A Tribute To Dan McFadden

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McFadden's work has spanned theory and data

- Simultaneously bringing micro-theory to data

- And data to micro-theory

Nobel Committee citation read:

"Showed how to statistically handle fundamental aspects of microdata, namely data on the most important decisions we make in life: the choice of education, occupation, place of residence, marital status, number of children, so called discrete choices."

But contributions were far broader, to theory, to econometrics, and to public policy and this talk highlights a few aspects of these contributions

I. Broader issue: inferences about truth

- Particularly relevant in this age of Trump

    - Not just alternative interpretations of facts

    - Alternative facts

- Destructive of the Enlightenment Project, the advances in science and technology which have been responsible for the enormous increase in our standards of living

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Historical living standards

Source: INET

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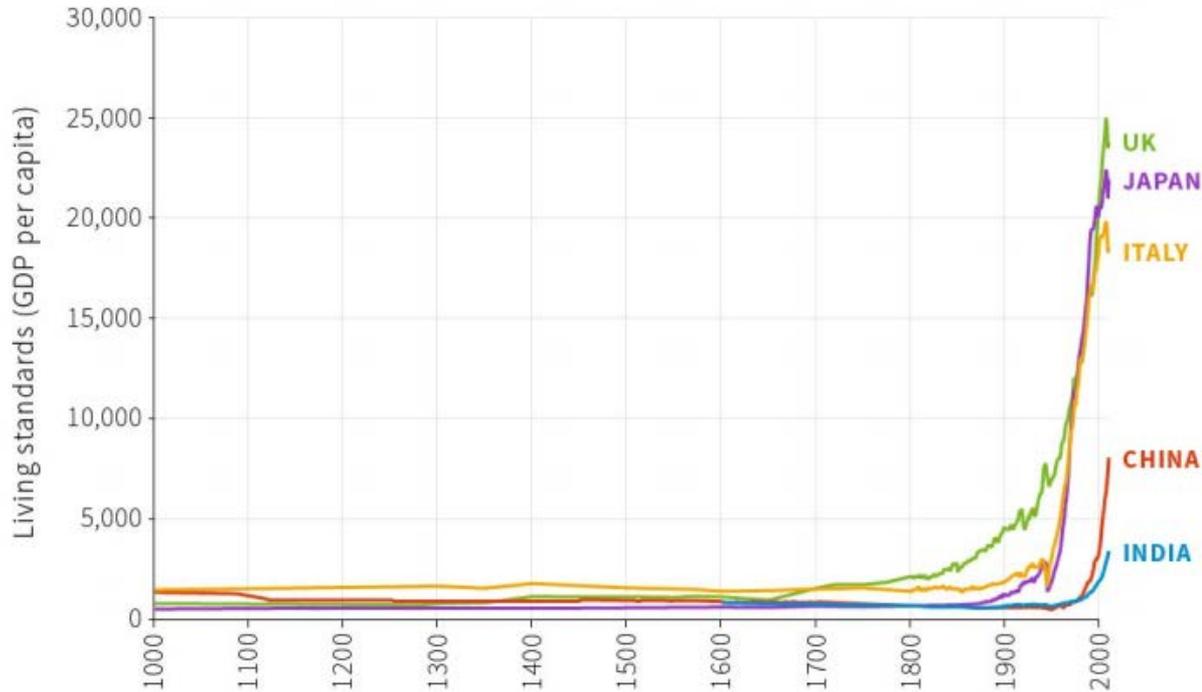
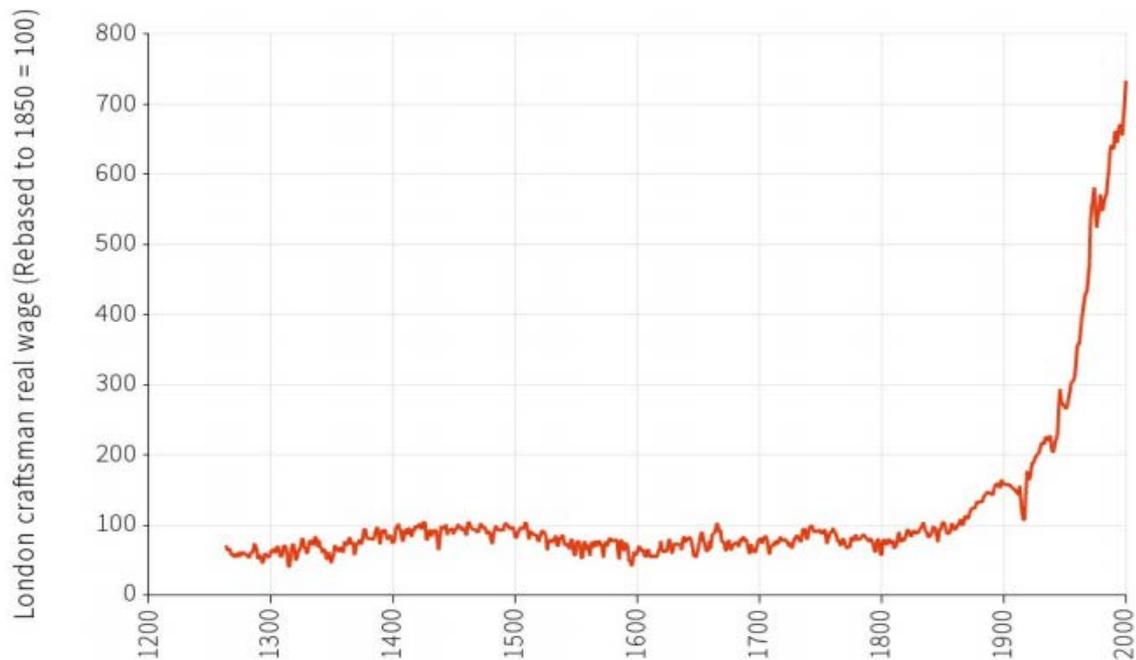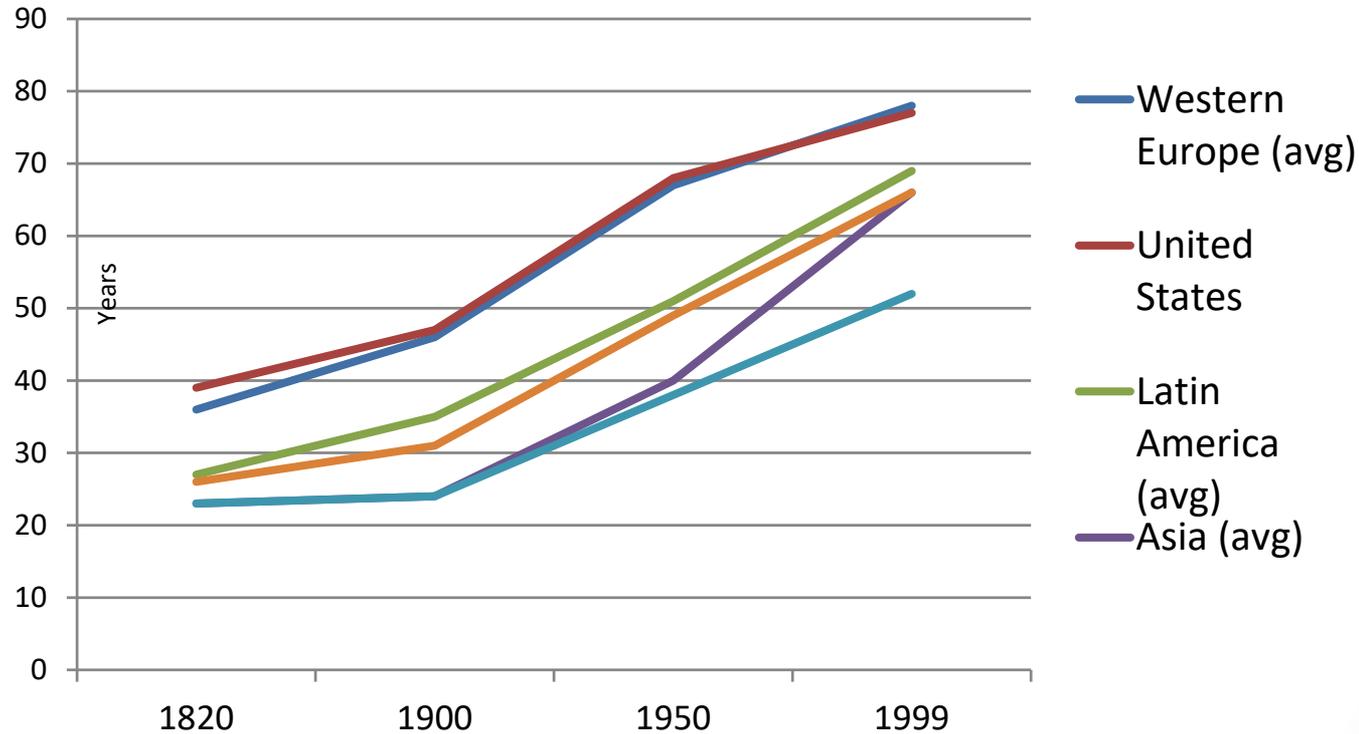# Real wages of London craftsmen, 1200-2000

Figure 3. *Real wages over seven centuries: craftsman (skilled worker) in London (1264-2001).*

Source: INET

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Improvements in life expectancy since 1820

Data are estimates from A. Maddison, 2001, "The World Economy: A Millennial Perspective," OECD.

Science is based on trust with verification, with recognition of uncertainty

- Analysis is made available for others to verify

- Institutional arrangements provide incentives for truth and verification

- All knowledge is tentative—when no evidence becomes available, previous hypotheses may be overturned

- We trust that others have done the testing and replication

- Our economy, society couldn't function without this trust

- There is now an assault on this institutional arrangement

  - If it were successful, it would have disastrous consequences

  - Those making the assault do not offer an alternative way of ascertaining truth

    - Worse: ask us to "trust" a serial liar

    - Society couldn't function on this basis

- Climate change is example

McFadden's approach is the anti-thesis

- Carefully formulated theoretical hypotheses

  - Enormous thought given to generality of each of the constituents

  - And to alternative formulations

- Using available data to test/estimate models

  - Lucky to arrive at a time when there was a plethora of new data and an enormous increase in computing capacity

  - Well articulated underlying statistical theory

  - Including a focus on making inferences when data is limited

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Limits to what we can know

- At the same time, McFadden's work has highlighted limitations of what we can know, and the confidence with which we should hold certain beliefs

- An important example are results on identification

- Early, and very disturbing result is the impossibility of identifying (without imposing arbitrary conditions) the elasticity of substitution and the factor bias of technological change

  - Important issue, since many results, e.g. in growth theory on the distribution of income, depend on the elasticity of substitution

  - And even existence of a long term steady growth path depends on the nature of the factor bias of technological change

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II. Use of expenditure functions

- McFadden was a pioneer in the use of duality in consumer and production theory

- This has proven to be a very powerful tool

  - Greenwald and Stiglitz (1986) used it to show the generic (constrained) inefficiency of the competitive market economy in the presence of asymmetric information or in the absence of a complete set of risk markets

  - Stiglitz (1969) used the indirect utility function to show that if individuals exhibit constant relative risk aversion at every set of relative prices (a usual assumption in macro-models), then preferences must be homothetic

# Using duality to assess effects of technological change

Consider recent worries about the effects of robotization

- Imagine a near workerless economy. Would standards of living collapse? Obviously not necessarily: utility possibility curve (dual to production function) has moved out, even if competitive equilibrium wage has decreased

- Redistribution (or change in intellectual property rights) would ensure that everyone could be made better off

- If redistribution (changes in intellectual property rights) are costly, so workers' couldn't be fully compensated, it implies that "new" utility possibilities schedule does not lie outside the other, taking into account costs of redistribution

  - Public policy may act to limit change

With redistribution, all groups could be made better off
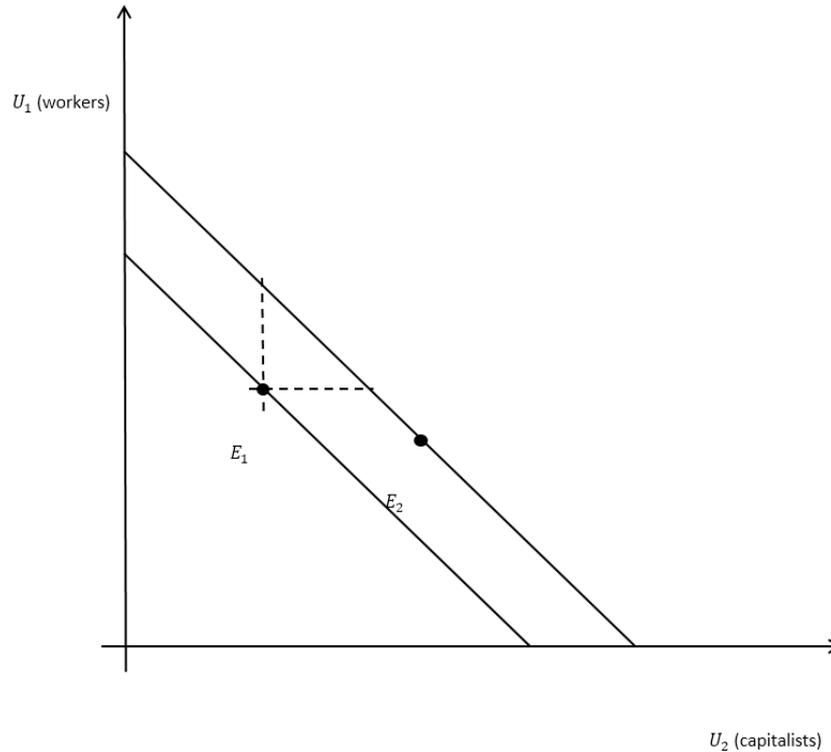
Technological advance not Pareto improvement
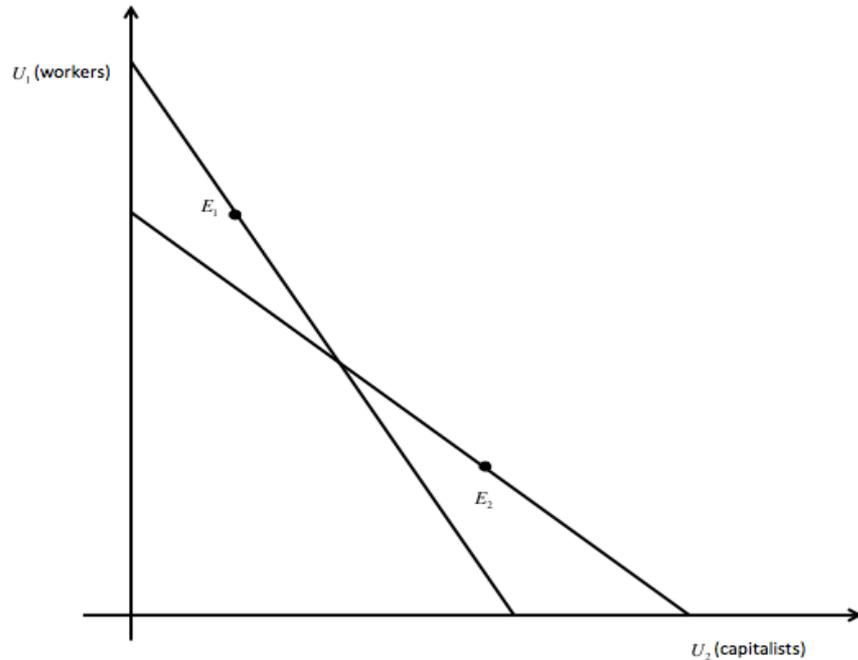
Critical question: public policy

- Are there public policies which would ensure that everyone would be better off?

- Political economy: will these policies emerge out of our political processes?

Similar analysis can be used to provide critique of Piketty's analysis of income distribution

- Alleges that interest rate has remained roughly the same, even as the capital/income ratio increased

- But technological change should have led to an increase in w at a fixed r

- Increase in capital/income ratio (capital labor ratio) should have led to a lower r and higher w at a fixed technology

- What is going on thus cannot be explained by standard model

  - Outside of competitive equilibrium model: monopoly rents

  - Outside of two-factor model: land and land rents

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III. Health insurance

Dan has used his creativity and technical tools to analyze some of the hardest problems, including the design of healthy exchanges for sick insurance

- Key public policy

- Uses key ideas from economics of information and theory of mechanism design

- Argues that "design and management of creditable coverage mandates are likely to be key determinants of the performance of the health insurance exchanges…"

- Failure to understand this lies at the root of the failures of attempts to devise an alternative to ACA

Recent advances in theory of insurance with adverse selection

- Have upturned earlier results of Akerlof and Rothschild-Stiglitz, especially the latter concerning (i) non-existence of an equilibrium pooling contract; and (ii) non-existence of equilibrium.

- Key difference with earlier literature: (a) information about insurance contracts purchased; and (b) endogeneity of information revelation

- Key results

- A) with endogeneity, neither the equilibrium proposed by Akerlof nor that of Rothschild-Stiglitz is an equilibrium

- B) there always exists an equilibrium, with a disclosed pooling contract (the most favored by the low risk individuals), and an undisclosed supplemental contract

- C) result holds for multiple groups (even a continuum)

(Stiglitz-Yun-Kosenko, 2017)

IV. Anti-trust: two sided markets

- Dan has been an active contributor to our understanding of some of the most important anti-trust cases of the day

- In many important recent anti-trust cases, two-sided markets have played an important role

  - Credit cards

  - Airline reservation

- Defendants have claimed that these are two sided markets

- In two sided markets, one side may be charged a higher price

  - To subsidize other side

  - Makes platform more beneficial for both: externalities

- In credit cards, used to justify high fees to merchants, used to finance subsidies to cardholders

- In airline reservation system, used to justify high charges to airlines, used to finance subsidies to travel agents.

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Key questions

- Were there any (significant) externalities?

  - With airline reservation, all airlines and all (major) travel agents are already on system

  - Similarly with Visa and MasterCard

- Even if there were externalities, can pricing patterns be explained by these externalities?

- Or alternatively: by market power

- AmEx and Sabre used market power to impose anti-competitive restrictions, when prohibited them effectively from imposing cost of transactions system on users

- Key distortion: competition among platforms

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Key distortion—with large distributive consequences

- Thus, users of high cost transaction system paid same price as a low cost transaction system: no incentive for efficiency in choice of transaction system, no incentive for innovation

- With restraints in place, could raise price on merchant, sharing some of proceeds with consumer, making consumer more likely to use credit card

- If everyone used credit card, and all of money redistributed, just inefficient system of moving money around: merchant paid 5% to credit card, charged 5% more to consumers, and consumers got 5% discount from credit card

Distortive Effects

- If there are any transactions costs or if credit card company keeps any money for itself, consumers are worse off

- If some consumers use cash, and there is no discrimination, price is same for cash and credit card users

  - Cash users subsidize credit card users

  - The higher the merchant fee the greater the transfer from cash to credit card users

  - Induces some to switch to credit card—even if it less desirable (without subsidy)

  - Usual test for anti-trust—is demand down—inverted: demand is up because market power has been used to help credit card consumers and monopolist at expense of cash consumer

- Thus, market power is used to distort competition among platforms (here cash and credit card)

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Network Effects as Barriers to Entry

- Old-school antitrust analyses focused on short-term price effects and long-term equilibria, which would not detect strategic behavior like tying that lower prices in the short-term, but stymies innovation and raises prices once competition is precluded

- Dan recognized that dynamic models were needed for antitrust damages, building on the Ericson Pakes framework for Markov-Perfect Equilibrium

  - These theories and models were applied to the Netscape / Microsoft browser wars to show how Microsoft's "bad acts" may have been decisive in Microsoft gaining market share and tipping the market

  - Network effects (interoperability externalities, momentum, etc.) can be substantial barriers to entry; incumbents have incentive and ability to maintain dominant market position (contrary to Schumpeter's hypothesis of a temporary monopoly)

- As in other areas in which Dan has worked, his work here has broad applications

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Indirect utility function can be used to show results

Focus on single group

Indirect utility $V(p, a, b)$

Where p = price of commodity, a charge for using network (credit card) imposed on individual, and b benefit of network

Simplify: $a + m + \pi = c$

Where m is the charge imposed on merchant, π the profit of the credit card company (per unit sold) and c is the transactions cost of platform.

Benefit $b = b (x_1, x_2)$

Level of participation by consumers and merchants, which in reduced form can be related to a.

- Assume product market is competitive so p = m + z,

where z is the (fixed, marginal) cost of production.

Assume for simplicity that π is fixed.

- Then $dV/dm = V_p - V_l + V_b \, db/dm$

From basic properties for indirect utility function (for this case) ,

$V_p = V_l$.

$db/dm < 0$. Credit card use don't care about how many others are using credit card. Only care about number of merchants accepting credit card. But key determinant of merchant's acceptance is price.

Hence, an increase in m leads to reduced acceptance, so $dV/dm < 0$.

Regardless of the consumer surplus enjoyed by the individual from the credit card, an increase in charges imposed on merchant in order to finance a rebate to consumers is welfare decreasing.

- Merchant acceptance is a function not of the number of people who hold a given card, but of the number of people who would not purchase if they did not accept. If, say, marginal AmEx card holder, when he has card, is indifferent to purchasing with card or with Visa, then there is no marginal benefit to merchant of an increase in acceptance. But there is a marginal benefit to consumers of having more merchants, so consumers should be charged fee to subsidize merchant participation.

McFadden's enormous contribution

- Has been to provide theorists and econometricians with the fundamental tools that they can use to examine a variety of problems.

- These tools help us make inferences about what the world looks like

- And the consequences of different policies

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