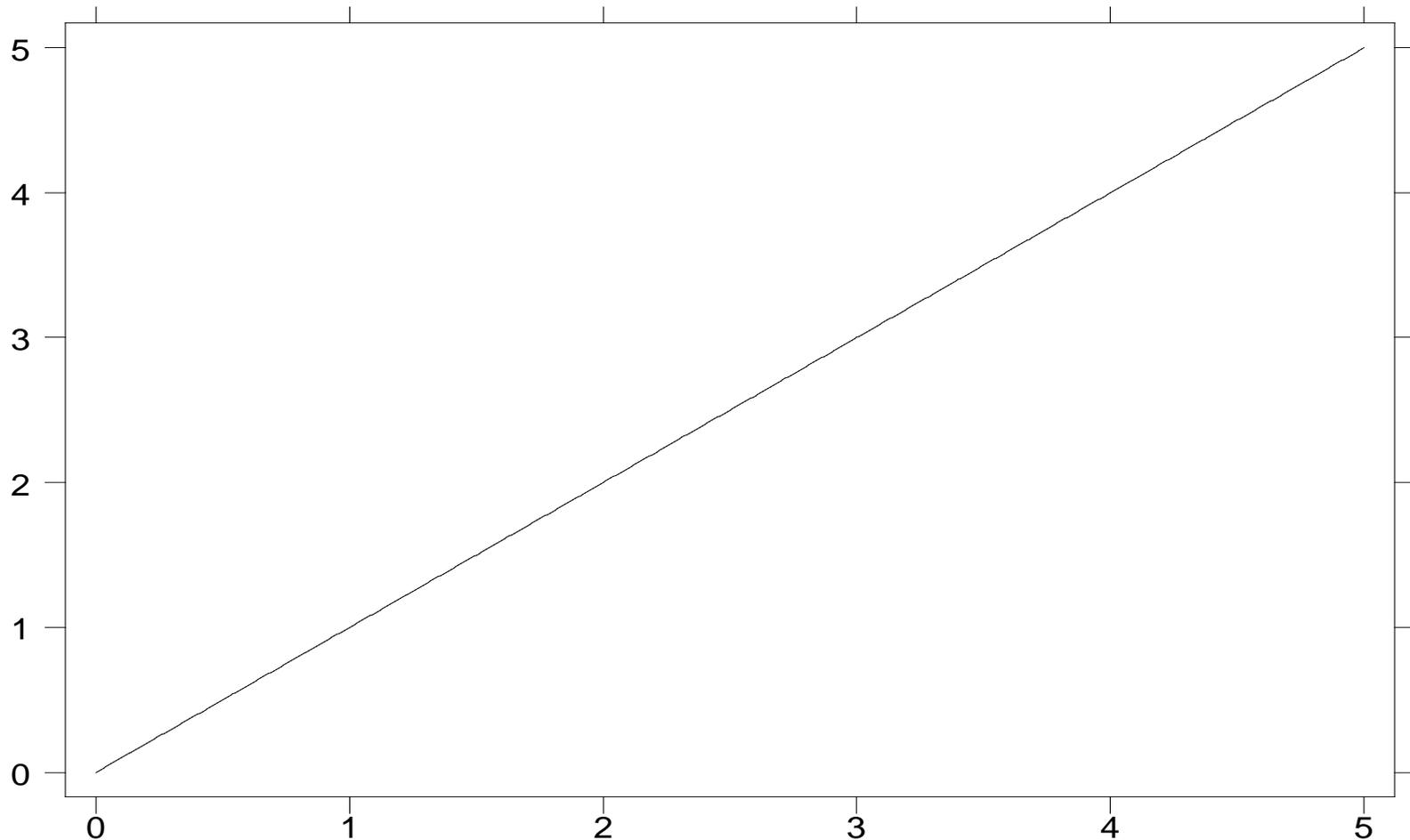
Specific Functions for Three Sociobehavioral Forces

- **Comparison**
  - log-ratio form proposed by Jasso (*AJS* 1978); proof that it is only form that satisfies both scale-invariance and additivity (Jasso, *SM* 1990); also satisfies loss aversion (*AJS* 1978) and symmetry (*SMR* 1996)

- **Status**
  - convexity property (Goode 1978); specific form proposed by Sørensen (*AJS* 1979) for occupations and adopted for individuals by Jasso (*ASR* 2001)

- **Power**
  - no work on functional form (Webster 2006)
  - must be linear (Jasso, *ESR* 2008)

Justice Evaluation Function

$$J = \theta \ln\left(\frac{A}{C}\right)$$

Properties of the
Justice Evaluation Function

- **Original three noticed (*AJS* 1978)**
  - **Mapping onto justice evaluation scale**
  - **Integrates rival ratio-difference views**
  - **Deficiency is felt more keenly than comparable excess**
- **Theorem and proof (*SM* 1990)**
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- **Two more properties (*SMR* 1996)**
  - **Symmetry**
  - **Limiting form of difference between two power functions**
- **New -- Links loss aversion and the Golden Number**

Status Function

$$S = \ln\left(\frac{1}{1-r}\right)$$

History and Properties of the
Status Function

- **Proposed by Sørensen (*AJS* 1979)**
- **Satisfies convexity condition discussed by Goode (1978)**
- **Status increases at an increasing rate with personal quantitative characteristic**
- **Status distribution is negative exponential**

Status Function
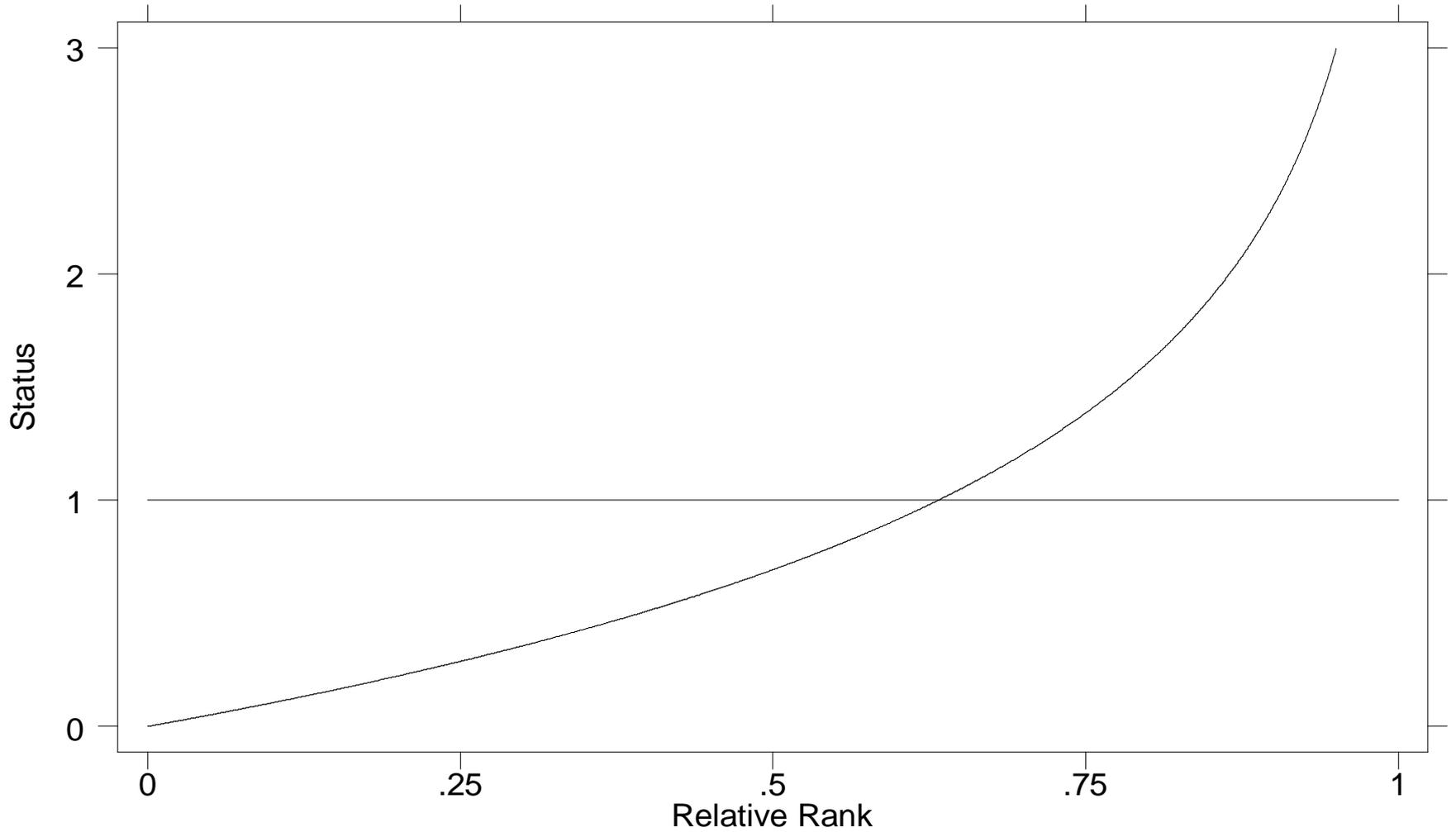
Power Function

$$P = a + bX$$

Five Types of Societies in the NUT

- **The new unified theory gives rise to five types of societies (recalls Plato)**
  - **justice-materialistic**
  - **justice-nonmaterialistic**
  - **status**
  - **power-materialistic**
  - **power-nonmaterialistic**

Subgroups in the NUT

- ## The NUT yields two kinds of subgroups
  - ### pre-existing subgroups
    - formed by categories of qualitative characteristics, such as race, sex, or nativity
  - ### emergent subgroups
    - arise via operation of basic sociobehavioral forces
      - Ex. underrewarded, fairly rewarded, overrewarded
      - Ex. Selfistas, Groupistas, Subgroupistas
      - Ex. mainstream, underworld, overworld

New Unified Theory
of Sociobehavioral Forces

Justice

Status

Power

All Domains of Behavior
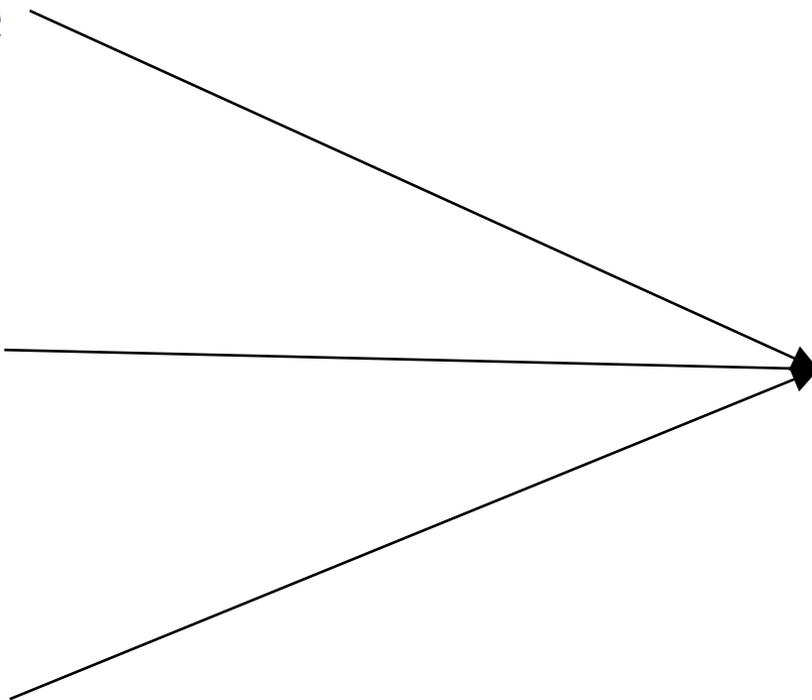
Four Techniques of Theoretical Derivation

- **Micromodel**

- **Macromodel**

- **Matrixmodel**

- **Mesomodel**

Justice Distributions -- 1

- **In the general case, comparison referent C can be any amount**

- **Examine ten scenarios**
  - **four micro scenarios**
  - **six macro scenarios**

Justice Distributions -- 2

- **Four micro scenarios**
  - *C* is equality, as in Socrates, "justice is equality" there is one *J*, in which *C* = *E*(*A*)
  - *C* is everyone below, as in analgēsia (feel no pain), individual has one *J* for every person below, aggregated into *J*(below)
  - *C* is everyone above, as in anhēdonia (feel no pleasure), individual has one *J* for every person above, aggregated into *J*(above)
  - *C* is everyone, individual has one *J* for every other person, aggregated into *J*(all)

Justice Distributions -- 3

- **Six macro scenarios**
  - **Based on actual reward distribution and just reward distribution**
  - **formed by crossclassifying**
    - **whether the *A* and *C* distributions are identical or different**
    - **whether the *A* and *C* distributions are perfectly positively associated, independent, or perfectly negatively associated**

Justice Distributions: One-Good Case

- **Justice** dist [$C=k$; e.g., $E(A)$ or $G(A)$]
  - **Ordinal good: positive exponential**
  - **Pareto good: negative exponential**
  - **Lognormal good: normal**
  - **Power-function good: positive exponential**
- **Justice** distribution (A and C varying)
  - **Many different forms**

Distribution of $J = \ln(A/C)$ in equality and global scenarios

A	J(equal) and J(all)
lognormal	normal
Pareto	negative exponential
power-function	positive exponential

Distribution of $J = \ln(A/C)$ in analgēsia and anhēdonia scenarios

A	J(below)	J(above)
lognormal	New 1a	New 1b
Pareto	New 2a	Equal
power-function	Equal	New 2b

Distribution of $J = \ln(A/C)$ in Macro Scenarios

A, C	Association between A and C		
	Perfect Positive	**Independent**	**Perfect Negative**
Identical	Degenerate at Zero	Symmetric about Zero	Symmetric about Zero
Different	Symmetric/Asymmetric about Any Number		

Distribution of $J = \ln(A/C)$: Distribution-Specific Results

A, C Lognormal	Association between *A* and *C*		
	Perfect Positive	**Independent**	**Perfect Negative**
Identical	Equal	Normal	Normal
Different	Normal	Normal	Normal

Distribution of $J = \ln(A/C)$: Distribution-Specific Results

A, C Pareto	Association between A and C		
	Perfect Positive	**Independent**	**Perfect Negative**
Identical	Equal	Laplace	Logistic
Different	Pos/Neg Exponential	Asymmetrical Laplace	Quasi-Logistic

Distribution of $J = \ln(A/C)$: Distribution-Specific Results

A , C Power-Function	Association between A and C		
	Perfect Positive	**Independent**	**Perfect Negative**
Identical	Equal	Laplace	Logistic
Different	Pos/Neg Exponential	Asymmetrical Laplace	Quasi-Logistic

Status Distribution: One-Good Case

- **Status** distribution
  - negative exponential

Power Distribution: One-Good Case

- **Power** distribution
  - The same as the distribution of X

New PSO Distributions: One-Good Case

- **Justice distribution**

  – **analgēsia and anhēdonia scenarios yield two new families of distributions**

    - New 1
    - New 2

New PSO Distributions: Multiple-Good Case

- **Justice** distribution
  - independent rectangular and Pareto yield asymmetrical Laplace
  - independent rectangulars yield Erlang

- **Status** distribution
  - two independent goods yield Erlang
  - two negatively associated goods yield "Unnamed", a new distribution subsequently named ring(2)-exponential

New PSO Distributions: Multiple-Good Case

- **more to come – expect new distributions**
    - **e.g., in studying status, multiple-good case led to discovery of new family of distributions, now called the mirror-exponential (Jasso and Kotz 2007)**

Fig 1. CDF of Standard Exponential, Erlang, and Ring(2)-Exponential
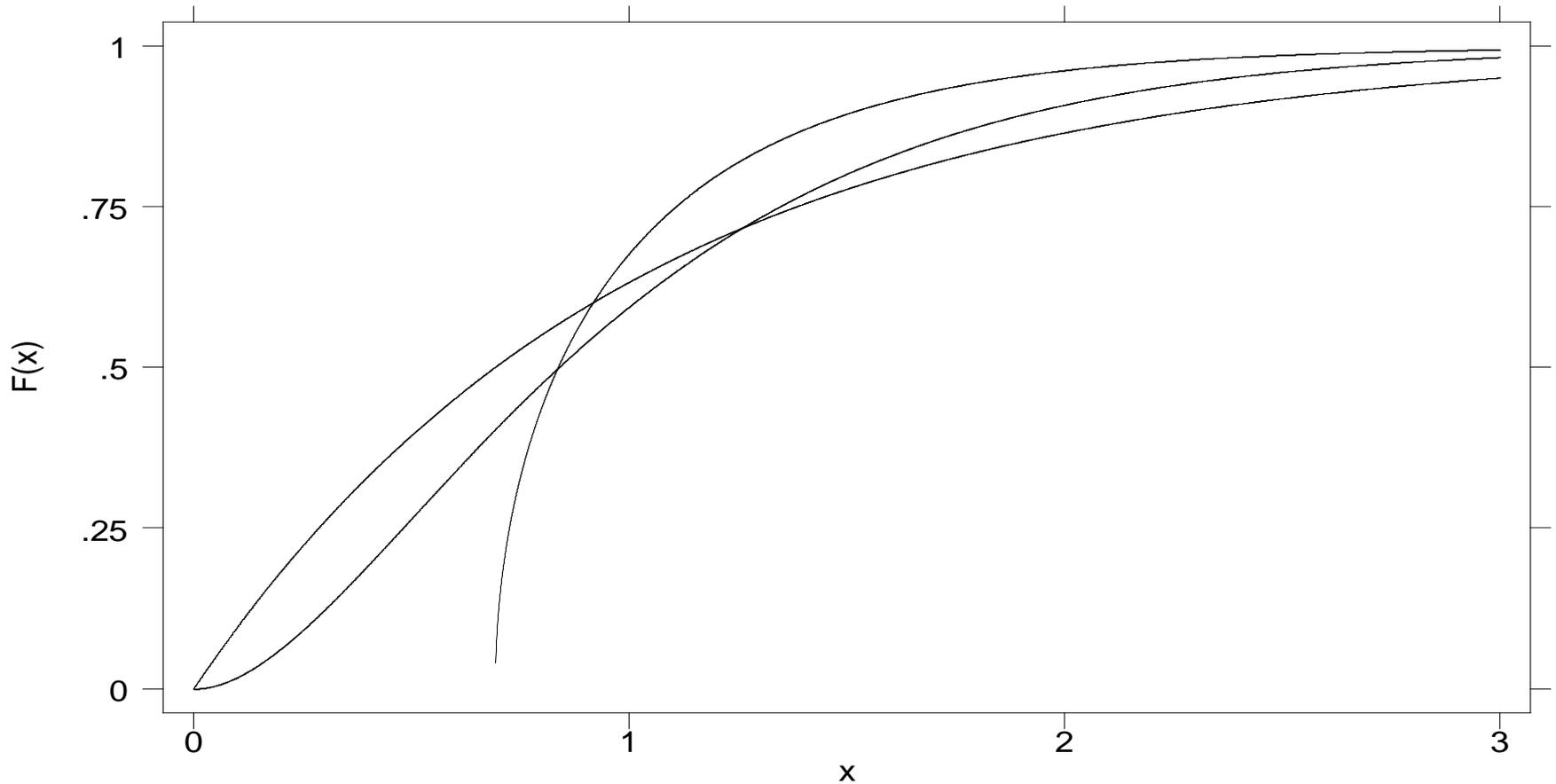
Fig 2. PDF of Standard Exponential, Erlang, and Ring(2)-Exponential
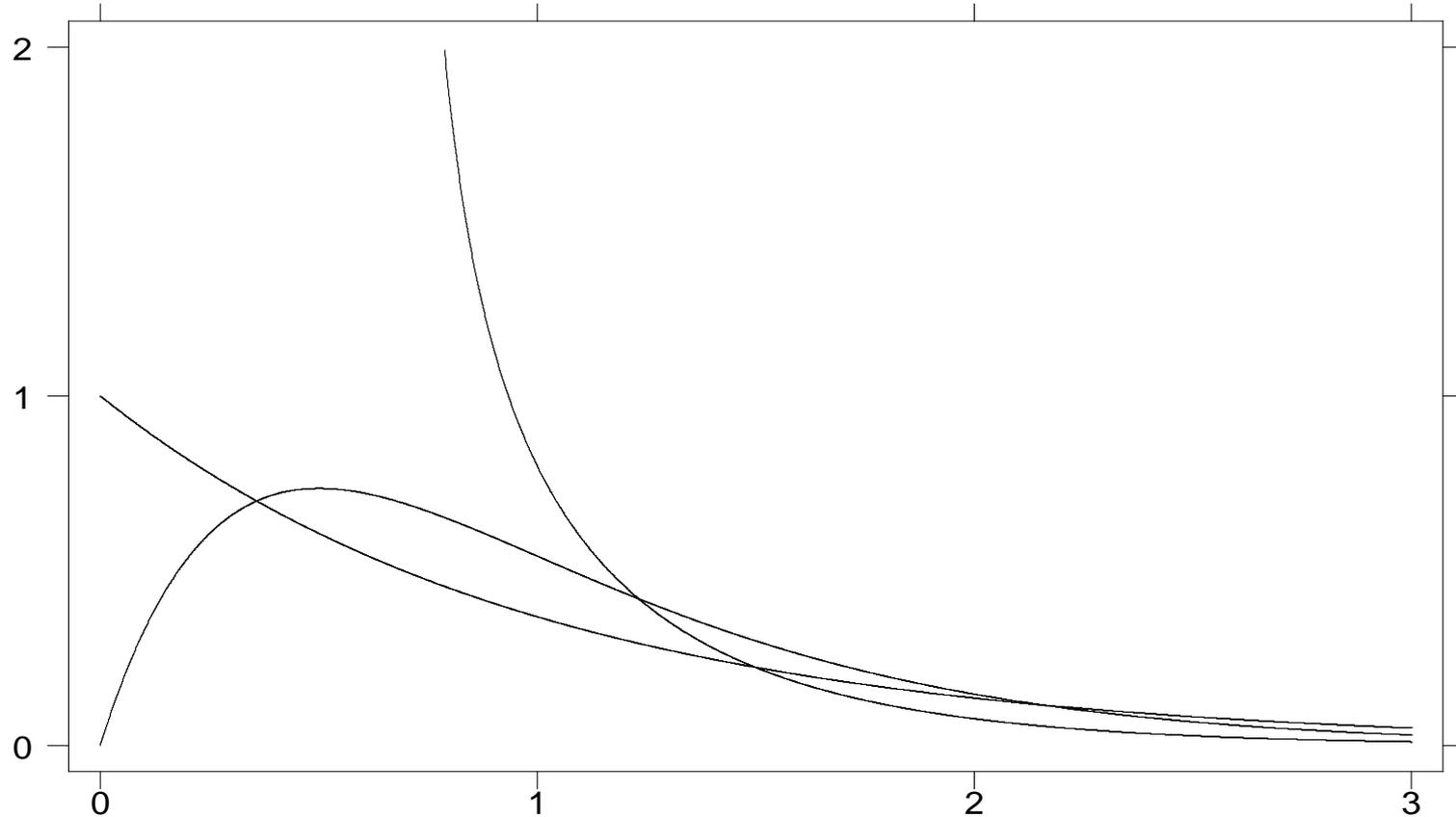
Fig 3. QF of Standard Exponential, Erlang, and Ring(2)-Exponential
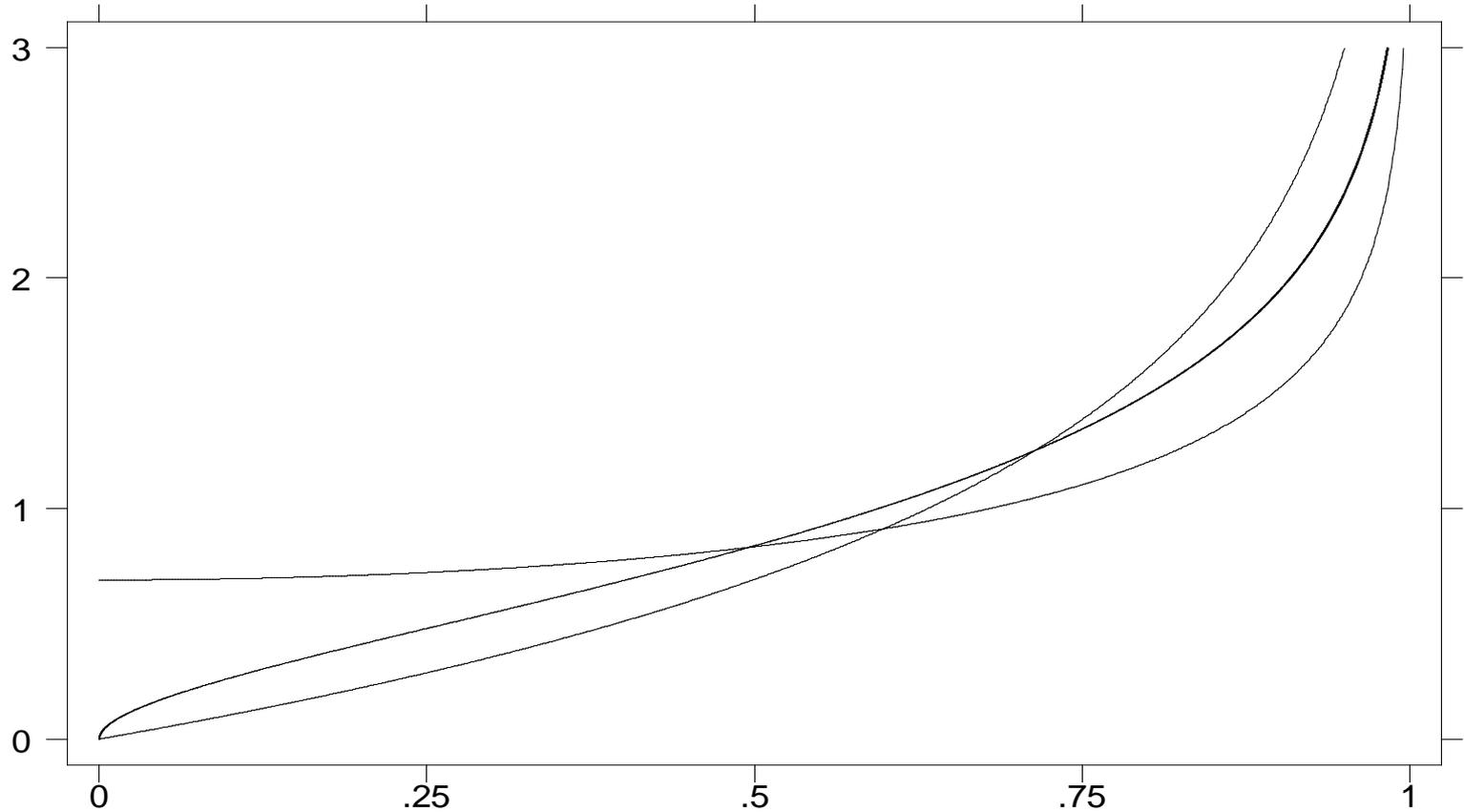
Derivation of Mirror-Exponential

- Arises when **status** is a function of g goods negatively associated
  - Berger et al. procedure
  - g goods arranged in 2 subsets
  - within each subset, all goods positively associated
  - two subsets negatively associated
  - equivalent to unequal weights, with weight parameter p

Properties of Mirror-Exponential -- 1

- **One-parameter distribution**
- **Parameter p: $0 \leq p \leq 1$**
- **Support:**

$$x \geq \ln\left(\frac{1}{p^p (1-p)^{1-p}} \right)$$

Properties of Mirror-Exponential -- 2

- **Properties symmetric about $p = .5$**
- **When $p = 0$ or 1, equivalent to standard exponential**
- **When $p = .5$, equivalent to ring(2)-exponential**
- **Standard exponential and ring(2)-exponential like bookends to mirror-exponential**

Properties of Mirror-Exponential -- 3

- **All formulas evoke mirror images**

- **Hence the name**

Properties of Mirror-Exponential -- 4

- **Among CDF, PDF, and QF, closed-form formula only for QF**

- **Exclusive club – Tukey's lambda distribution**

QF of Mirror-Exponential

$$-(p-p^2)\ln\{\alpha+[(p-p^2)(1-\alpha)^2]\}$$

$$-(1-p)^2\ln[(1-p)(1-\alpha)]$$

$$-p^2\ln[p(1-\alpha)]$$

where p is the weight parameter. The two subsets of goods are weighted p and $(1-p)$.

Fig 5. QF of Members of Mirror-Exponential Family
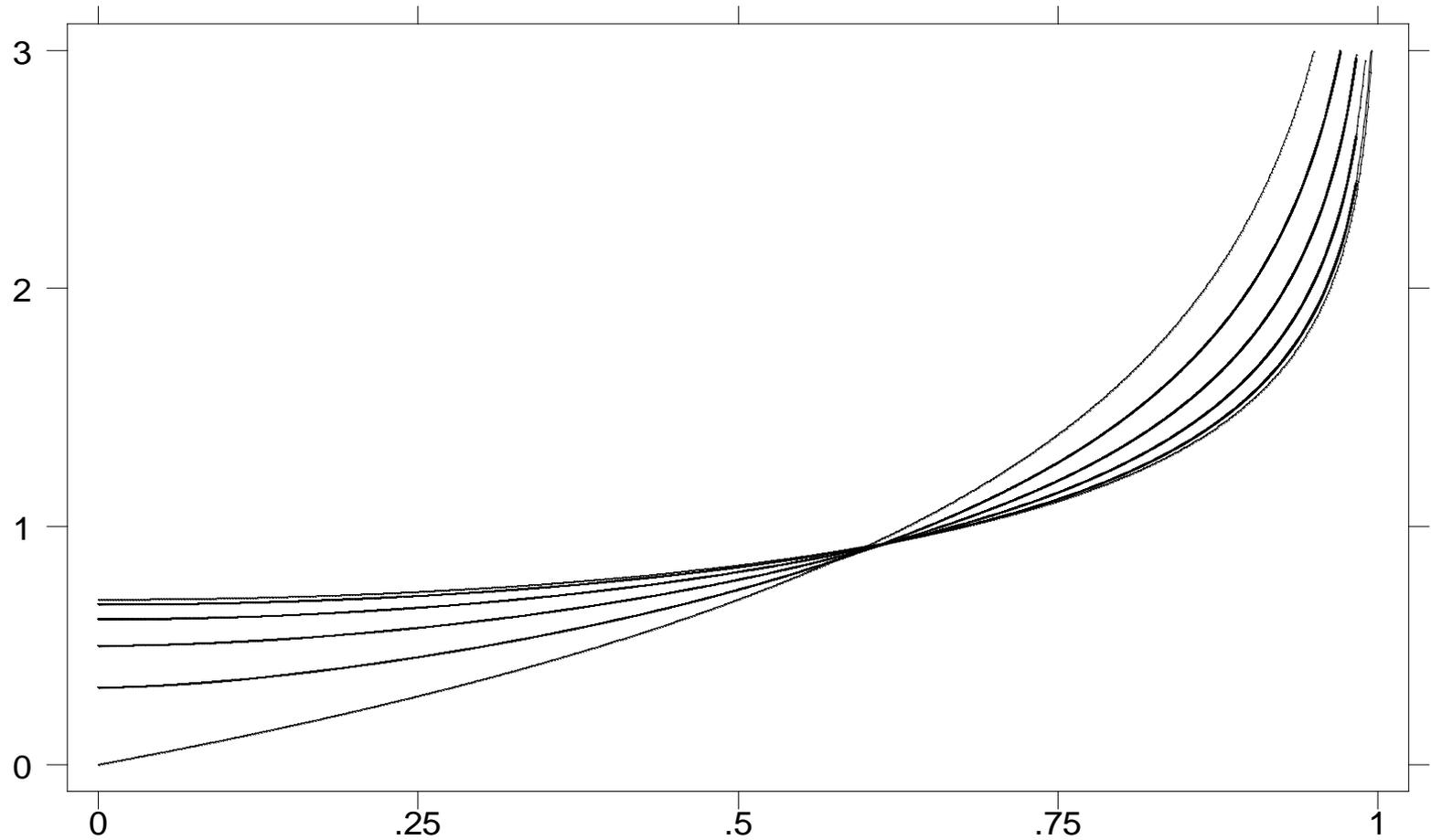
Some Predictions of JusticeTheory

- Gain from theft greater when stealing from a fellow group member rather than an outsider; this premium is greater in poor groups.

- Parents will spend more of their toy budget at an annual giftgiving occasion than at birthdays.

- Veterans of wars fought away from home are more vulnerable to posttraumatic stress than veterans of wars fought on home soil.

- Gifts are more valuable in the giver's presence.

- Blind are less susceptible to eating disorders.

More Predictions of JusticeTheory

- Loss aversion and deficiency aversion
- Inequality aversion
- Conditions for endowment effect
- Conditions for migration from top, bottom, or both
- Effect of inequality on vocations to the religious life
- Differential loyalties to self, subgroup, and group
- Effect of subgroup split on social conflict
- Effect of inequality on social conflict

Some Predictions About Theft

- **A thief will prefer to steal from a fellow group member rather than from an outsider, but victim prefers outsider thief.**

- **Thief's preference for insider theft and victim's for outsider theft are stronger in poor groups than in rich groups.**

- **In outsider theft, there are natural affinities between (i) thief and members of victim's group, and (ii) victim and members of thief's group.**

- **Society loses when rich steal from poor.**

A Thing's Value Changes

- A gift is more valuable to the receiver when the giver is present.

- A thief's gain from theft is greater when stealing from a fellow group member.

- The gain or loss from having a gift stolen depends on whether the giver and the thief are from inside or outside the group.

- In an experiment, if a thing is given by the experimenter and lost to a fellow participant, the loss from theft exceeds the gain from the gift.

Some Predictions on Conversation

- **Topics raised signal valued goods**
  - **Ex. hereditary monarch discussing horse bloodlines**
- **Number of interruptions in a group depends on**
  - **Number of potential valued goods**
  - **Inequality in the distribution of cardinal goods**
  - **Intercorrelations among valued goods**
- **Homogeneous groups have fewer interruptions**
- **Interruptions are group-specific; a given actor may interrupt repeatedly in one group, never in another**
- **Courtesy is lower in heterogeneous groups, and thus in urban settings**

Some **Predictions** Related to War

- **In wartime, the favorite leisure-time activity of soldiers is playing games of chance.**

- **Giftgiving increases in wartime.**

- **Posttraumatic stress is greater among veterans of wars fought away from home than among veterans of wars fought on home soil.**

- **In epochs when husbands predecease their wives, fathers are mourned more than mothers.**

- **Love increases during mobilization and decreases during demobilization.**

Some Predictions for Coups

- **Who leads the coup? Highest-ranking always in status society, sometimes in power society, never in justice society**

- **Coups more prevalent in small states**

- **Enslaving Caesar always maximizes gain**

- **So why kill Caesar? To achieve equal gains, which can only happen in a justice society**

- **Thus, states where coups kill Caesar must be justice societies**

- **And equality is a major objective**

Fundamental Constants Arising from the Sense of Justice

- **Critical inequality level occurs when Atkinson's inequality equals $1-(2/e)$, or approx .264**
  - about when Gini's inequality equals .42
  - switches between cardinal and ordinal goods
- **Societal mainstream lies in the region between $J = -1$ and $J = +1$**
  - relative ratios/ranks between $1/e$ and e, or approx between .368 and 2.72
  - ordinal-good societies have no "top"
  - cardinal-good societies can have neither "top" nor "bottom"

Inequality as Switching Constant when Justice is the Force

- **Critical inequality level occurs**
  - when Atkinson's **inequality** equals $1-(2/e)$, or approx **.264**
  - when Theil's **MLD** equals $\ln(e/2)$, or approx **.307**
  - about when Gini's **inequality** equals .42
- **May govern switch between cardinal and ordinal goods**
- **Based on guardian model**

Some Interpretations of Non-Recurring Events

- **invention of mendicant institutions in 12th century was a response to switch from valuing attributes (birth, nobility, rank) to valuing possessions (wealth)**

- **invention of mystery novel in 19th century the same**

- **In Mariel emigration, Cuba used a punish-via-bad strategy against U.S.**

Justice Approach to Inequality Aversion -- I

- **Concept of just inequality**

- **Exact relations between inequality and justice – three proofs**

- **If sense of justice is operating and if income is regarded as a good, then as inequality becomes larger than just inequality, injustice increases**

Justice Approach to Inequality Aversion -- II

- **Exact relations between inequality and justice**
    - **JI1 and Atkinson-measure**
    - **JI1 and inequality parameter**
    - **JI1* and Theil's MLD**

Justice & Inequality

- **In any distribution, the justice index decreases as inequality increases, with inequality measured by Atkinson's measure.**

- **In any two-parameter mathematically-specified distribution, the justice index decreases as inequality increases, with inequality represented by the variate's general inequality parameter.**

- **The special justice index, in which justice is equality, is the negative of Theil's MLD**

Happiness and the NUT

- **Happiness produced by individual's PSO profile**

- **Assess effects on happiness of**
  - changes in valued goods and in their distribution
  - changes in groups and subgroups
  - changes in dominant PSOs

New Questions in the NUT

- **New Questions**
  - **Competition among PSOs**
  - **Effects of identity components on culture and personality**
  - **Effects of identity components on interaction**
  - **Effects of inequality in goods and bads on inequality in PSOs and on inequality in happiness**

Testing Theoretical Predictions: Evidence

- **New explicit tests**
  - **Marital cohesiveness**
- **Tests not designed to test the theory**
  - **Response to gains concave and to losses convex**
  - **Vocations across countries**
- **Predictions consistent with known facts**
  - **Parental giftgiving and Christmas**
  - **Vietnam veterans' posttraumatic stress**
- **Predictions consistent with conjectures**
  - **Giftgiving in courtship and marriage**
- **Novel predictions – no tests yet**
  - **Eating disorders and blindness**

Overview

- **Social Science Analysis**
- **Basic Building Blocks**
- **New Unified Theory**
- **New Explorations, Theoretical & Empirical**

New Explorations

- **Theoretical**
- **Empirical**

New Explorations

- **Theoretical**
- **Empirical**

1. Voting for an Income Distribution

- **Candidate represented by income distribution resulting from policies**

- **Which candidate wins depends on properties of the income dists**

- **Winner may be lower- or higher-inequality**

- **Winner need not contain median voter**

- **Source. *JMS* 2010.**

Pairs of Distributions Drawn from the Same Family

A. Lognormal
   c = .5 and 1.5
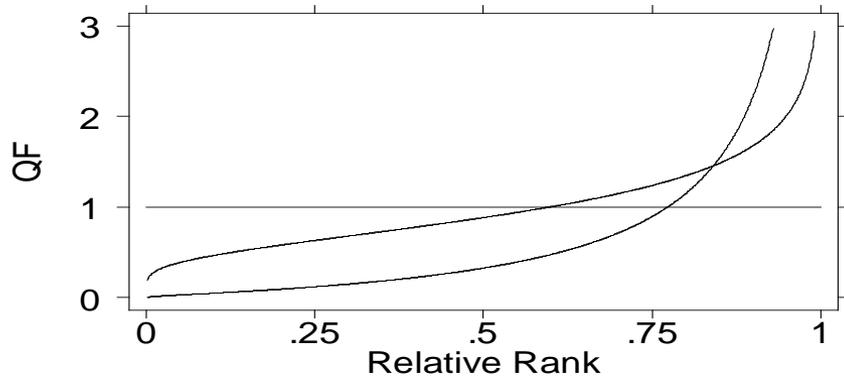
B. Pareto
   c = 1.5 and 2.5
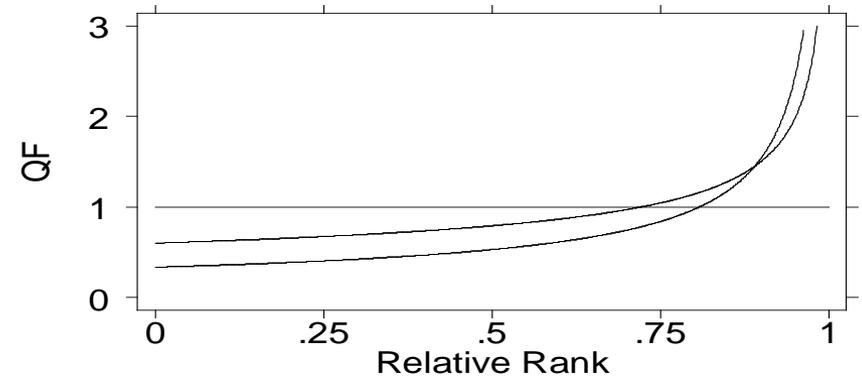
C. Power-Function
   c = .5 and 1.5
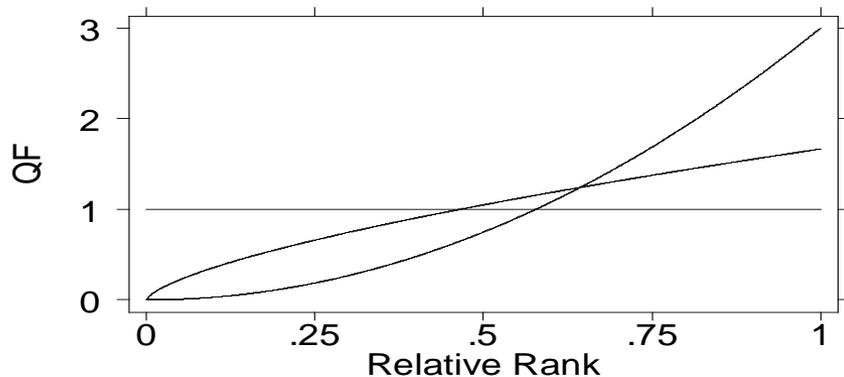
Pairs of Distributions Drawn from Different Families

A. Lognormal (c = .5) and Pareto (c = 2)
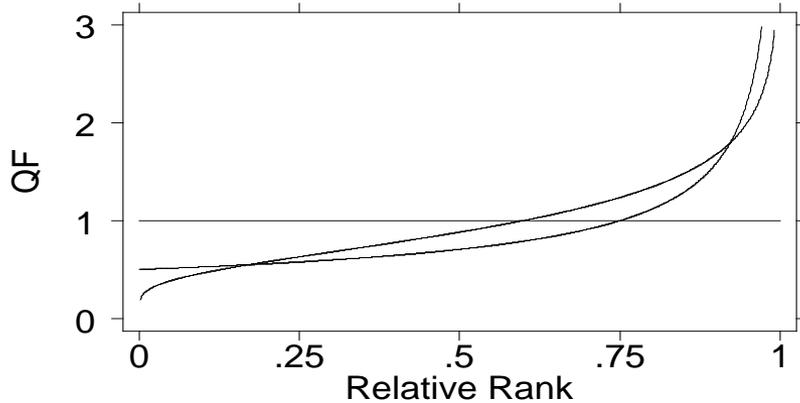
B. Lognormal (c = .5) and Power-Function (c = 2)
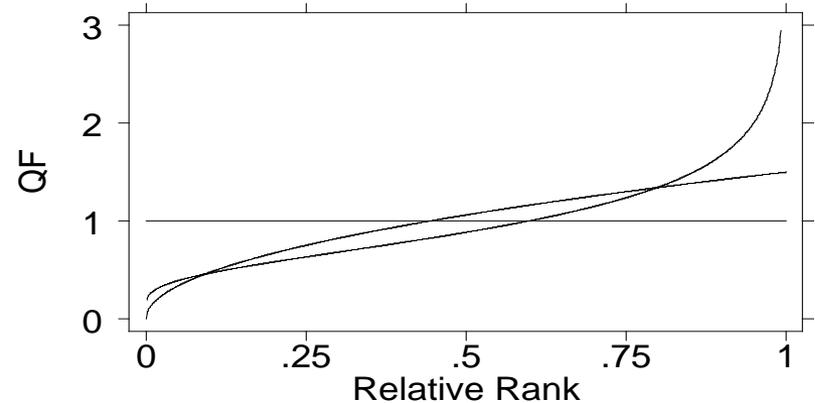
C. Pareto (c = 2) and Power-Function (c = 2)
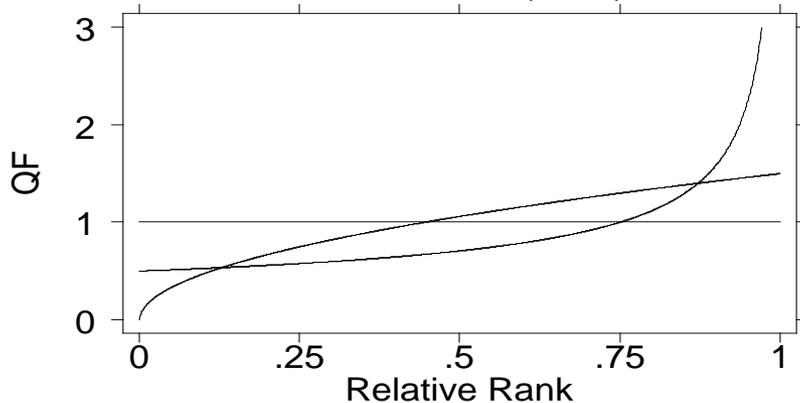
D. Lognormal(c = 0.82) and Pareto (c = 2)
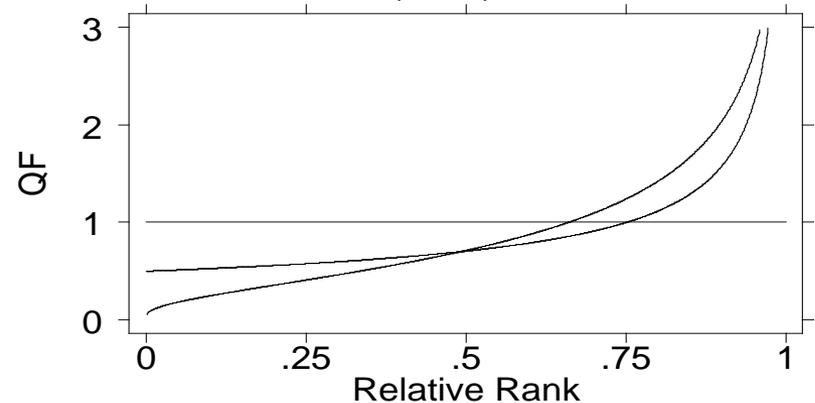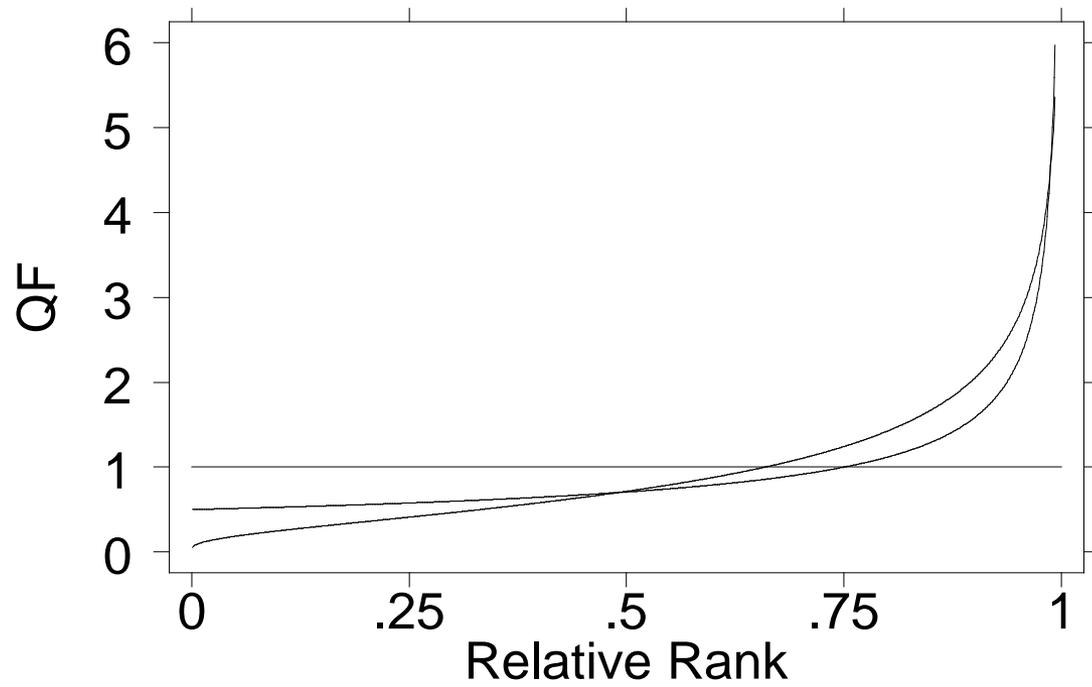
Anselmian Theory

- **Postulate:**

  The will has two inclinations
  - **Affectio commodi**
  - **Affectio justitiae**
- Source: *SJR* 1989

Anselmian Theory

- **Predictions I**
  - Two preference orderings
  - Three possible states
    - Harmony
    - Conflict
    - Ambiguity

Anselmian Theory

- **Predictions II**
  - If alternatives = 2, individual either in Harmony or Conflict
  - If alternatives > 2, individual can be in any of three states

Anselmian Theory

- **Predictions III**
  - **Individual behavior shaped by Anselmian state**
  - **Social phenomena shaped by configuration of Anselmian states**

Anselmian Theory

- **Predictions IV**

  Choosing an Income Distribution

  – **Proportions in 3 states determined by shape of income dist.**

  – **Poorest always in Harmony**

  – **Richest may be in Conflict or Ambiguity**

Anselmian Theory

Variate	Anselmian State		
	Harmony	**Conflict**	**Ambiguity**
Exponential	**63.2%**	**36.8**	**0**
Lognormal	**50.0**	**0**	**50.0**
Pareto	**63.2**	**0**	**36.8**
Power-Function	**36.8**	**0**	**63.2**
Quadratic	**50.0**	**50.0**	**0**

2. Wage-Setting Model

- **If wage-setters disagree, inequality declines**

- **If wage-setters are independent, the larger the number of wage-setters, the lower the inequality**

- **If wage-setters are parties and there are two parties, the closer to 50-50, the lower the inequality**

- **Source: *RAS* 2009**

Inequality and the Number of Deciders: Theorem

- **Inequality in the distribution of a good or bad is a decreasing function of the number of equally-weighted independent decisionmaking units.**
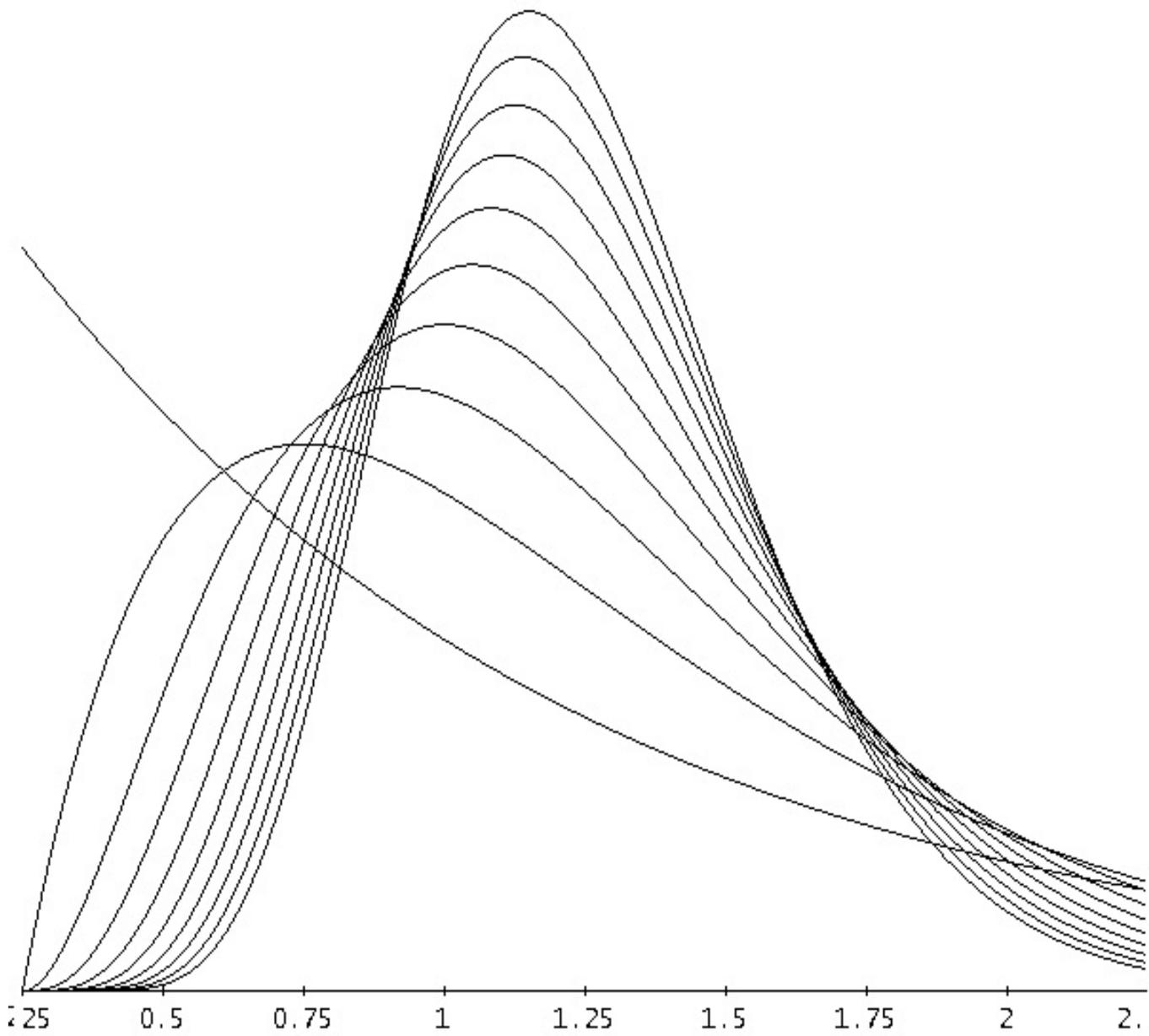
Illustration with Just Rewards

- **Just earnings for 20 fictitious workers in the eyes of 23 respondents**

- **253 covariances in the 23 just earnings distributions**

- **Pervasive individualism – 50 covariances negative**

- **Final earnings distribution (average of 23 amounts) has smaller variance than 21 of the 23 distributions**

- **Consistent with Hatfield's Principle: Equity is in the eye of the beholder**

3. Migration -- Who Leaves

- **Aristotle's Conjecture: Propensity to leave group higher in bottom and top**

- **Define bottom and top: below –1 and above +1**

- **Justice and Status Types of Societies**
  - **Justice society can have both bottom and top**
  - **Status society has only top**

- **Materialistic and Nonmaterialistic Regimes**
  - **Operate differently in justice society**
  - **Operate the same in status society**

- **Source: *Handboook of the Life Course* 2003**

Who Leaves – Predictions I

- **Justice-Materialistic**
  - People with incomes less than 37% of the mean or higher than 271% of the mean
- **Justice-Nonmaterialistic**
  - Bottom 18 %
- **Status-Materialistic/Nonmaterialistic**
  - Top 37%

Who **Leaves** – Predictions II

- **Justice-Materialistic**

  – Proportion at risk of leaving the group is an increasing function of inequality in the distribution of the valued good

- **Other Societies**

  – no effect of inequality

4. How Much More Keenly Is Underreward Felt Than Overreward?

- **Use justice evaluation function to understand loss aversion and deficiency aversion**

Justice Approach to Loss Aversion

- **Derive predictions for contrasts between**

  - **Deficiency and excess in actual reward, relative to just reward**

  - **Loss and gain in actual reward, relative to current actual reward**

Loss versus Gain -- I

- **Let A denote the actual reward, C the just reward, k the loss or gain, CJ the change in J from T1 to T2, and let C remain constant.**

$$\left| CJ^{Loss} \right| > CJ^{Gain}$$

$$\left| \ln\left(\frac{A_0 - k}{A_0} \right) \right| > \ln\left(\frac{A_0 + k}{A_0} \right)$$

Loss versus Gain -- II

- **Define difference D and ratio R between CJ in loss case and CJ in gain case**

$$D^{CJ} = \left| \ln\left(\frac{A_0 - k}{A_0} \right) \right| - \ln\left(\frac{A_0 + k}{A_0} \right)$$

$$R^{CJ} = \frac{\left| \ln\left(\frac{A_0 - k}{A_0} \right) \right|}{\ln\left(\frac{A_0 + k}{A_0} \right)}$$

Loss versus Gain -- III

- **After algebraic manipulation, formulas become**

$$D^{CJ} = \ln\left(A_0^2\right) - \ln\left(A_0^2 - k^2\right)$$

$$R^{CJ} = \frac{\ln\left(\dfrac{A_0}{A_0 - k}\right)}{\ln\left(\dfrac{A_0 + k}{A_0}\right)}$$

Loss versus Gain -- IV

- **Examine special quantities and cases**
- **Example. Ratio *R* equals 2 when:**

$$k = A_0\left(\frac{\sqrt{5}}{2} - \frac{1}{2}\right) \approx .618 A_0$$

Loss versus Gain -- V

- **First partial derivatives**
  - **Effect of A is negative**
  - **Effect of k is positive**
- **Interpretation**
  - **The greater the actual reward, the smaller the discrepancy between the outcomes**
  - **The greater the amount of the loss or gain, the greater the discrepancy between the outcomes**

Loss Aversion -- Summary

- **Justice approach predicts both that**
  - **Deficiency is felt more keenly than excess**
  - **Loss is felt more keenly than gain**
- **Justice approach predicts the exact magnitudes by which deficiency(loss) is felt more keenly than excess(gain) – for both difference and ratio**
- **Interpretation is context-specific**
  - **Deficiency(excess) of actual reward relative to just reward**
  - **Loss(gain) in actual reward from T1 to T2**

Loss Aversion
and
the Golden Number

- **Loss is felt twice as keenly as gain when:**

$$k = A_0\left(\frac{\sqrt{5}}{2} - \frac{1}{2}\right) \approx .618 A_0$$

5. Modeling Polarization

- **Begin with a group or population**
- **The group has a subgroup structure generated by a personal qualitative characteristic such as race or sex**
- **Two types of polarization**
  - **subgroups internally homogeneous**
  - **subgroups internally heterogeneous**

Modeling Polarization cont'd

- **Subgroup internally homogeneous**
  - each person attaches to the subgroup, thinks and acts exclusively as a member of the subgroup
  - relations between subgroups a function of distance between the subgroups
- **Subgroup internally heterogeneous**
  - some persons attach to the subgroup, others not
  - new subgroups emerge, consisting of individuals attached to their subgroup plus one mixed subgroup

Modeling Polarization cont'd

- **New vocabulary**
  - **Pre-existing subgroups – based on personal qualitative characteristics**
  - **Emergent subgroups – based on sociobehavioral attachments**

Modeling Polarization cont'd

- **Example – racial segregation**
  - **Two pre-existing subgroups, blacks and whites**
  - **First polarization model – everyone attaches to their own racial subgroup, and relations between the races vary with distance between the subgroups**
  - **Second polarization model – some blacks identify as black, some whites identify as white, and some blacks and whites are color-blind – generating three emergent subgroups (e.g., choosing to live in all-black, all-white, and mixed neighborhoods)**

First Type of Polarization

- **In nonmaterialistic societies, polarization is a decreasing function of the relative size of the disadvantaged group.**

- **In materialistic societies, the direction of the effect of subgroup size depends on the shape of the income distribution.**

- **In materialistic societies, polarization is an increasing function of inequality in the distribution of the valued material goods.**

Fig 2. How Polarization of the First Type Varies with Proportion in Bottom Subgroup and Inequality

A. Quality-Good

B. Lognormal Quantity-Good
   (c=1; c=2)

C. Pareto Quantity-Good
   (c=1.5; c=2)

D. Power-Function Quantity-Good
   (c=1.5; c=2)
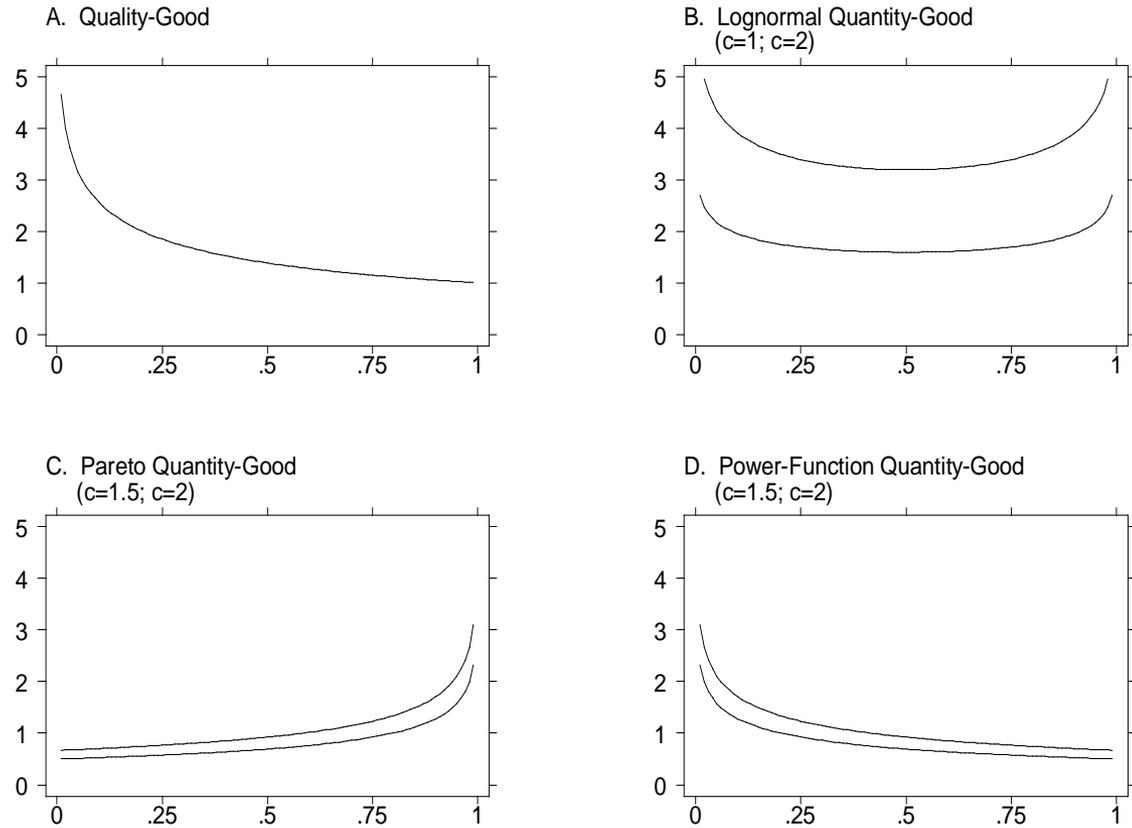
Second Type of Polarization

- **Individuals seek to enhance their identity and maximize their happiness, comparing their own J with the average for their subgroup**

- **If the personal J is less than the subgroup average J, the person attaches and orients to the subgroup, but if the personal J exceeds the subgroup average J, the person becomes blind to subgroup**

Early Results

- **Early results in two-subgroup case**
  - **higher-ranking from each subgroup are Selfistas (Integrationists)**
  - **lower-ranking from each subgroup are Subgroupistas (Segregationists)**
  - **proportions Selfistas and Subgroupistas depend on subgroup relative size, valued goods, distributional form of cardinal goods, and sociobehavioral force**

Figure 4. Personal and Subgroup *J*
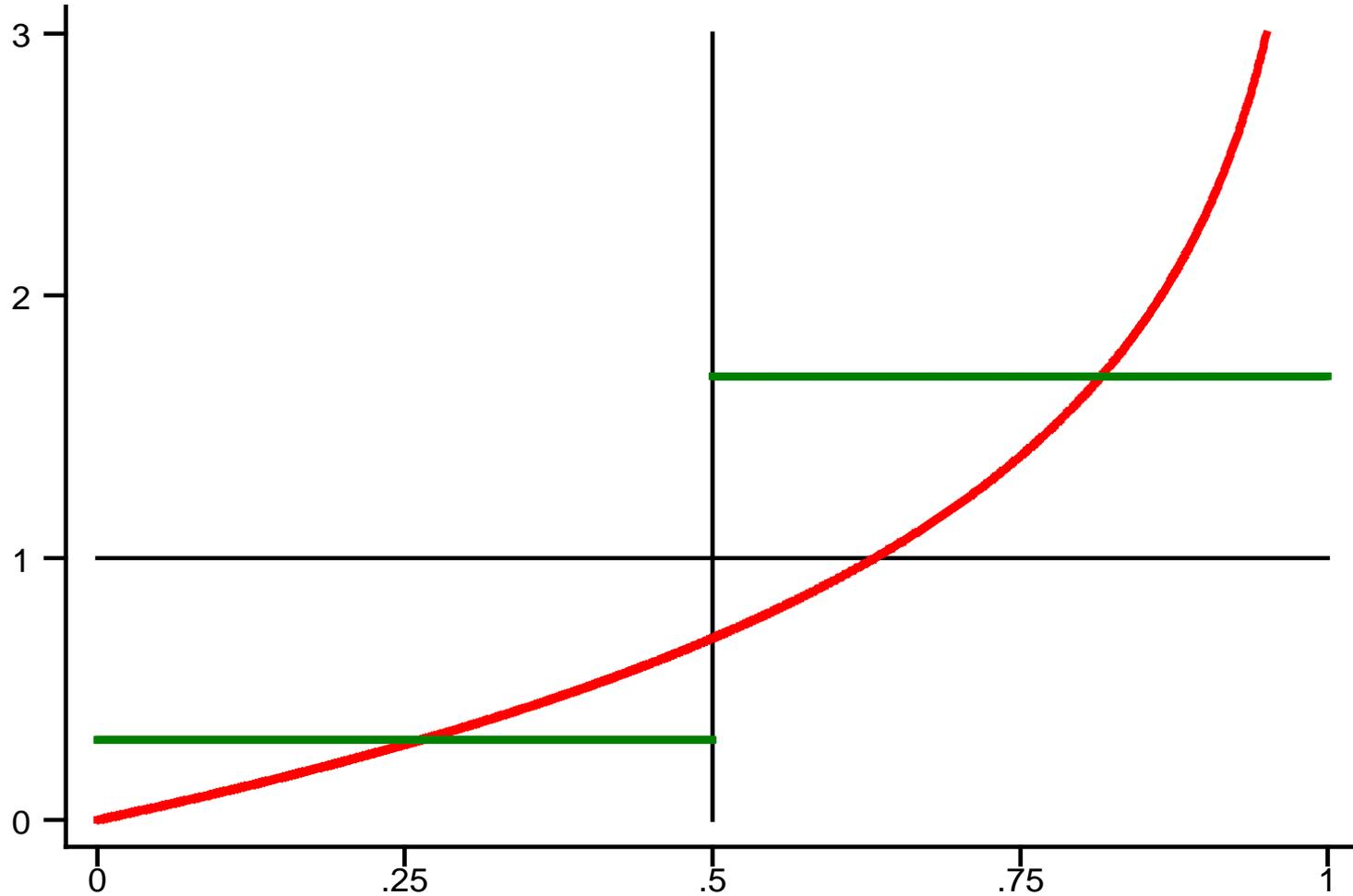
Fig 5. Personal *J* and Subgroup Mean *J*, by Subgroup Split: Ordinal Good

A. Subgroup split equals .25-.75.

B. Subgroup split equals .368-.632.

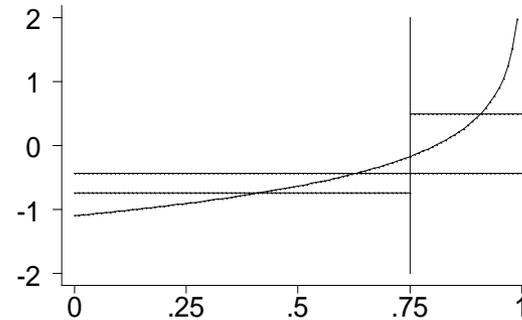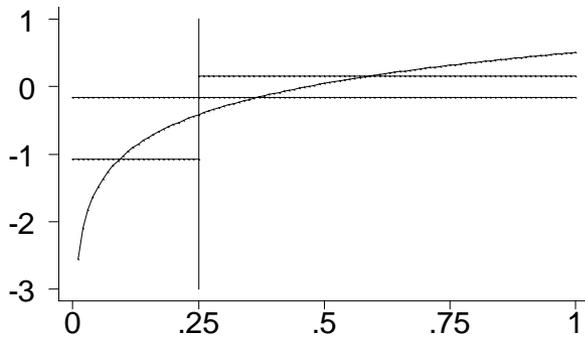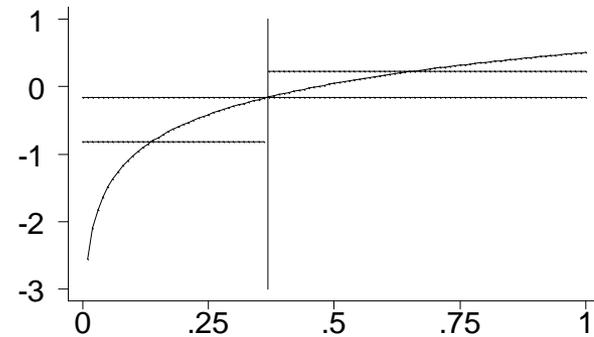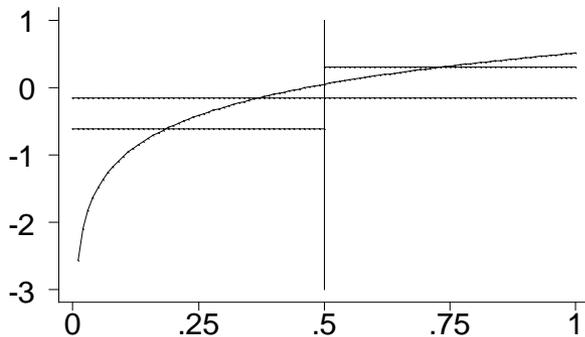C. Subgroup split equals .50-.50.

D. Subgroup split equals .75-.25.
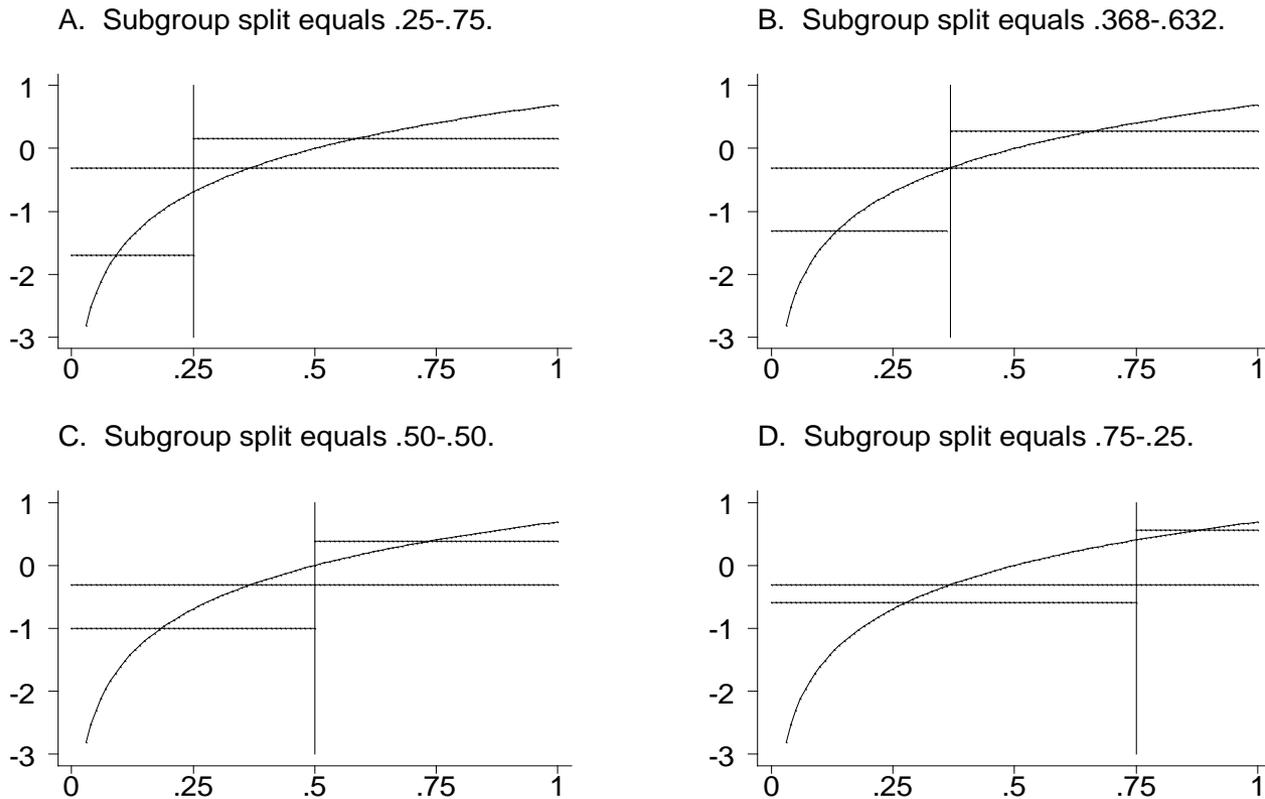
Fig 6. Personal *J* and Subgroup Mean *J*, by Subgroup Split: Lognormal Cardinal Good

A. Subgroup split equals .25-.75.
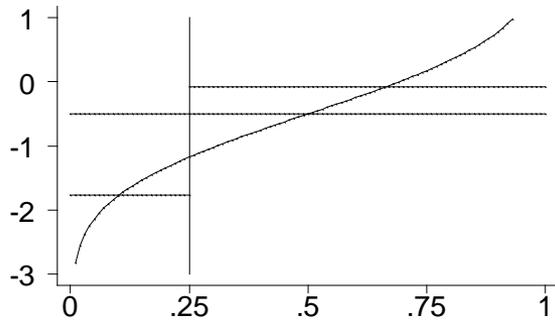
B. Subgroup split equals .50-.50.
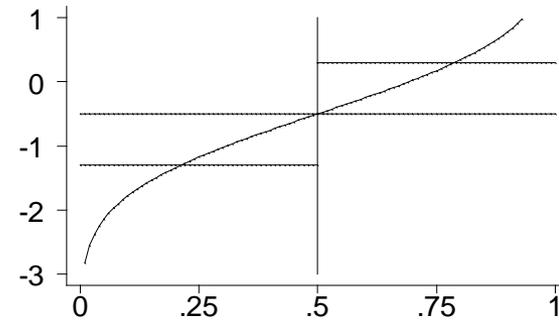
C. Subgroup split equals .75-.25.
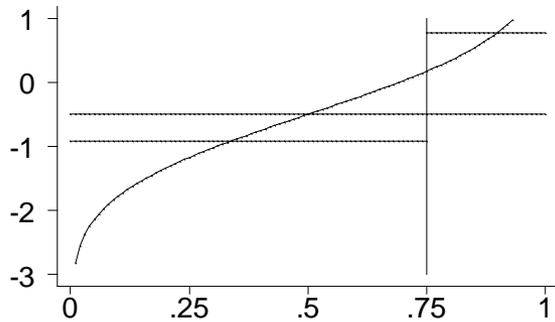
Fig 7. Personal *J* and Subgroup Mean *J*, by Subgroup Split: Pareto Cardinal Good

A. Subgroup split equals .25-.75.
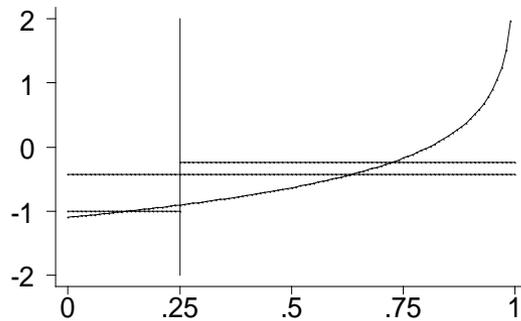
B. Subgroup split equals .50-.50.
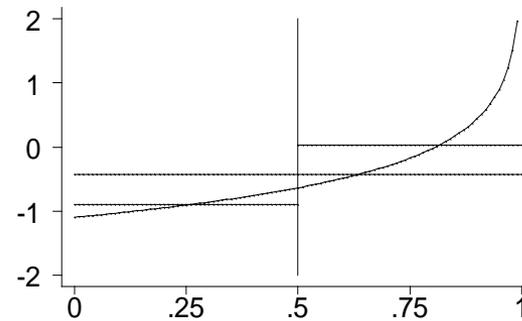
C. Subgroup split equals .632-.368.
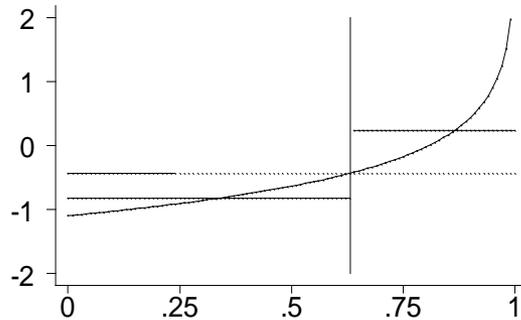
D. Subgroup split equals .75-.25.

Fig 8. Personal *J* and Subgroup Mean *J*, by Subgroup Split: Power-Function Cardinal Good
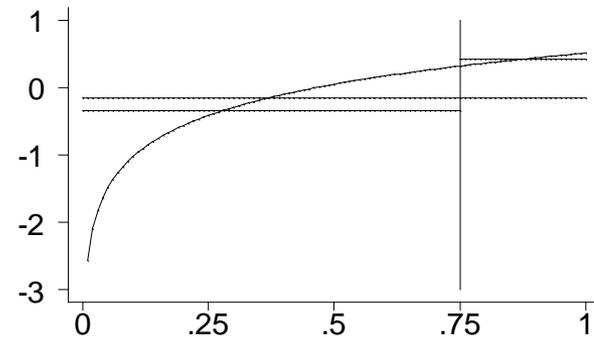

A. Subgroup split equals .25-.75.

B. Subgroup split equals .368-.632.

C. Subgroup split equals .50-.50.

D. Subgroup split equals .75-.75.

Racial Segregation Application

- **In racial segregation application**
  - **Proportions Segregationist & Integrationist**
  - **Proportions Segregationist & Integrationist within black & white pre-existing subgroups**
  - **Proportions black and white within Segregationist and Integrationist emergent subgroups**
  - **All proportions vary with subgroup split, valued goods, distributional form of material goods, and sociobehavioral force**
  - **In materialistic regime, no effect of inequality**
  - **Work in progress modeling strength of attachment to Segregationist & Integrationist emergent subgroups**
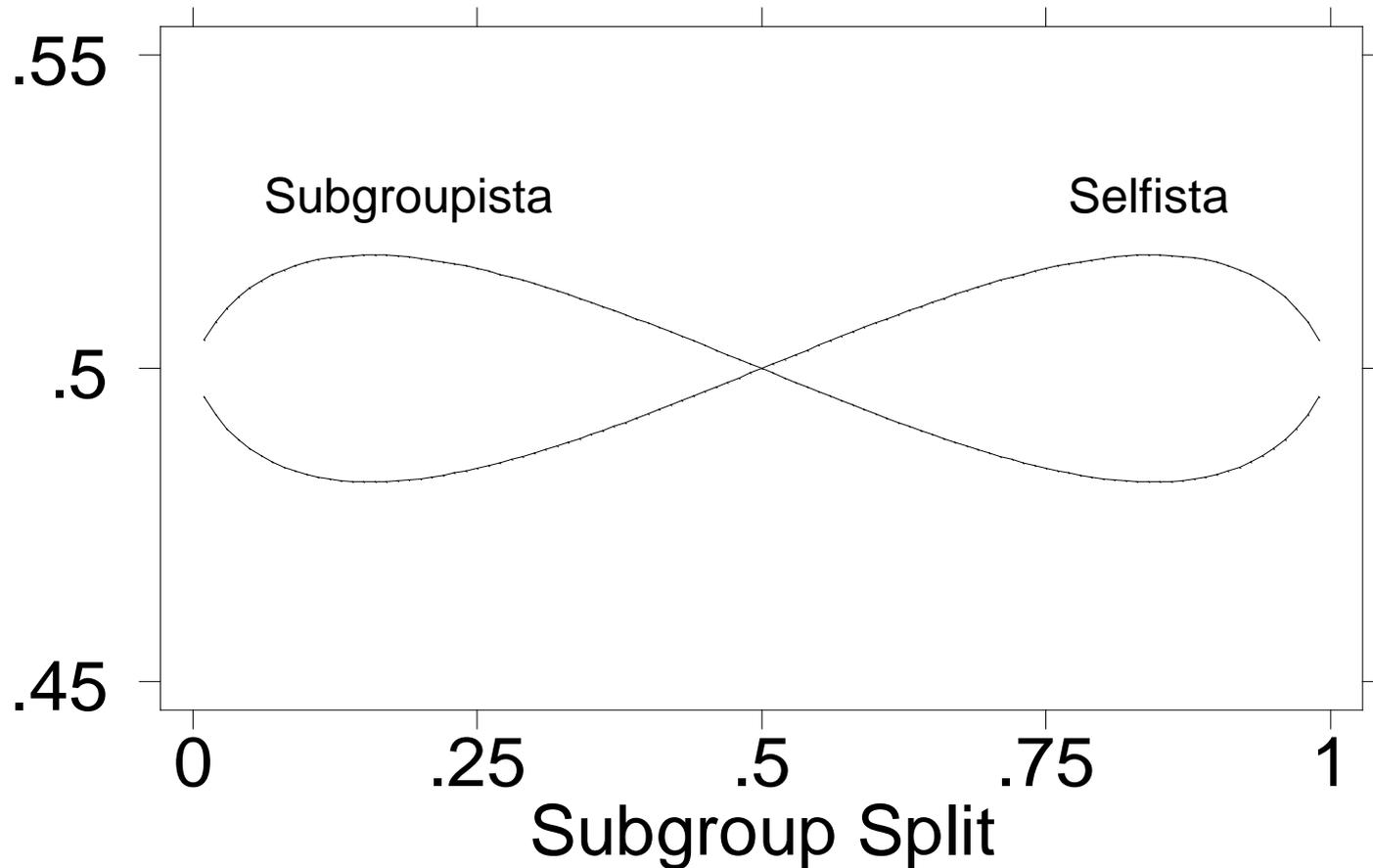
Selfistas and Subgroupistas
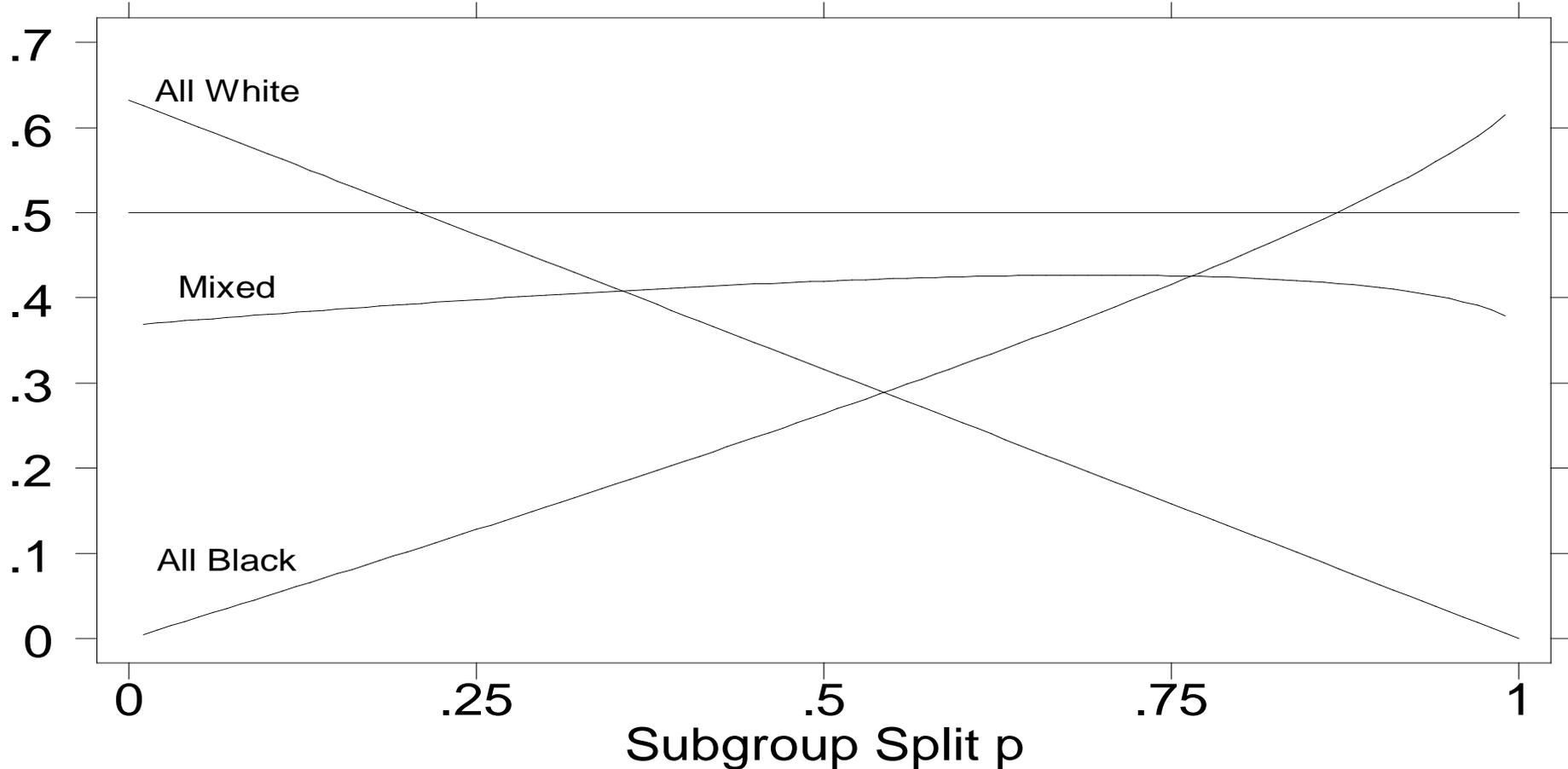## in **Justice**-Nonmaterialistic Society
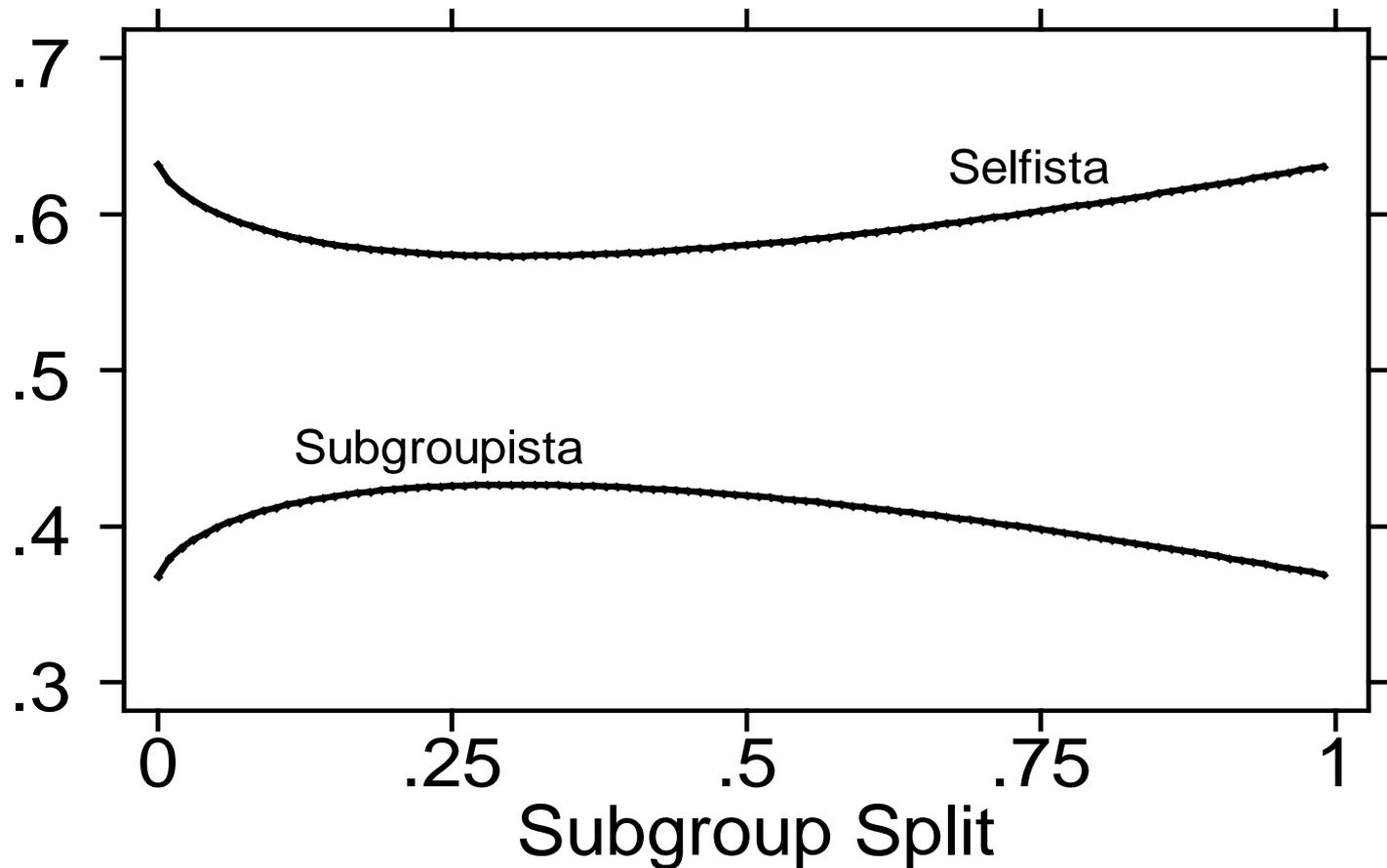
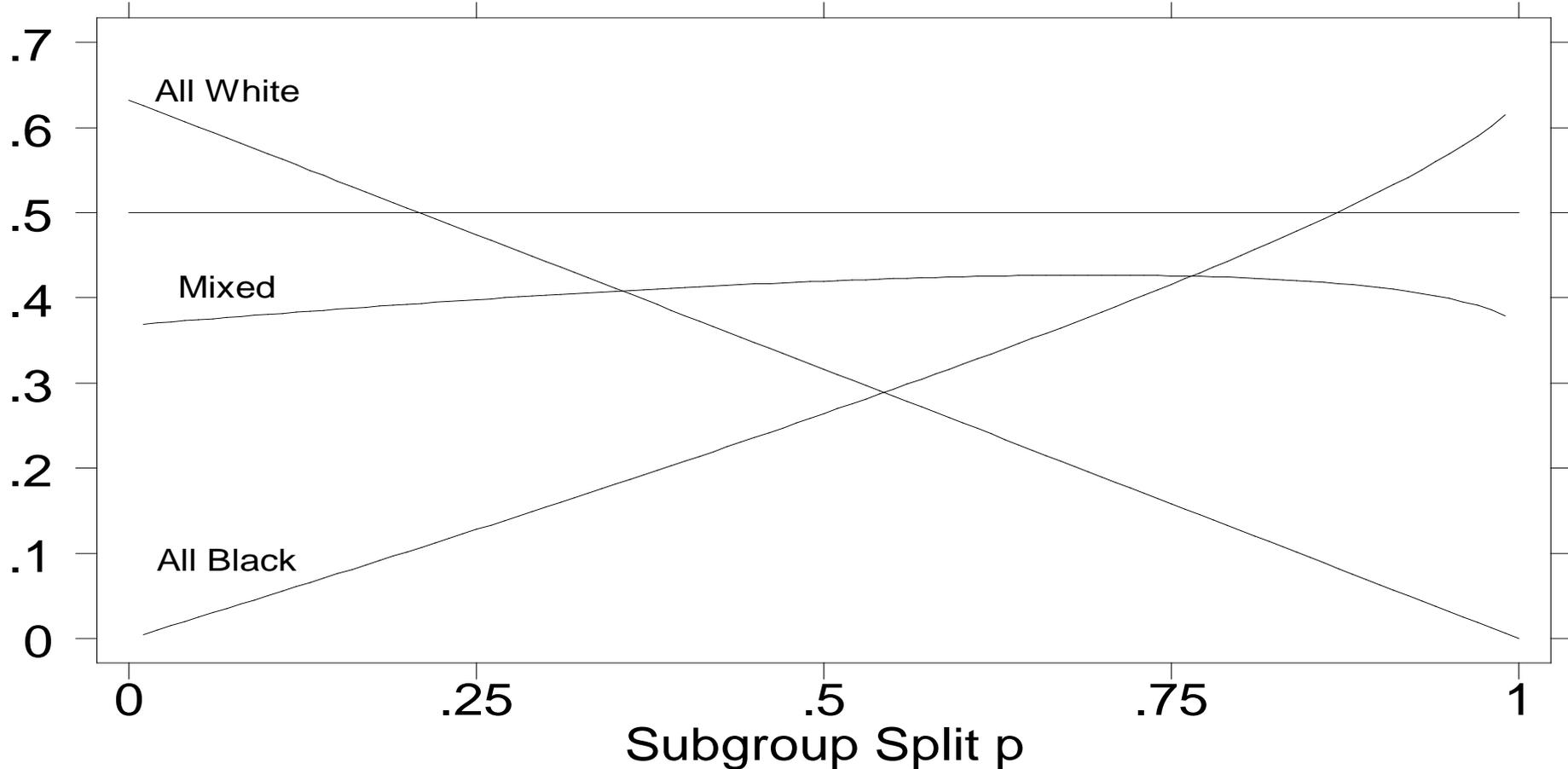# Selfistas and Subgroupistas in **Justice**-Pareto Society
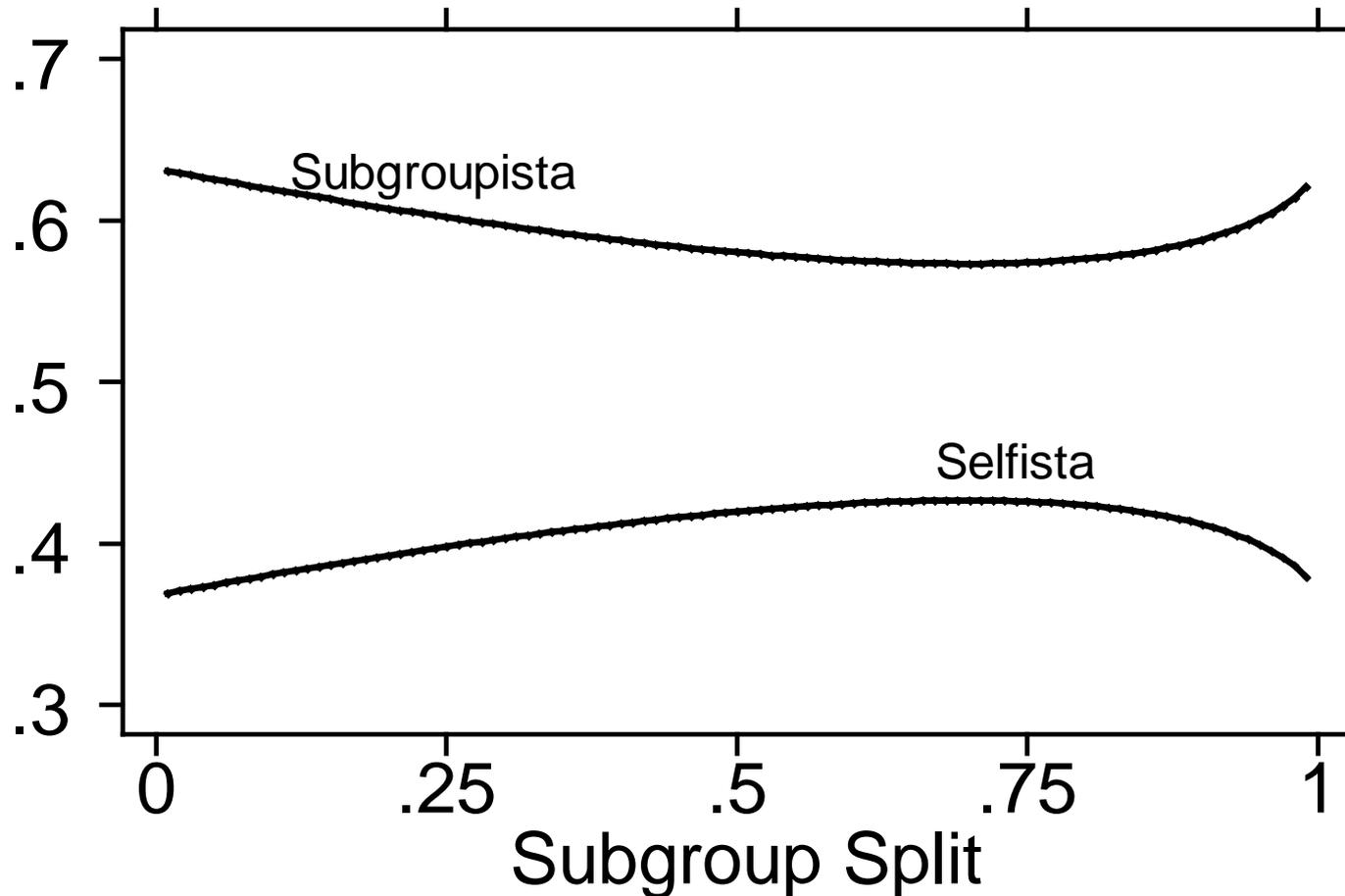
Selfistas and Subgroupistas in **Justice**-Lognormal Society

Residential Segregation
in a **Justice**-Pareto Society

Residential Segregation in a **Status** Society

6. Is Inequality A Good or A Bad?

- **Using the framing coefficient in the justice evaluation function and the Justice Index, it can be shown that:**

- **Inequality in the distribution of a good is a bad, and inequality in the distribution of a bad is a good**

Limitation

- **Inequality Theorem only holds for individuals who experience justice evaluations**

7. The Just Society Has a Mixed Government

- **For a society in which citizenry is independent-minded, combination of Inequality Theorem and the Number of Decisionmakers Theorem yields the Just Society Theorem**

Premises

- **Inequality Goodness or Badness**
  - **If an observer regards a thing as a good (bad), then that observer regards inequality in the distribution of that thing as a bad (good).**

- **Inequality & Number of Deciders**
  - **Inequality in the distribution of a good or bad is a decreasing function of the number of equally-weighted independent decisionmaking units.**

The Just Society: Theorem

- **The just society has a mixed government.**
  - **Distribution of benefits is by democracy.**
  - **Distribution of burdens is by oligarchy.**

8. What do Individuals Think Is Just for Themselves? And Why Does It Matter?

- **Ongoing theoretical work derives justice evaluations, justice indexes, and formulas in probability distributions under a variety of just reward scenarios**

Example

- **If every person compares to every other person, the just reward reduces to the geometric mean**

- **Because GM LE AM, the justice evaluation is greater than when comparing to the arithmetic mean. And JI1 is positive rather than negative**

Importance of Information about Just Reward

- **Theorem shows that importance diminishes as inequality declines**

- **Because as inequality declines all amounts converge on the arithmetic mean**

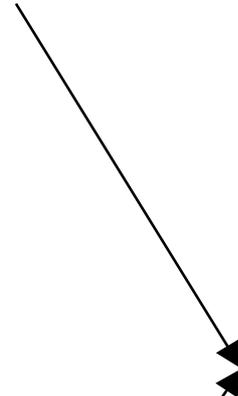- **Source. Penultimate paper with Sam Kotz (in progress)**

New Explorations

- **Theoretical**
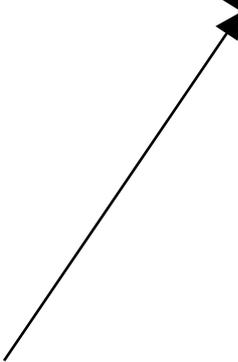- **Empirical**

9. Where Do Ideas of Justice Come From?

- **Homans suggests:**
- **"whatever is, is always becoming what ought to be"**

The World of Distributive Justice
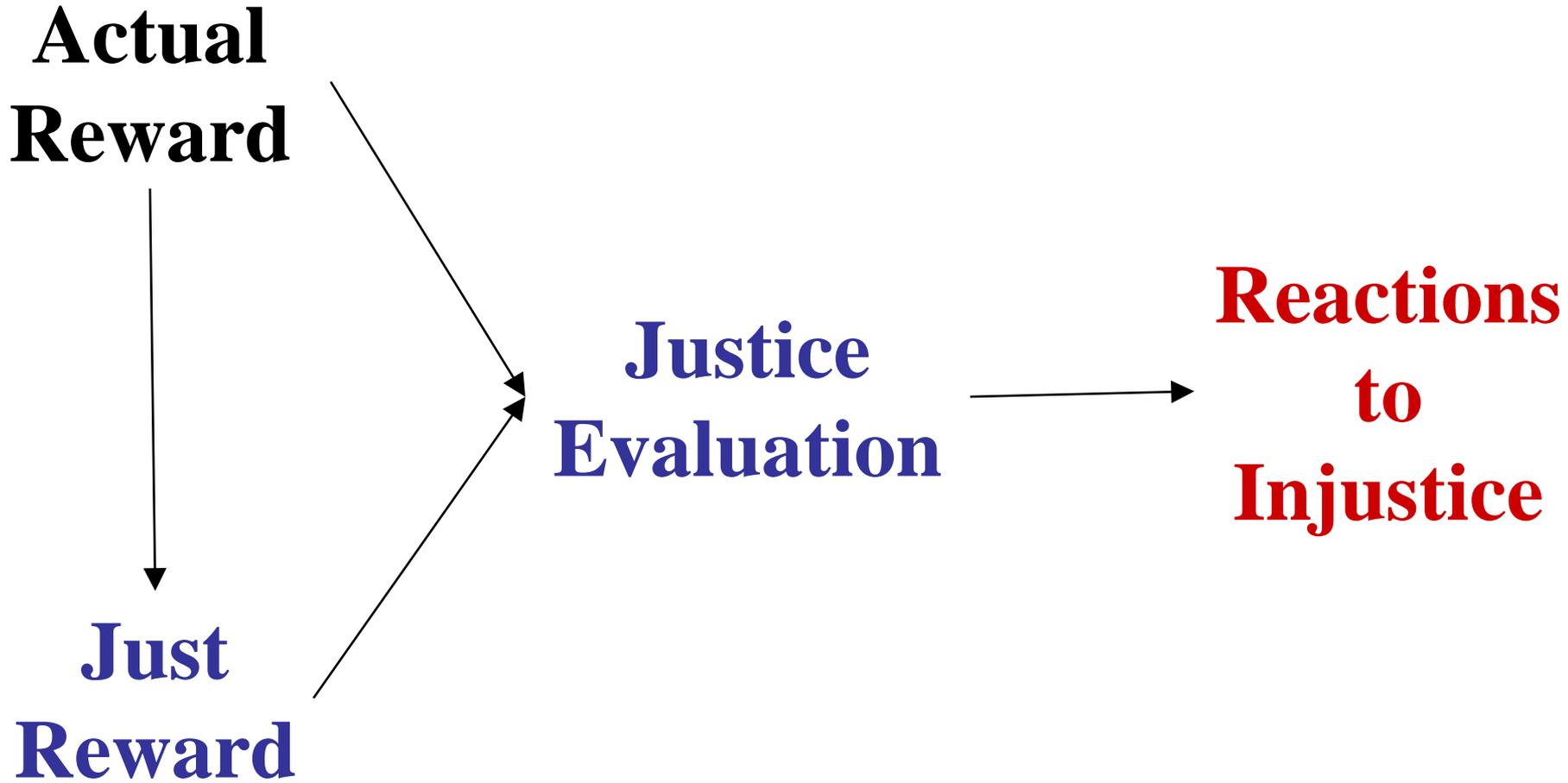
Homans' View of Distributive Justice

Assessing Homans' Conjecture

- **Assess Homans' conjecture that actual rewards influence just rewards**

  - use one-reward-per-rewardee method

  - generate two vignette samples, identical in every respect except with hypothetical rewards that differ by a factor of k, and assign them to random subsets of the respondent sample

  - compare just reward distributions

- **48 respondents in 2002, $k = 1.5$**

- **Respondents' ideas of just earnings are not influenced by vignette actual earnings**

Assessing Homans' Conjecture

- **A recent study constructed two identical vignette worlds, but assigned each worker in the B world earnings 1.5 times higher than in the A world.**

  – **If observers use information from the vignette world to form ideas of justice, then the just earnings distributions should differ**

Assessing Homans' Conjecture

- But the two estimated just earnings distributions are almost the same

- suggesting that respondents bring to the study their own ideas about just earnings and are not swayed by the actual earnings distribution in the vignette world
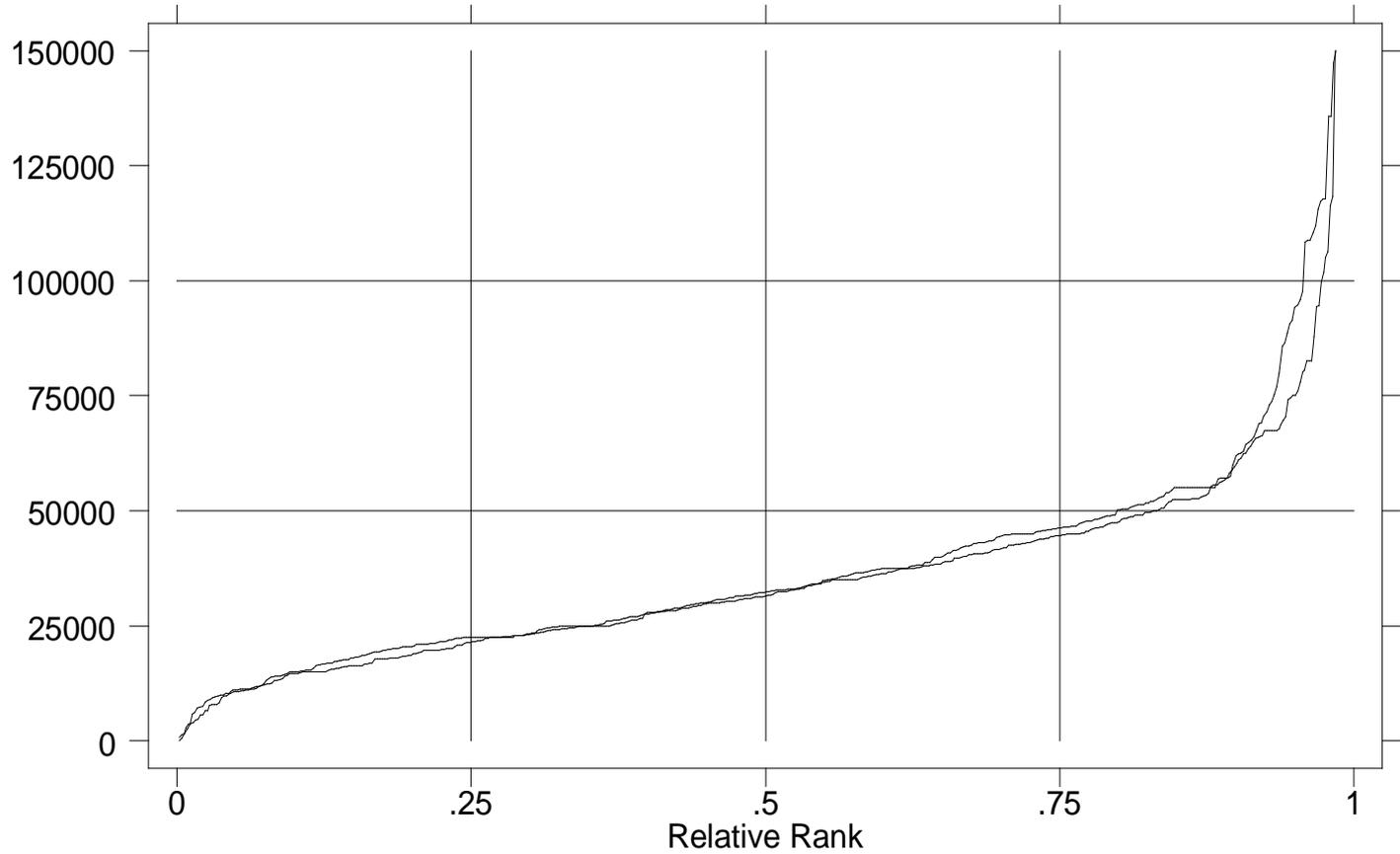
- Source

- Jasso, *Homans*, Treviño (ed.), 2006

Figure 2. Just Earnings Distribution Across Two Earnings Treatments

10. Justice and Impartiality

- **The theoretical and empirical apparatus of justice theory enables assessment of four types of impartiality**
  - **In ideas of justice (first central question)**
    - **Taking into consideration an irrelevant qualitative characteristic (e.g., sex in just earnings equation)**
    - **Forming ideas of justice differently for subgroups based on irrelevant qualitative characteristic (e.g., different just earnings equations for males and females)**
  - **In judgments of justice of actual situations (3rd ques)**
    - **Framing things as goods or bads differently for individuals, including individuals who differ on irrelevant qualitative characteristic (e.g., framing income as a good for males and as a bad for females)**
    - **Expressing justice evaluation with greater or lesser emotion for individuals, including individuals who differ on irrelevant qualitative characteristic (e.g., shouting concern for low income of females but whispering concern for low income of males)**

Illustration -- 1

- **Assess respondent impartiality across rewardees**

  - **framing-impartiality: Does R frame earnings uniformly across 10 rewardees?**

  - **expressiveness-impartiality: Does R have the same expressiveness across 10 rewardees?**

- **Test, separately for each respondent, hypotheses that sign and absolute magnitude of θ vary across rewardees**

Illustration -- 2

- **439 respondent-specific/worker-specific regressions indicate complete framing-impartiality: earnings is universally framed as a good**

- **44 sets of respondent-specific tests indicate that 70% fail expressiveness-impartiality, and the number could be as high as 75%**

- **This new kind of impartiality could destroy the good effects of impartiality in ideas of justice – if observers express themselves differentially**

- **Source. "Emotion," *Handbook*, Stets/Turner (ed) 2006**
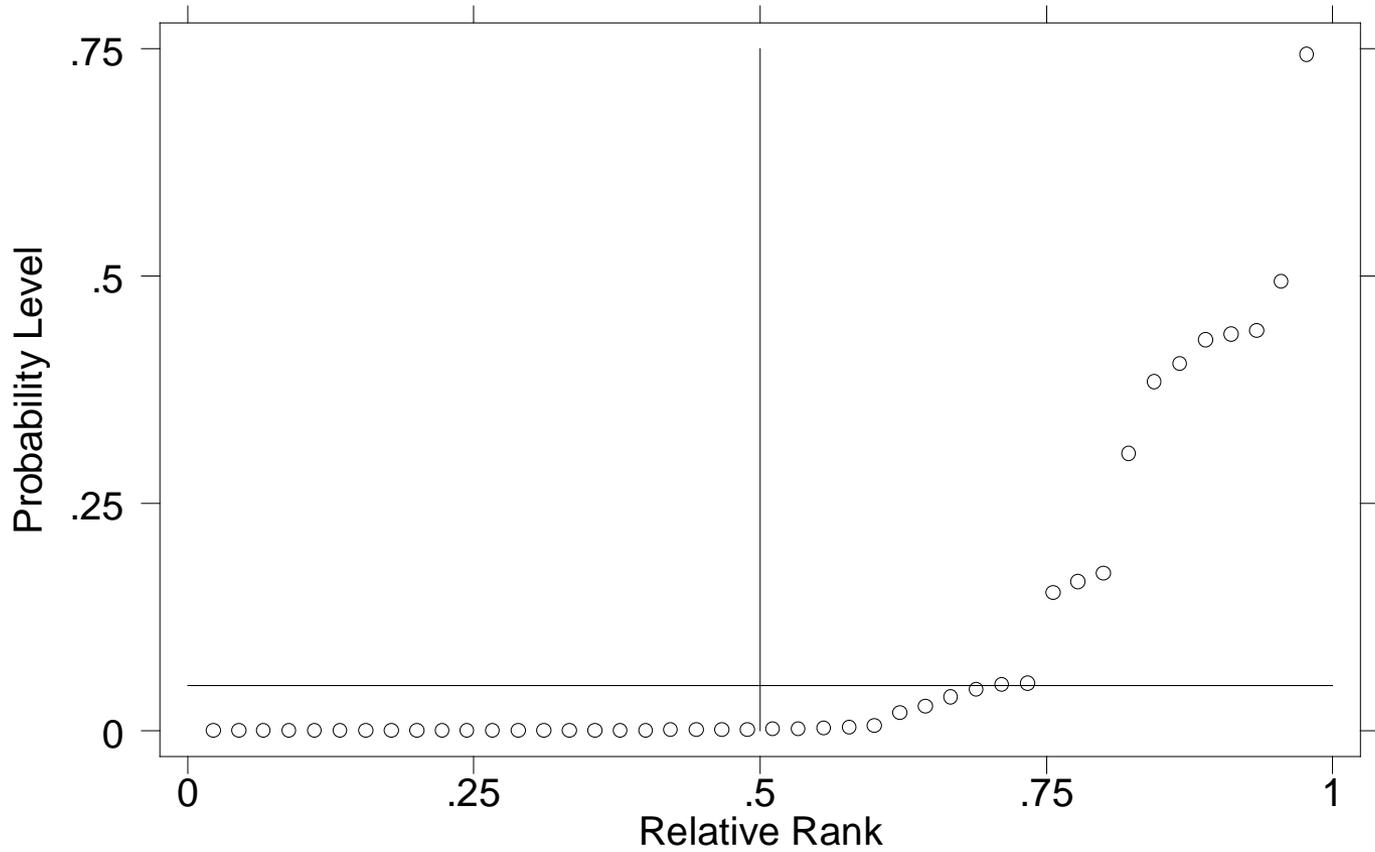
Figure 2. Distribution of Probability Levels in Impartiality Test

11. Actual and Just Mean and Inequality

- **Use decomposition of Justice Index to assess portion of injustice due to poverty and portion of injustice due to inequality**

- **Source: *ASR* 1999**

Justice Approach to Inequality Aversion -- I

- **Concept of just inequality**
- **Exact relations between inequality and justice – three proofs**
- **If sense of justice is operating and if income is regarded as a good, then as inequality becomes larger than just inequality, injustice increases**

Justice Approach to Inequality Aversion -- II

- **Exact relations between inequality and justice**
  - **JI1 and Atkinson-measure**
  - **JI1 and inequality parameter**
  - **JI1* and Theil's MLD**

Justice & Inequality

- **In any distribution, the justice index decreases as inequality increases, with inequality measured by Atkinson's measure.**

- **In any two-parameter mathematically-specified distribution, the justice index decreases as inequality increases, with inequality represented by the variate's general inequality parameter.**

- **The special justice index, in which justice is equality, is the negative of Theil's MLD**

Justice, Poverty, and Inequality

- **The justice index JI1 – the arithmetic mean of *J* – yields a decomposition of overall injustice into injustice due to poverty and injustice due to inequality.**

$$\ln\left[\frac{actual\ mean}{just\ mean}\right] - \ln\left[\frac{f(actual\ inequality)}{f(just\ inequality)}\right]$$

Justice Index JI1

$$E(J) = E\left[\ln\left(\frac{A}{C}\right)\right]$$

Justice Index JI1

$$E(J) = \ln\left(\frac{G(A)}{G(C)}\right)$$

Atkinson's Inequality

$$I(X) = 1 - \frac{G(X)}{E(X)}$$

Justice Index JI1

$$\ln\left[\frac{\left[E(A)\right]\left[1-I(A)\right]}{\left[E(C)\right]\left[1-I(C)\right]}\right]$$

Justice, Poverty, and Inequality

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Effect of Inequality on the Justice Index

$$\frac{\partial \text{JI1}}{\partial I(A)} = -\frac{1}{1 - I(A)}$$

Justice Index in 1991 in 13 Countries

- **East: Bulgaria, Czechoslovakia, Estonia, East Germany, Hungary, Poland, Russia, Slovenia**
- **West: West Germany, Great Britain, Japan, Netherlands, United States**
- **Greater injustice in the East than in the West**
- **Western countries similar, Eastern dissimilar**
- **inequality too high in Japan, Netherlands, Poland, Slovenia, U.S.**
- **mean too low in all countries**

Atkinson & MLD

$$= \ln\left(1 - I(X)\right)$$

$$= \text{-MLD}_X$$

Justice Index and Inequality in *A* and *C*

- **increases with inequality in C**
- **decreases with inequality in A**
- **increases with mean-component of JI1**
- **established with Theil and Atkinson measures**
- $\text{JI1} = \ln(\mu_A/\mu_C) - \ln[1\text{-}I(C)] + \ln[1\text{-}I(A)]$
- $\text{JI1} = \ln(\mu_A/\mu_C) + \text{MLD}_C - \text{MLD}_A$

Justice Index JI1*

$$E\left[\ln\left(\frac{A}{E(A)}\right)\right]$$

Justice Index JI1*

$$\ln\left(\frac{G(A)}{E(A)}\right)$$

Justice Index JI1*

$$= \ln\left(1 - I(A)\right)$$

$$= \text{-MLD}_A$$

Justice Approach to Inequality Aversion -- 3

- **Discrepancy between JI1 and JI1***

$$JI1 \begin{Bmatrix} < \\ = \\ > \end{Bmatrix} JI1^* \Leftrightarrow E(A) \begin{Bmatrix} < \\ = \\ > \end{Bmatrix} G(C)$$

Example. In U.S. in 1991, JI1 = -.221 and JI1* = -.352. In this case, taking into account individuals' ideas of justice reduces overall injustice.

Decompositions of the Justice Index JI1

- **Decomposition of overall injustice into component due to poverty and component due to inequality (ASR 1999)**

- **Decomposition of overall injustice into component due to reality and component due to ideology (ASR 1999)**

- **Decomposition of group overall injustice into subgroup-specific overall injustice (ST 2004)**

Justice and Two Types of Inequality

- **Given JI1 in each of two subgroups**

- **Given JI1's mean and inequality components in each subgroup**

- **Given actual and just subgroup inequality**

$$JI1_{Mean}^{L1} - JI1_{Mean}^{L2} = \ln\left(\frac{Actual\ Gap}{Just\ Gap}\right)$$

Thus, usual way of measuring subgroup inequality is completely inattentive to within-subgroup inequality.

12.Transforming ARD into JRD
Additive & Multiplicative Mechanisms

- **Multiplying every income by a positive constant preserves inequality**

- **Adding a positive constant reduces inequality**

- **Subtracting a positive constant increases inequality**

Ongoing Empirical Work Based on ISJP-1991/1996 Data

- **Each person provides own and just reward for self**

- **Within each country or country-sex group, regress just reward on actual reward**

- **Slope is multiplicative constant, intercept is additive constant**

Some Results for 1991

- **West Germany**
  - $C = 1.046A + 404.05, \ R^2 = .244$

- **East Germany**
  - $C = .938A + 988.17, \ R^2 = .291$

- **U.S.**
  - $C = .964A + 6696.86, \ R^2 = .880$

- **Great Britain**
  - $C = 1.239A + 457.86, \ R^2 = .193$

Foundation for Empirically Derived Just Linear Tax

- **Progressive**

- **Reduces inequality**

- **Based on people's ideas of fairness**

- **Source. In preparation with Bernd Wegener**

13. Assessing the Tail Behavior of Just Reward Distributions

- **Project with Chetan Dave**

- **In the spirit of Benhabib, Bisin, and Zhu (2011)**

- **Take respondent-specific just earnings distributions obtained via vignette methods**

- **Assess the tail behavior of each R's dist**

- **Link to respondent characteristics, including sociocultural context**

14. Assessing the Heritability of Attitudes to Immigration

- Using vignette procedures in Jasso (1988), obtain for each respondent a point system for the selection of migrants

- Assess respondent heterogeneity

- Obtain personal point systems for sets of grandparents and grandchildren

- Assess net effect of each grandparent on each grandchild

- Link grandparents' effects to their personal characteristics and the sociocultural context

15. Assessing the Heritability of the Sense of Fairness

- **Using standard vignette procedures, obtain for each respondent the just reward distribution for the same set of workers**

- **Assess respondent heterogeneity**

- **Obtain just reward distributions for sets of grandparents and grandchildren**

- **Assess net effect of each grandparent on each grandchild**

- **Link grandparents' effects to their personal characteristics and the sociocultural context**

Overview

- **Social Science Analysis**

- **Basic Building Blocks**

- **New Unified Theory**

- **New Explorations, Theoretical & Empirical**

EITM Lectures

Guillermina Jasso
New York University

University of Houston
Hobby Center for Public Policy
20 June 2012