Equity in health (and health care): the Economist's perspective

Michel Grignon

' utline

- General framework: equity versus efficiency, equity as efficiency
- ormative theories of equity (Economic or not): the underlying social planner's utility function
- Measuring (in)equity:
  - (!) Gini as a social planner
  - (") Equity of what: contri#ution, access, or health$
  - (%) &onvenient estimator, convenient software

General framework

- Economists follow le(icographic preferences when evaluating distri#utions:
  -) *distri#ution+ is a *who gets what and in which quantity+
  - !st determine all efficient distri#utions (ma(imi,e sum of utilities), "nd pick the most equita#le among those efficient distri#utions-
  - 'ne consequence is: do not waste resources (that have societal utility) in order to make the distri#utions of outputs more fair-

E(ample !: pills for pain relief

- .wo individuals, /0 pills availa#le
-) and 1 similar in all respects e(cept meta#olism:
  -) needs % pills to gain ! hour of pain relief, 1 needs only !
- Efficient distri#ution ma(imi,es pain relief in society:
  - Give 1 "/ hours ("/ pills), leaves 0 hours ("/ pills) to)
  - 2s it equita#le$
- 3ow much should we waste to #e equita#le$
  - /3 4 /0, or %5 pills for) and !" for 1 (#oth get !" hours)
- 6et us vote: who prefers efficiency, who stands for equity$

E(ample ": pills, pain relief, and cigarettes

- .wo individuals, /0 pills availa#le
-) and 1 similar in all respects e(cept that) smokes and 1 does not-)s a result:
  -) needs % pills to gain ! hour of pain relief, 1 needs only !
- Efficient distri#ution ma(imi,es pain relief in society:
  - 7hat is it$ 2s it equita#le$ 3ow much should we waste to #e equita#le$
  - 6et us vote: who prefers efficiency, who stands for equity$

Efficiency vs Equity

- 7hat makes a difference in our votes in these " distri#utions is the role of decision versus situation (or rationality versus cosmic catastrophe)
- 8ames 9uesen#erry: *economics is all a#out how people make choices: sociology is all a#out how they don't have any choices to make-+ (! ;5<, p- "%%)
- &hoice = Efficiency !st: o choice = Equity !st
- (>*ree to choose* vs >*ree to lose*)

"Henceforth, we steal from the rich and provide incentives to help the poor steal for themselves."

Equity as Efficiency

- 3ealth and health care are not standard goods
- &osmic catastrophe more likely, rational choice less relevant
- Equity can trump efficiency
  - Equity is ' . altruism (preference for redistri#ution, glow effect)
  - &ulyer (! ;0<): *.he whole point of making a ?udgement a#out ?ustice is so to frame it that it is (and can #e seen to #e) a ?udgement made independently of the interests of the individual making it+
- Equity is allocating scarce resources in order to ma(imi,e an o#?ective function that reflects principles

ormative theories of equity: the social planner's utility function

.wo individuals (or two groups)

' ne scarce resource to distri#ute: resource is in finite quantity

@roduction possi#ility frontier: technical constraints on the distri#ution (how much of the resource to take away from 1 to increase)'s allocation #y one unit$ @revious case: ! to %)

Aocial planner's utility function (or Aocial 7elfare >unction): given #y a contour or isoButility locus-)ll distri#utions yielding the same level of utility for society

Aocial planner strictly reflects society's utility- Aociety does not care who is who: interpersonal preferences #ased on principles-

ormative theories of equity: the social planner's utility function (%)

E(treme conve(ity 4 egalitarianism,) and 1 must receive the same F in order to ma(imi,e the social planner's utility- Equal weight : equality of health- 9ifferent weights: equality of opportunity (disadvantaged individuals are compensated G e-g- More educated individuals receive less care than low educated ones for illnesses that depend on lifestyle choices, such as lung cancer

ormative theories of equity: the social planner’s utility function (/)

@rocessB#ased approaches to equity

!) &onstraining the possi#ility space: process rather than outcomes theories of equity

E(ample (graph): utilitarianism with unequal weights and constraints on minimal decent level of health for #oth

1inding: optimum is not where preference line is tangent to @@>

ormative theories of equity: the social planner’s utility function (H)

@rocessB#ased approaches to equity (")
") &onstraining the @@> (lower level): among all feasi#le distri#utions only those that satisfy a given constraint such as equal rights (li#ertarianism), equal access (Mooney, 6e Grand), noBenvy (Iarian), or participatory democracy (3a#ermas) G

.hese theories are usually utilitarian (#eyond the restriction on the @@>)-

&onclusion ormative theories

- 9ifferent conceptions of what ought to #e deemed equita#le
- Each conception can #e linked to a specific social welfare function
- 7hen measuring inequity: important to know the underlying social welfare function-

Gini as a social planner

- Juantitative measures of inequity #ased on concentration indices
- &oncentration: what proportion of the resource (good health, health care use) is in the hand of the @K who rank lowest on the classification varia#le
- E(ample !:
  - resource 4 classification varia#le (Gini inde()- .ypically, concentration of income: what proportion of total income in the hand of the !<K, "<K, %<K etc- poorest$
  - 2f answer is !K, %K, LK, distri#ution of income is concentrated among the rich

7 hy concentration inde($

Atandard inequality measures are statistical (range, relative mean deviation, variance, coefficient of variation, Atdev of log), informational (.heil), or e(plicitely welfareB #ased ()tkinson: quantity of income needed to reach same level of welfare if equal distri#ution)-

- 3owever, &oncentration only one that involves the rank
-)llows adaptation to #iBdimensional measures

7 here does it land us$

&orrado Gini G !00/B!;5H-

9emographer and statistician, author of the *Acientific 1asis of >acism+, !;"L

MBrelated concentration of N

2ncomeBrelated concentration of health or health care utili,ation:

7hat proportion of total illBhealth (e-g- dummy varia#le indicating #eing in poor health) falls on the @K poorest$

Fanking individuals according to varia#le M (here, income, from poorest to richest) and calculate the share of the total varia#le N (here, illBhealth in society) that *#elongs+ to each proportion of lowest ranks of M

7hy does it matter$

Because Gini is one of those measures that cannot provide a total ranking of distributions – contrary to an Atkinson « equivalent income » measure, Gini fails when Lorenz curves intersect

A = 1 – el/mu, el such that U(el)mu = SW(distribution)

But it is the only bi-dimensional (because ranking plays a role)

.he underlying social welfare

- Gini 2nde(4 twice the area #etween diagonal and green dashed curve
- 'r, ! G "P)rea1
- 9iscrete distri#ution G individuals ranked #y h (! for poorest, n for richest): 6oren , is defined as

$$L\left(\frac{h}{n}\right) = \frac{\sum_{i=1}^{h} x_h}{n\mu}$$

- .he area 1 is therefore:

$$\sum_{h=1}^{n-1}\frac{1}{2}\left(L(h)+L(h+1)\right)\left(\frac{h+1}{n}-\frac{h}{n}\right)=\frac{1}{2n^2\mu}\sum_{h=1}^{n-1}\left(\sum_{i=1}^{h+1}x_i+\sum_{i=1}^{h}x_i\right)$$

$$=\frac{1}{2n^2\mu}\sum_{h=1}^{n-1}2\sum_{i=1}^{h}x_i+x_{h+1}=\frac{1}{2n^2\mu}\left(\sum_{h=1}^{n-1}2(n-h)x_h+\sum_{h=1}^{n}x_h-x_1\right)$$

Aince "(nBh) 4 < for h4n and with the convention that (! 4 < this can #e rewritten as:

$$G=1-2B=\frac{\sum_{h=1}^{n}nx_h-\sum_{h=1}^{n}\left(2(n-h)+1\right)x_h}{n^2\mu}=\frac{\sum_{h=1}^{n}(2h-n-1)x_h}{n^2\mu}$$

- FeBranking in descending order (richest #ecomes !st): k 4 nO!Bh, or h 4nO!Bk and "hBnB! #ecomes "nO"B"kBnB! 4 nB("kB!) and the Gini can #e reBwritten as:

$$G = \frac{\sum_{k=1}^{n}(n-(2k-1))x_k}{n^2\mu} = 1 - \frac{\sum_{k=1}^{n}(2k-1)x_k}{n^2\mu}$$

.he underlying social welfare

- 1asic assumption: society cares for efficiency and equity in a complementary way: for a distri#ution h (h!,h",----,hn) in a pop'n with n mem#ers:
  - >(h) 4 μ(h)(!B2(h)) (if 2 4 <, perfect equality, welfare is the mean: if 2 4 !, perfect inequality, society is unhappy no matter how high the mean is)
  - Gini is one specific inde(for 2 (with k descending rank):

$$G = 1 - \frac{\sum_{k=1}^{n}(2k-1)x_k}{n^2\mu} = 1 - \frac{F(h)}{\mu(h)}$$

Dnderlying social welfare (")

- Gini inde(is a measure of relative rather than a#solute inequality
- Atarting from situation where ;<K worseBoff have < and !<K #etterBoff have ! we move to a situation where 0<K worseBoff have < and "<K #etterBoff have now !
- 2f you #elieve inequality has increased (more rich get !) G a#solute inequality is your concern
- 2f you #elieve inequality has decreased, relative inequality is your concern-

Dnderlying social welfare (%)

- Given that n" 4 Σ("iB!), the underlying >(h) is the sum of values of the concentration varia#le (h that #elongs to each individual i) weighted #y ("iB!), i the descending rank according to the classification varia#le
- .olerance for inequality (as a matter of societal principles, not individual preferences):

Dnderlying social welfare (/)

-)ny concentration inde(is #ased on two assumptions regarding the A7>

  (#eside > 4 μ(!B2))
-)ssumption Q! 4 additivity: if h Rp-tS h' then (hOh+) Rp-tS (h'Oh+)
-)ssumption Q" 4 @rinciple of health transfer: a transfer of health from #etter off to worse off (in health) does not reduce > provided ranks are not affected

Dnderlying social welfare (H)

-)dditivity might #e violated in real life situations: in a poor country, planner might prefer (<-H:<-!) to (<-%:<-%) since at least <-H is in decent health- 1ut (<-0:<-0) will #e preferred to (!-<:<-5)-
- 3ealth transfer raises an issue of multiB dimension assessment of fairness (if healthiest is poor, is it still ' kay$)

Measuring (in)equity in health

-)ssume we agree to use concentrationBtype methods for outcomeBoriented measures of inequity
-)ssume further that we want to measure incomeBrelated inequity in health
- Femaining question is: 2nequity of what$
  - >inancing (contri#ution)
  -)ccess
  - Dtili,ation of health care services
  - 3ealth (outcomes)

2nequity of what$

- >inancing G no one should ?eopardi,e consumption #ecause of health care spending
  - &oncept of catastrophic spending
  - 9ifferent from contri#ution according to a#ility to pay (redistri#utive o#?ective)
- 2ssues are:
  - what proportion of income spent on health is *catastrophic+$ (1undorf and @auly)
  - 7hat if individuals cut on health care$

2nequity of what$ (")

- 2nequity of)ccess: preferred option for economists (feasi#le set, not choices or #ehaviours)
- 9efinitions:
  - 9ef! (Mooney, !;0%): Aame (money and time) price
    - .his is a supply side definition- 2ssue: does not guarantee equal access across income levels
  -

2nequity of access (")

9ef" (' lsen and Fodgers, ! ; ; !):

.he ma(imum attaina#le level of care (given price and income) should #e the same for all

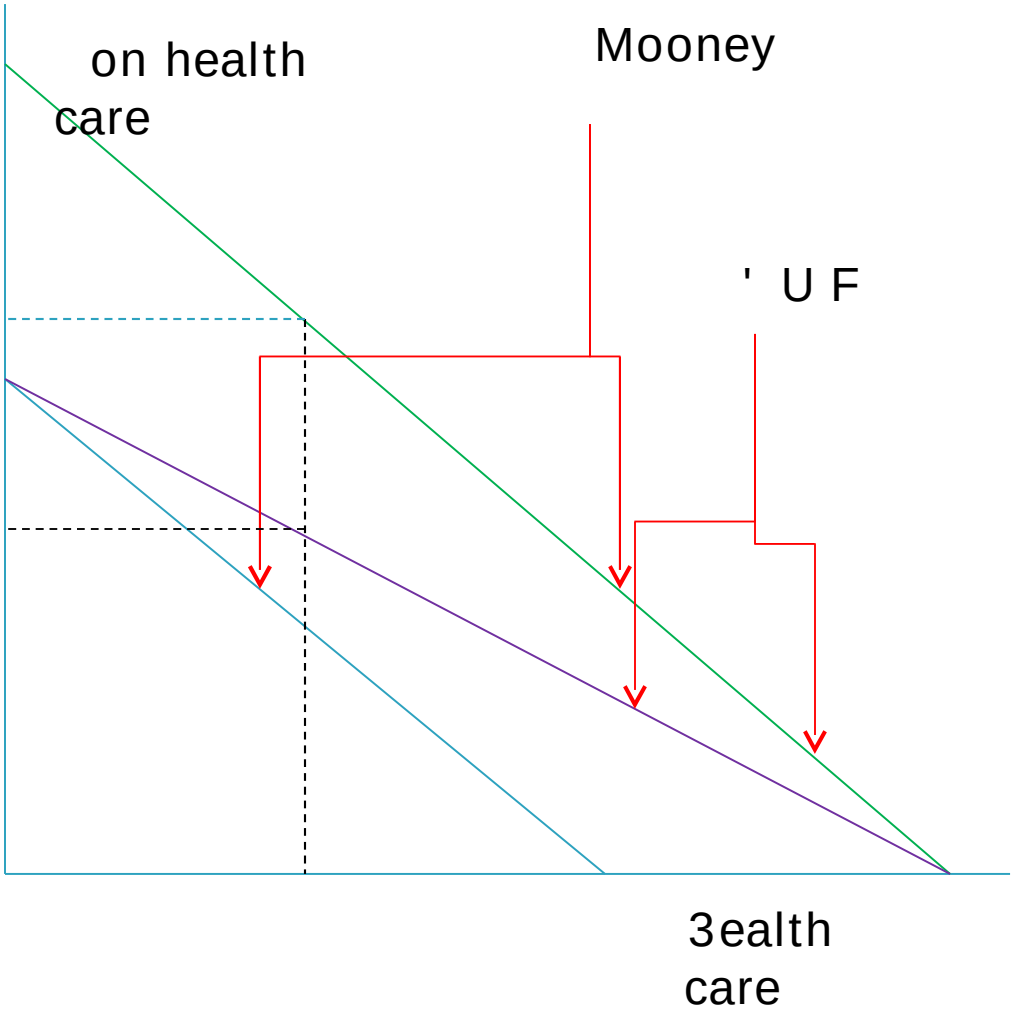
2f rich individuals (income 4 !<<) pay full cost of health care and price is !< (ma(they can #uy is therefore !<), those making H< should pay TH only per unit of health care- 2ssue: does not guarantee equal treatment (poor still have to forgo more non health care consumption to reach the same level of health care as the rich)

)ccess cont'd

'UF: price of health care is decreased to raise ma(imum amount feasi#le to same level as of rich

ew #udget constraint of the poor 4 purple line

@oor has to forgo more of other goods than the rich to reach that same amount of health care (more effort)



Empirical studies

-)s a result, we use utili,ation as a pro(y for access (outcome rather than processBoriented)-
- .rue rationale is: equal access should translate into equal use
- 2mplication is: any #ehavioural difference (if systematically related to income) is attri#uted to the health care system
- 2llustrations 4 the poor tend to smoke more G immigrants tend to visit physicians less-

Empirical studies (")

- >ocus on two main measures:
- 2nequity of health care use, inequity of health
- 2n #oth cases, incomeBrelated &2 of standardi,ed varia#le (use or health)
- Atandardi,ation for health: age and gender (in case these correlate with income)
- Atandardi,ation for use: need

eedBstandardi,ation

- 9efinition(s) of need: concept and practical options
  - 2ll health
  - &apacity to #enefit (need is partially a supplyBside concept, as is access): 2 can #e healthy and need care (prevention), or sick #ut not need care (no effective treatment of palliative care availa#le)
  - 6evel of e(penditure necessary to e(haust capacity to #enefit
- 9efinitions clash if used in vertical equity

eedBstandardi,ation

- Empirical studies 4 hori,ontal equity-Atandardi,ation #y health status (two individuals same place same time same health will face same capacity to #enefit and same ma(e(penditure to e(haust capacity to #enefit)-

3ori,ontal inequity inde(

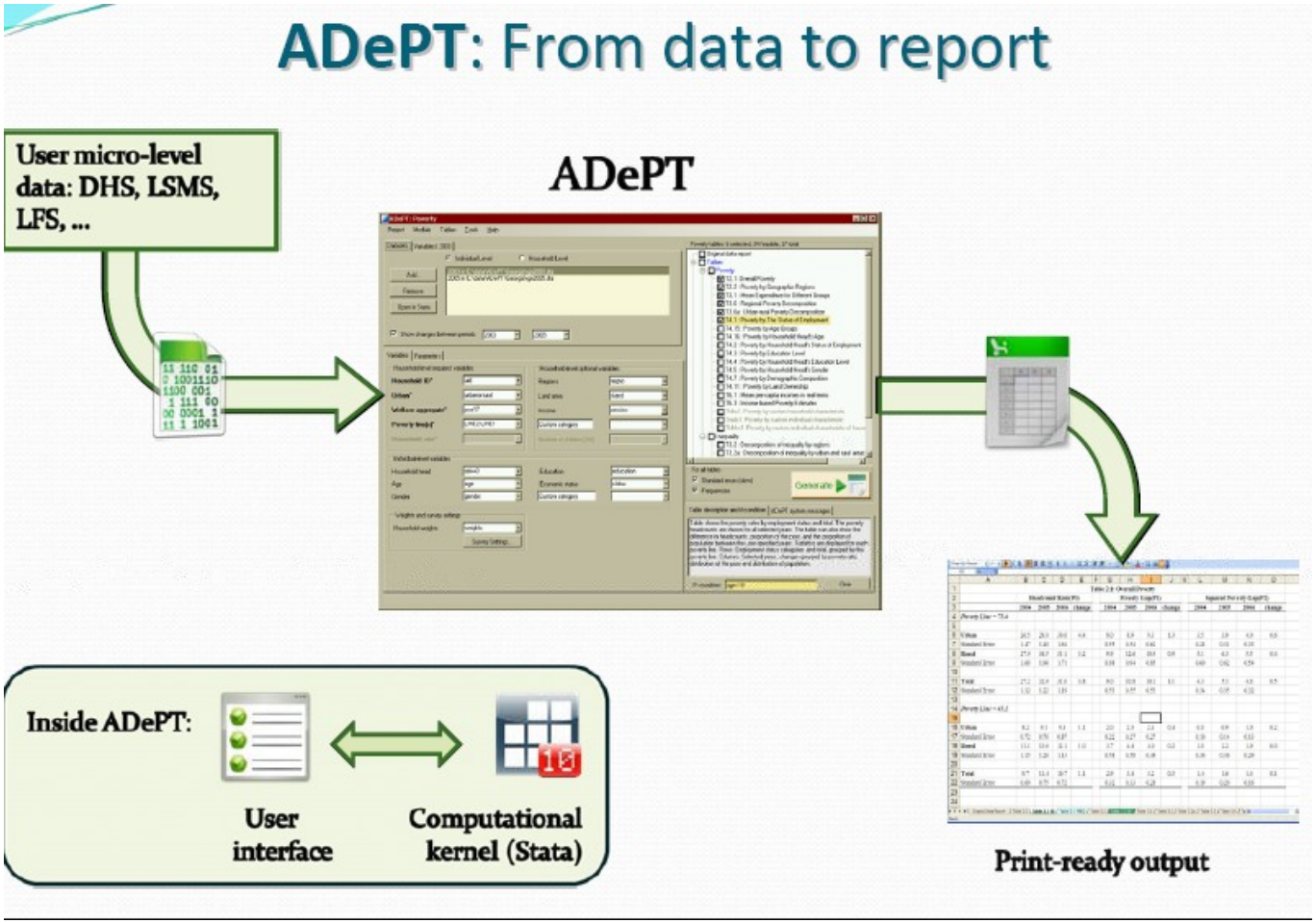
- 3ow it works

  - Analogous to (indirect) demographic standardization
  - Let medical care use (y_i) be explained linearly by

$$y_i = \alpha + \beta \ln inc_i + \sum_j \beta_j x_{ji} + \sum_k \gamma_k z_{ki} + \varepsilon_i$$

    - where *ln inc* is log income, x_j are the need-proxies and z_k are the non-need control variables (other than income)
  - Need-expected utilization: $\hat{y}_i^X = \hat{\alpha} + \hat{\beta} \overline{\ln inc}_i + \sum_j \hat{\beta}_j x_{ji} + \sum_k \hat{\gamma}_k \bar{z}_p$
    - where overscore indicates mean values and ^ indicates OLS coefficients
  - (Indirectly) need-standardized utilization is: $y_i^{IS} = y_i - \hat{y}_i^X + \bar{y}$
  - Horizontal inequity = CI for need-standardized utilization

) 9e@.: a short introduction



Main findings for &anada

- Aurvey data (selfBreports) G @3A and &&3A
  - Atrong proBpoor #ias in inpatient utili,ation (one of the strongest among 'E&9 countries)
  - @roBrich inequity in pro#a#ility to visit a doctor (G@ or specialist)
  - @roBpoor inequity in conditional num#er of visits to G@
  - Amall proBrich inequity in conditional num#er of visits to specialist
  - Atrong proBrich inequity in dental care (mostly preventive care): O<-!"

Main findings for ' ntario

- Aurvey data linked to administrative data (' 32@)
  - 2ncidence inpatient: more proBpoor
  - &onditional inpatient: less proBpoor
  - 2ncidence G@ visit: less proBrich
  - &onditional G@ visit: less proBpoor
  - 2ncidence Apecialist visit: less proBrich
  - &onditional Apecialist visit: from proBrich to neutral
- *' verall: confirms selfBreport, #ut toward <*
  - 9ayBprocedures: strongly proBrich

T value of health care services used

- ' ntario G linked data
  - .otal T: <-<<<!V @erfect neutrality
  - 1ut: O<-<<0 for incidence and B<-<<5 for conditional e(penditure
  - 9ay @rocedure: incidence 4 O<-<%/ 44 offsets inpatient proBpoor (overall hospital T is B-<"<", ns)
  - G@: proBpoor spending (B<-<"</, p4!K, due to conditional)
  - Apecialist: proBrich spending (O<-<%/, p4!K, due to incidence)

Ao what$ 3ow to interpret a &2E32$

.echnical (al#eit important) point: for a #inary (#ounded) varia#le of mean p, &2 values are in WpB!:!BpX

3ospital use: p40K BB &2 in WB-;":O-;"X)

G@ use: p 4 ;<K BB &2 in WB-!<:O-!<X

Aolution (7agstaff "<<H): &2E(!Bp)

Generali,ation for aYMY# with mean m:

&2g 4 Wm(#Ba)E(#Bm)(mBa)X&2

Ao what$ (")

General interpretation of a &2E32: equivalent level of equal health or health care use for all (>(h) 4 e)

) mount to redistri#ute so that 2(h) 4 <

Ao what (%): decomposition

- &2 (or 32) can #e decomposed as follows:
  - >or each varia#le (need or nonBneed) in the model (see slide %!) its contri#ution to overall inequity is the product of its own (incomeBrelated) &2 and the elasticity of 3ealth (3ealth &are) relative to that varia#le
  - 2f education is strongly correlated to income and health strongly correlates to education, one should e(pect strong proBrich contri#ution of education (same for private insurance and use)
  - Fegion correlates with health and use, #ut not so much with income G weak contri#ution

>urther readings

7agstaff,)dam and Eddy van 9oorslaer ("<<<) +Equity in health care finance and delivery+ in *3and#ook of 3ealth Economics*, ed-) 8- &ulyer and 8-@- ewhouse, !0</B!05"

7illiams,)lan and Fichard &ookson ("<<<) *Equity in health+ in *3and#ook of 3ealth Economics*, ed-) 8- &ulyer and 8-@- ewhouse, !05%B!;!<

&ulyer,)nthony 8- and)- 7agstaff (!;;%) *Equity and Equality in 3ealth and 3ealth &are+ *8ournal of 3ealth Economics*, !"(/): /%!B/HL

- 1leichrodt, 3a[illegible] and Eddy Lan 9oorslaer

3ooked$

.he full opus

- 'wen ''9onnell, Eddy van 9oorslaer,)dam 7agstaff, and Magnus 6indelow ("<<L) *)naly,ing 3ealth Equity Dsing 3ousehold Aurvey 9ata G) Guide to .echniques and .heir 2mplementation*, 7orld 1ank 2nstitute G 6earning Fesources Aeries
- 9ownloada#le free of charge at www-world#ank-org
-