A new look at poverty: Defining joint income & time poverty with respect to well-being

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Poverty, well-being, time, and income

1. Motivation and interests
2. Why have well-being data not been used to estimate poverty?
3. What are the limitations of income poverty?
4. Poverty considering time and income
5. Empirical strategy and data
6. Results
7. Summary and discussion

Human need is a continuing fact, which each age discovers, or thinks it discovers afresh.

Robert H. Bremner (1992), *The Discovery of Poverty in the United States*

- “Poverty” = low well-being
  - At risk of insecurity, poor health, and inadequate living conditions
  - Unable to maintain “a minimally decent life” (Blank 2008, p. 234)
  - Over time, simplified to “command over resources, typically annual income” (Haveman 2009, p. 388)

- “Poverty” → low well-being
  - Poverty as metric for targeting and evaluating policies
  - “Improving the well-being of deprived people is a nearly universal goal among policymakers in all nations” (Haveman, 2009, p. 388)

- “Poverty” focuses solely on income
  1. Narrow focus on a single resource
  2. Disconnect from well-being

- Include another resource we argue is on par with income
- Explicitly connect poverty to well-being
- Use novel approach to data exploration (in 3-D!)
- Present findings where poverty, defined as (conditional) well-being, is explored as a function of both time and income

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- Worked out how to measure income and income poverty long ago
- Data limitations mean research using well-being data still in its nascence (Allin 2014)

Income versus well-being

Measurement and research

- Most of the research using well-being data investigates the determinants of well-being (e.g., Meier and Stutzer 2008; Stutzer and Frey 2008)
- Some recognition that incorporating well-being data into poverty estimates can provide new insights (Frey and Stutzer 2002)
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Limitations of income poverty

- Money can't buy everything
- Physical access, market access, discrimination, and other barriers
- Easterlin Paradox: Above a relatively modest plateau, increases in real income do not result in significant changes in well-being
- Control over resources clearly important for well-being, but what resource(s)?

Poverty, well-being, time, and income

- To create well-being, need:
  - Income to purchase and consume goods
  - Time to purchase and consume goods, produce at home, rest and recover, etc.
- Strong theoretical foundation
  - In economics, considerations of time in production of utility go back (at least) to Becker (1965)
  - Time is the “currency of life” (Krueger, Kahneman, et al. 2009)

- Time is a unique resource
  - All people have the same fixed time endowment, which we must allocate among certain activities
  - How we allocate our time directly influences individual and household well-being
  - Some activities can be done by hired labor = can buy free or leisure time
  - More free/leisure time is not always better
- Time is intuitive

npr

How Scarcity Trap Affects Our Thinking, Behavior

(iStock)

The Washington Post

Clock management and parenthood: Finding the time to shower, and to think

Americans Won't Relax, Even Late at Night or on the Weekend

On a typical weeknight, a quarter of U.S. employees did some kind of work between 10 at night and six in the morning.

Work-Life Balance Poses Challenges Regardless of Wealth

The Atlantic

BUSINESS

The Neverending Workday

A pervasive cultural norm of work devotion leaves many employees with little time for family, friends, or sleep.

No Money, No Time

By MARIA KONNIKOVA JUNE 13, 2014 7:19 PM

The Atlantic

BUSINESS

Long Commutes Are Awful, Especially for the Poor

Gillian B. White | June 10, 2015, 12:37 PM ET

- Time is a measurable resource, like income
- Like income, therefore, we can speak of a critically low level of time
  - "Time poverty" first defined by Vickery (1977) but little work until past decade
  - Disparate literature and no unifying framework
    - Different definitions of basket of time of interest
    - Income poverty adjusted for time: Vickery
    - Time as independent dimension: Kalenkoski and Hamrick (USDA)
  - Williams et al. (2015) synthesize time poverty literature and propose framework
    - Williams, J.R., Masuda, Y.J., & Tallis, H. 2015. A measure whose time has come: Formalizing time poverty. *Social Indicators Research*.

- Time is a measurable resource, like income
- Like income, therefore, we can speak of a critically low level of time
  - Scholars focus on how time poverty prevents an individual from engaging in leisure
  - Basic idea: there is some minimum level of leisure time for well-being
  - Free time to pursue *unnecessary* activities
  - Others focus on a broader basket of free time that might be allocated to voting, activism, volunteering, helping neighbors, etc.

- A primary challenge has been categorizing what is *necessary* and what is *discretionary* time
- Empirical literature has taken extremely different approaches
  - Williams et al. (2015) outline general guidance on how to do this across contexts so future studies can use the same process/criteria

Necessary activity time "Time an individual spends on activities required to meet the basic necessities of life in a given society. . . . Activities meeting this definition are included whether they are done by that individual or by paid labor."

Discretionary activity time "Time spent on activities that people by and large choose to do. It implies that there is a level of freedom of choice that is not associated with necessary time."

Activities not deemed necessary for basic health, income, and household production, which entail more discretion as far as choosing if and how much time to allocate:

1. Caring for non-household members
2. Eating and drinking
3. Socializing, relaxing, and leisure
4. Sports, exercise, and recreation
5. Religious and spiritual activities
6. Volunteer activities
7. Personal/social communication (phone, email)
8. Travel related to the above activities

Considering time and income jointly

Tying it together

- Both necessary to create well-being
- Basic and measurable resources to create downstream outcomes
- Trade-offs between time and income
  - Purchase time-saving technology
  - Do it yourself or purchase services?
  - Preferences for free time (less labor) versus material goods (more labor)
- More of both $\rightarrow$ higher well-being (or utility)

Linking time, income, and well-being

Data

- American Time Use Survey (ATUS) 2012 and 2013, linked to corresponding March CPS supplement (ASEC)
  - ATUS involves CPS households 2-5 months after final CPS interview
  - One person per household
  - $N = 5417$ adults with requisite data
- For today's exploration, we also bring in correlates from
  - Other ATUS and CPS Supplements items
  - County-level air pollution (EPA)
  - County-level violent crime (UCR)
  - County average public school spending (US Census)
  - County voter turnout (US Election Assistance Commission)

- Cantril ladder scale
- “Please imagine a ladder with steps numbered from 0 at the bottom to 10 at the top. The top of the ladder represents the best possible life for you and the bottom of the ladder represents the worst possible life for you. If the top step is 10 and the bottom step is 0, on which step of the ladder do you feel you personally stand at the present time?”
- Outcome: Well-being, on 11-point scale ranging from 0 (“Worst possible life”) to 10 (“Best possible life”)

Linking time, income, and well-being

Methodology and modeling

- Identify the effect of income + time on outcome
- $WB_i = \beta_0 + \beta_1 Y_i + \beta_2 T_i + \beta_3 P_i + \varepsilon_i$
  - WB: well-being score
  - Y: Income, as poverty-income ratio (PIR)
  - T: Discretionary time, as percentage of median discretionary time
  - P: personal covariates (age, gender, number of kids and number of adults in household, employment status, general disability status, whether the family owns a business or their home)
- Want to explore β_1 and β_2 together, throughout joint range of income + time
- Does effect of income + time depend on where you are in income + time distribution?
- Does effect of time depend on income?
- Does time matter?

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As income + time move, correlations between income + time and covariates change, introducing noise into the effect of income + time

Solution:

Purge well-being of effect of covariates and analyze residual well-being

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- Residual well-being = f(time, income)
  - A (smoothed) surface of local average residual well-being in a given range of time and income
  - If time is not important → will not vary with time
  - If time is important → frontier will be curved to reflect trade-offs

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  - Splines smooth data based upon a set of anchor points and the flexibility of the curve or surface. The anchor points define basis functions which are combined to form the surface.
  - We use tensor plate (scale invariant) splines with cubic regression basis functions
  - R package `mgcv` ("Mixed Generalized Additive Model Computation Vehicle")
  - Optimizes smooths via cross-validation, penalty for wiggliness

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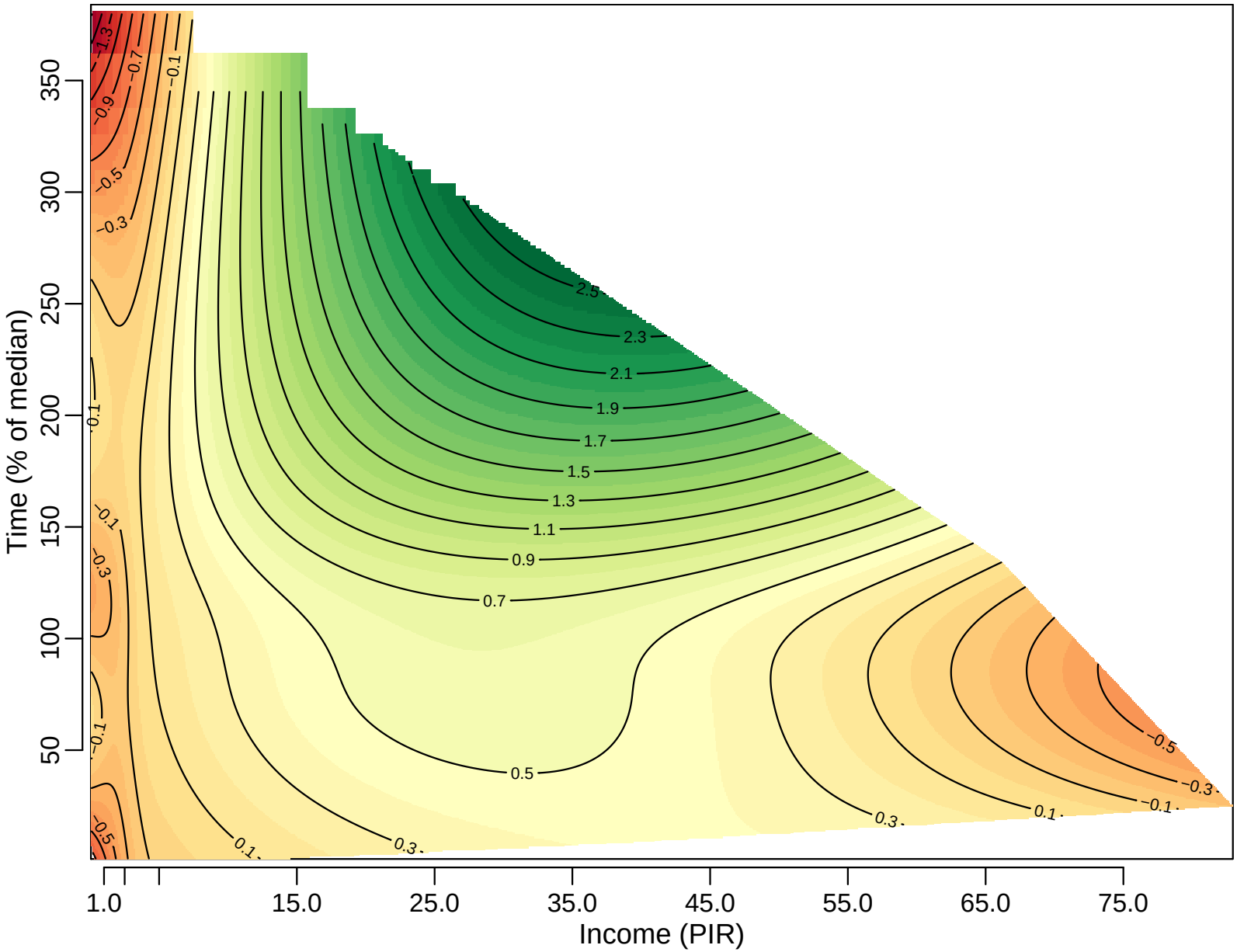
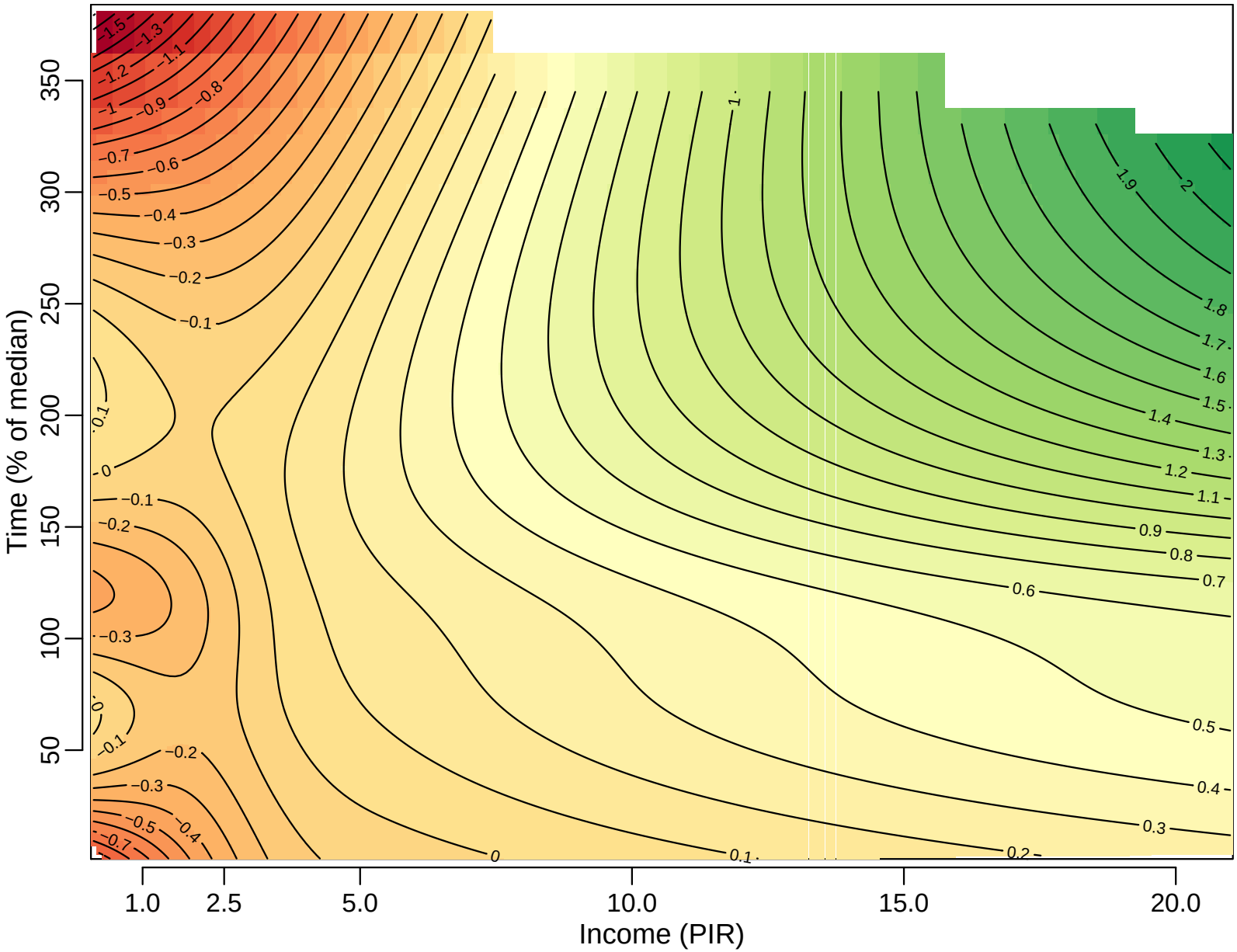
Well-being = f(time, income)

Predicted residual well-being over time & income



Finding optimal joint poverty thresholds

Predicted residual well-being over time & income



Well-being = f(time, income)

Impressions

- *Generally* see well-being increase as time and income increase
- Small areas of lower than expected well-being, one of which is among the high income

Well-being = f(time, income)

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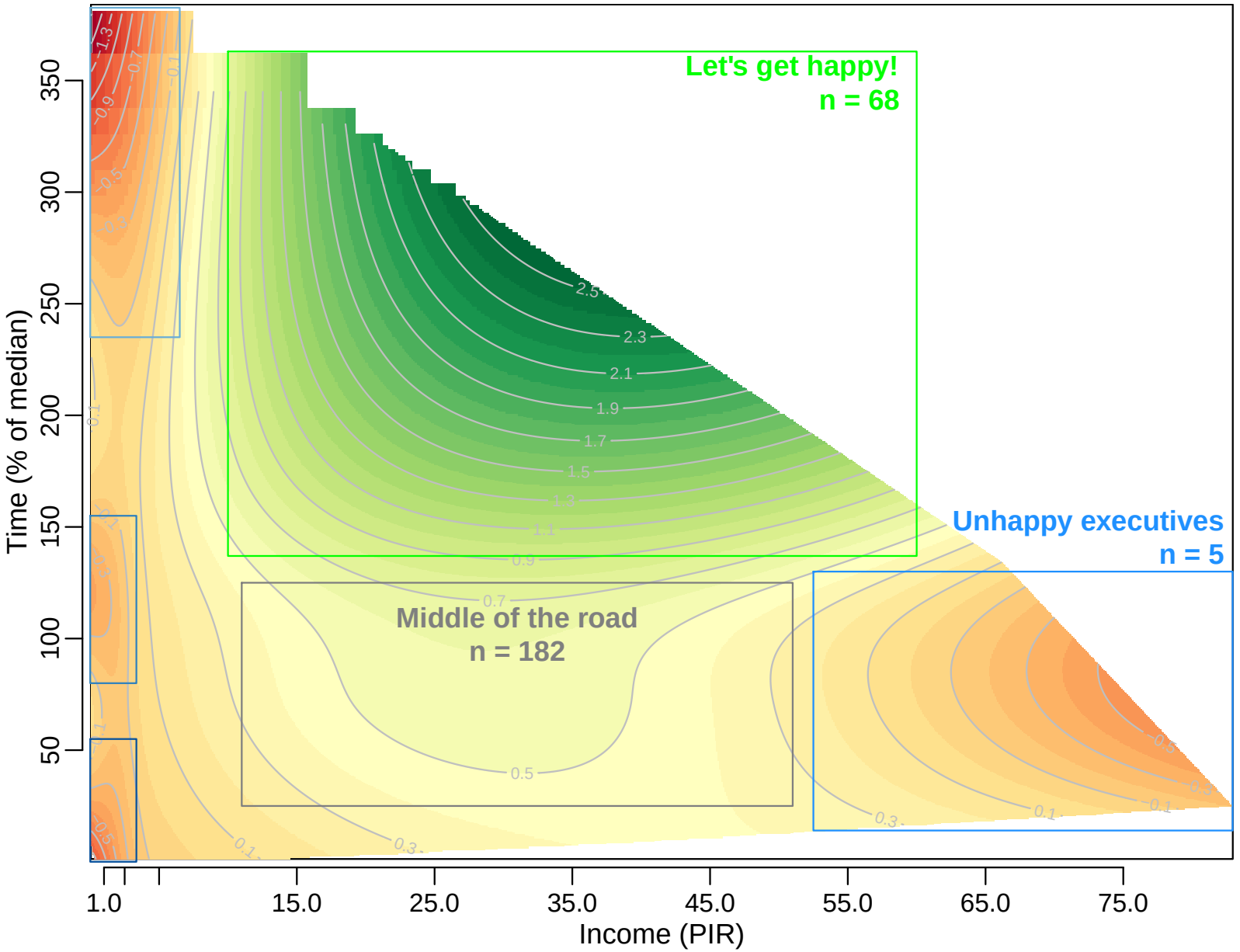

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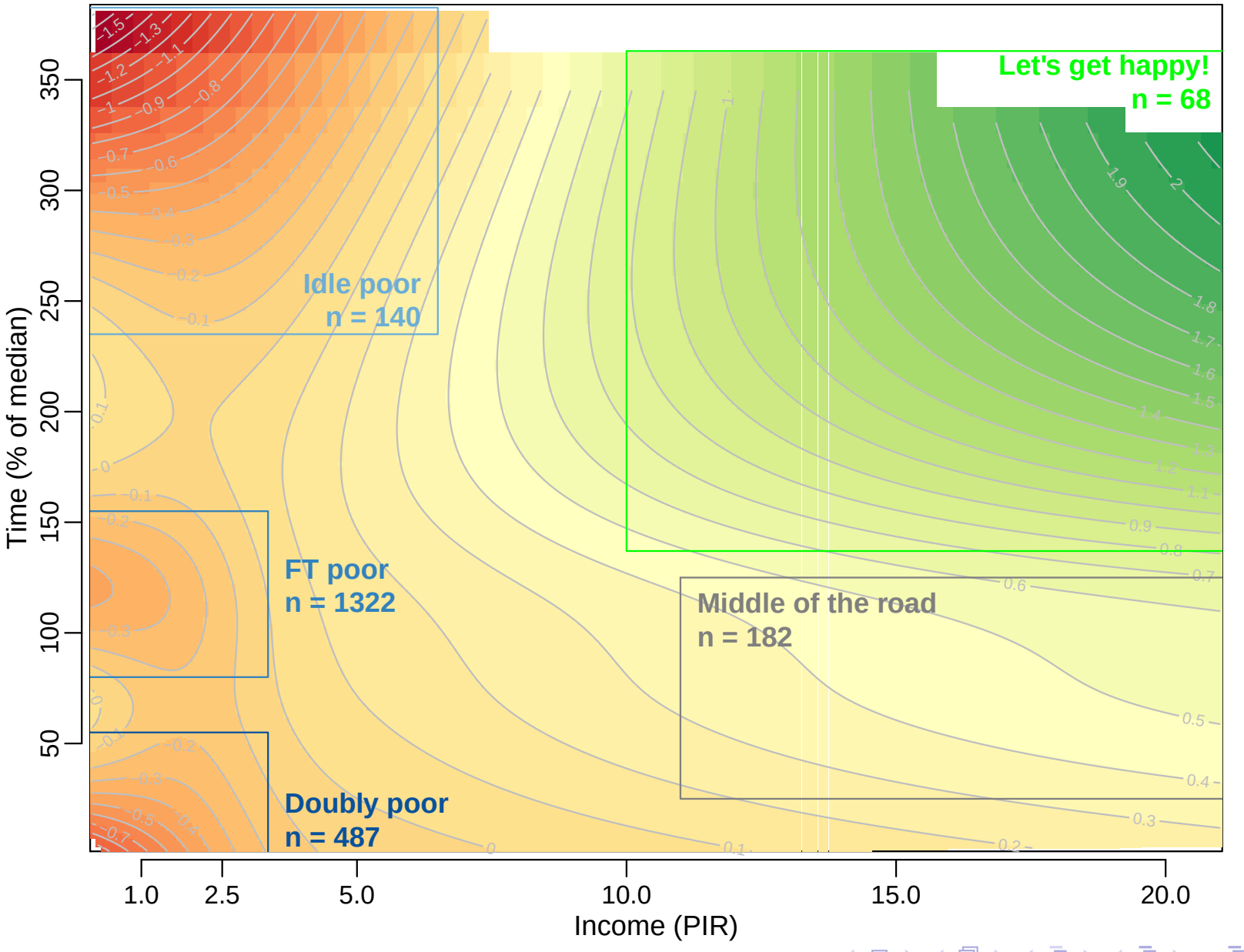


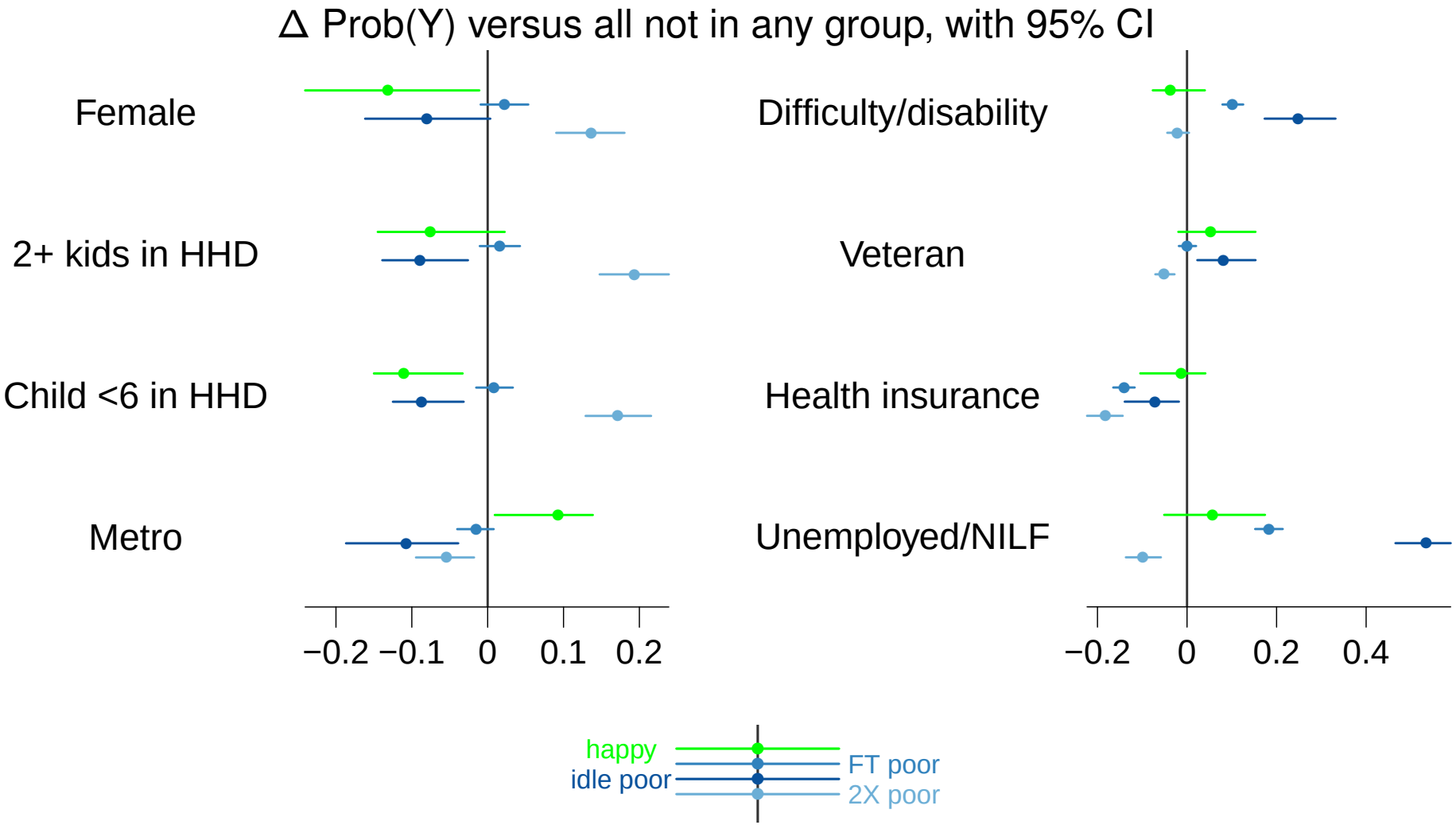
Profile differences, versus all others

Characteristics and risks

- Collapse “middle of the road” and “unhappy executives” with all others (reference group)
- Regress outcome on profile membership
- Present predicted change in quantity of interest for moving from the reference group to the
  - happy group
  - FT poor
  - idle poor
  - doubly poor
- Do the groups differ on key characteristics and risk factors associated with poverty?

Profile differences, versus all others

Individual-level correlates, difference in expected probability



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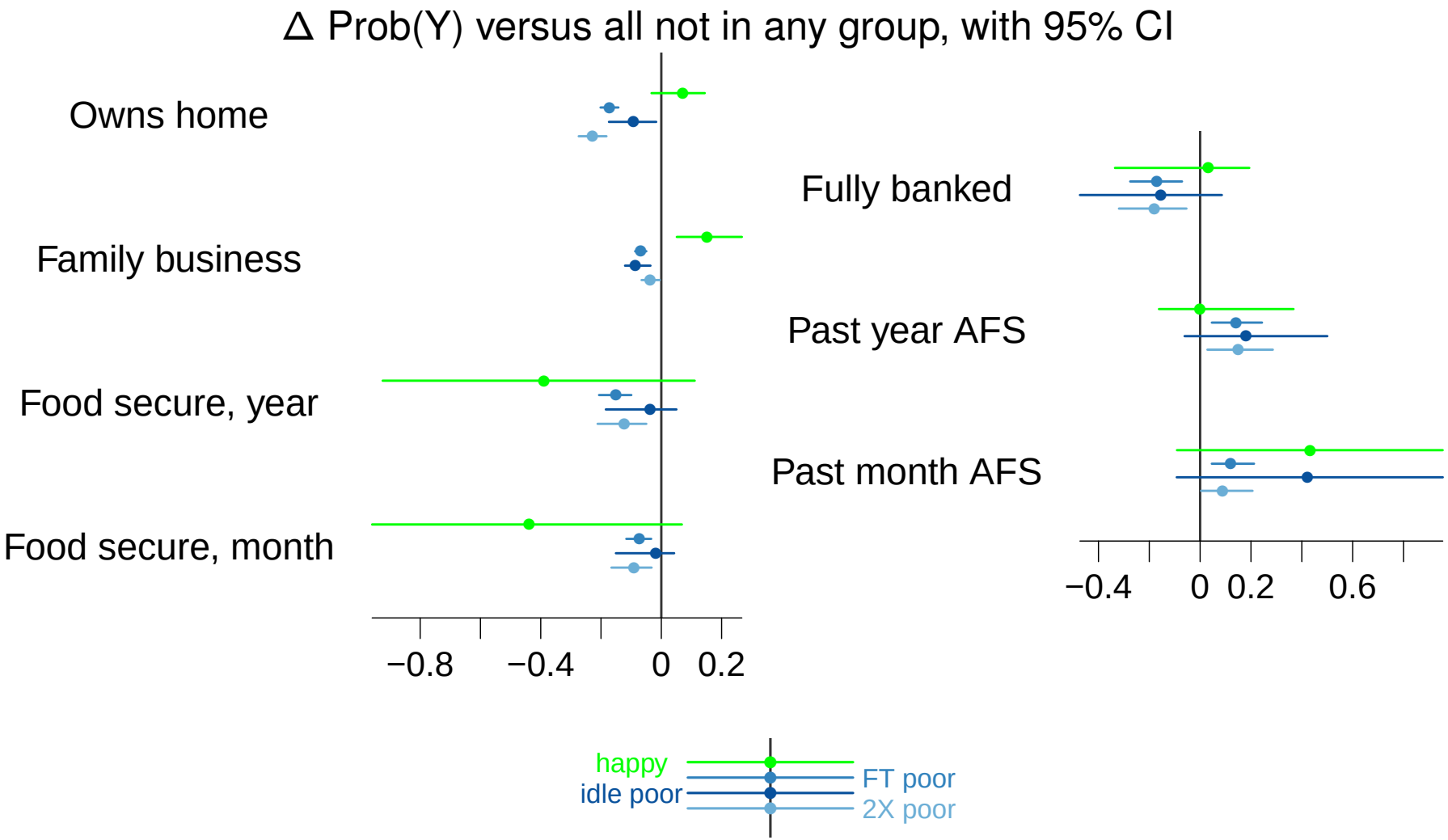
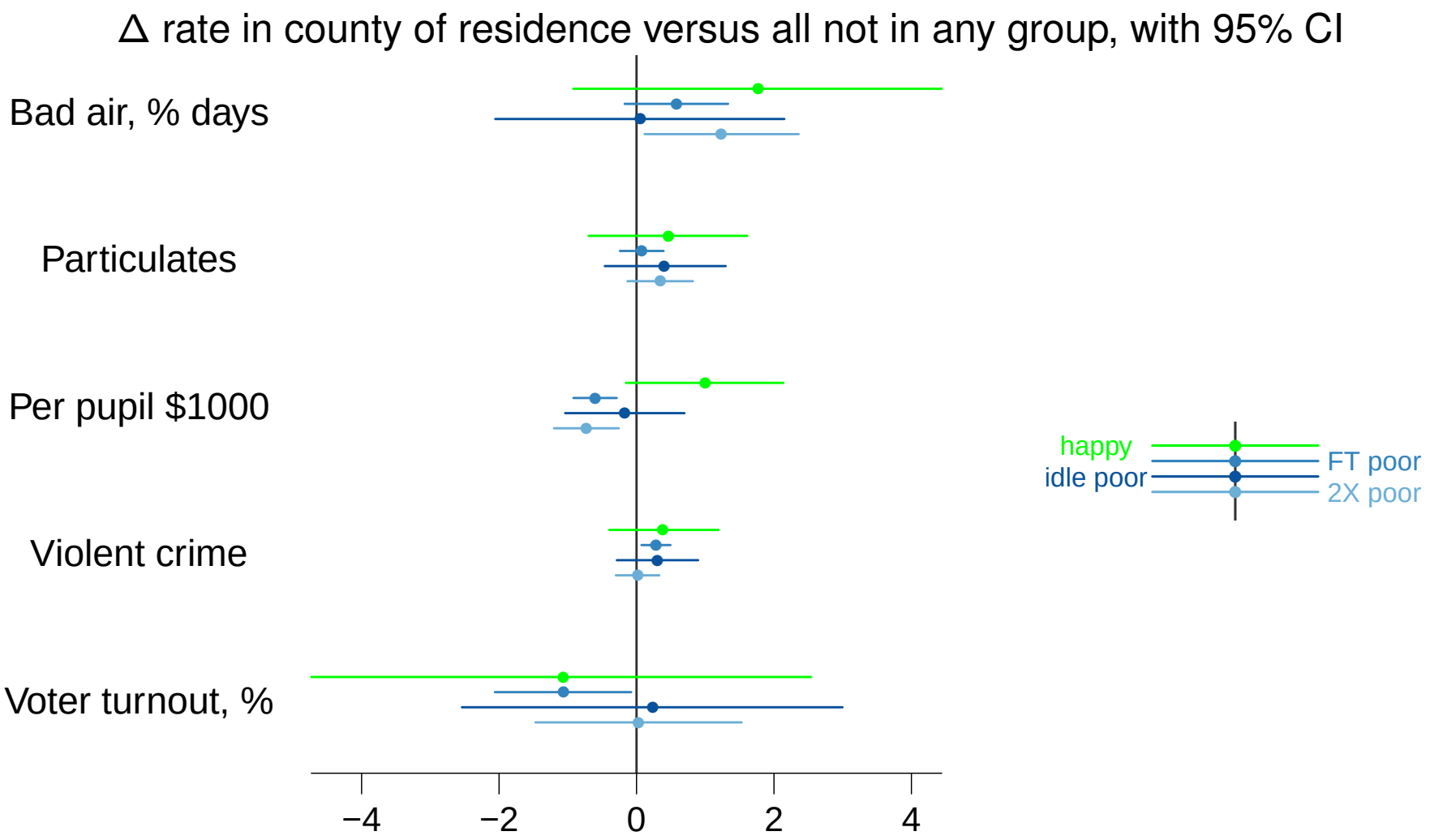


Note: For food security, $N = 1169$; for banking, $N = 478$–496

Profile differences, versus all others

County-level correlates, difference in expected county rate



Note: For bad air days, $N = 2313$; for weighted annual mean of inhalable coarse particles, $N = 2088$; for school spending, $N = 2365$; for violent crime per 1000 residents, $N = 2447$; for voter turnout, $N = 2343$

- Defining poverty (utility) as well-being reveals important links between poverty and income + time
  - Conditional well-being not uniform below PIR of 1 (or any other income level) → time matters
- Differences among those with lower than expected well-being

Well-being = f(time, income)

Conclusions

	Female	Children	Young child	Metro	Disability/difficulty	Veteran	Health insurance	Unemployed/NILF	Owns home	Business	Food secure	Fully banked	Bad air days	Particulates	School spending	Violent crime	Voter turnout
FT poor					⇑		↓	⇑	↓	↓	↓	↓			↓	↑	↓
Idle poor		⇓	⇓	↓	⇑	↑	↓	⇑	↓	↓							
2X poor	⇑	⇑	⇑	↓		⇓	↓	⇓	⇓		↓	↓	↑		↓		

Note: ↓ and ↑ significantly below and above reference group, respectively. ⇓ and ⇑ also significantly below and above, respectively, at least one other poor group.

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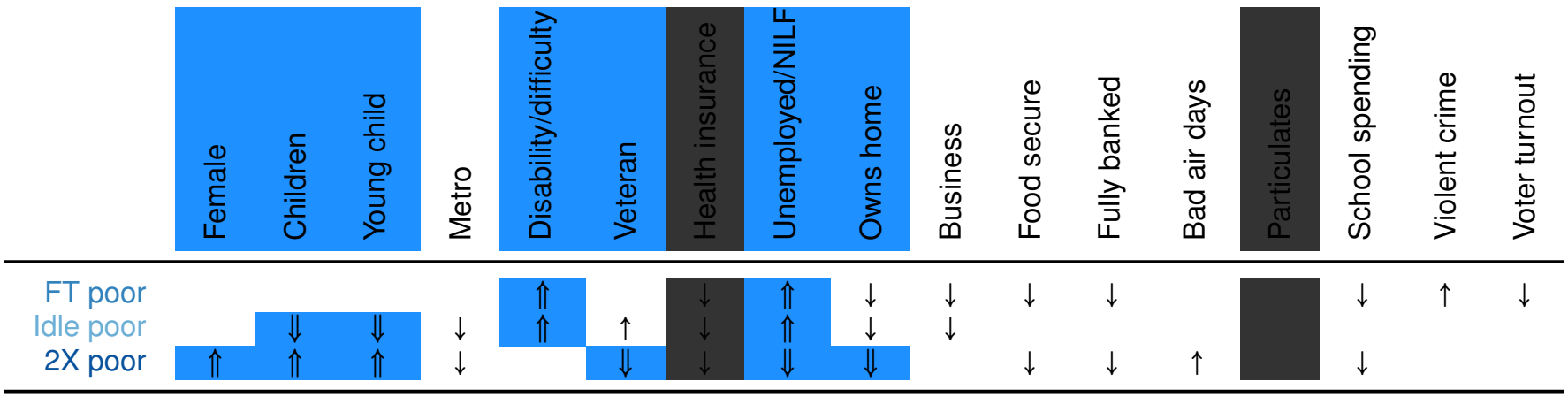

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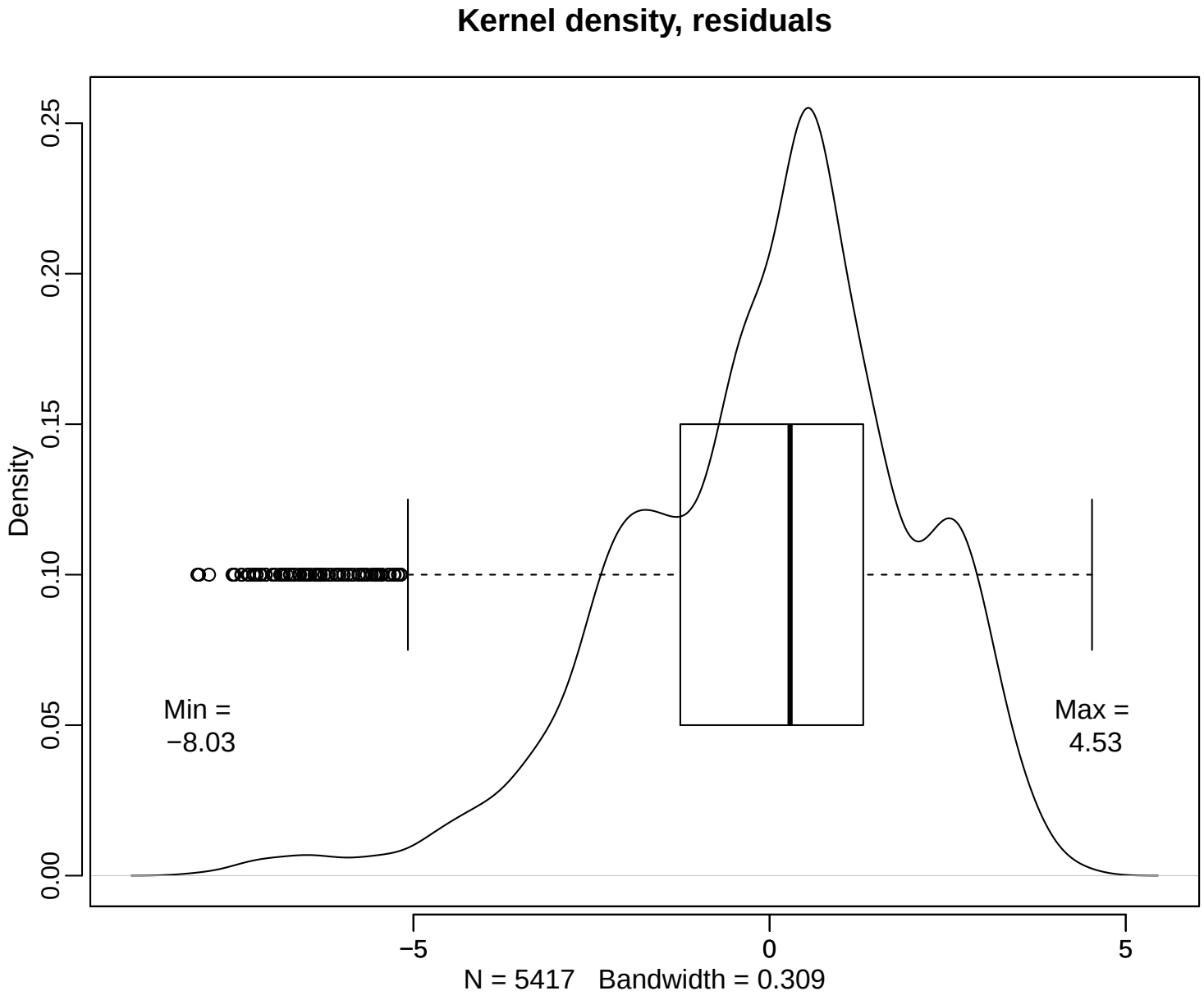
- Identifying a joint poverty threshold
- Applications in other settings (e.g., Kenya)

- Exploring how policies can be tailored to different profiles
- Applications for conservation policies


Kernel density, residuals
Density
0.00
0.05
0.10
0.15
0.20
0.25
Min =
−8.03
Max =
4.53
−5
0
5
N = 5417 Bandwidth = 0.309

Well-being = f(time, income)

Profiles: In terms of time and income

Happy (n=68) Higher than expected well-being seems to come with higher income + time

Unhappy executives (n=5) Too stressed? (Curve here driven by small group)

Middle of the road (n=182) Plateau of as-expected well-being

Idle poor (n=140) Preference for leisure time versus material goods?

FT poor (n=1322) Around median in terms of free time, so spending normal amount of time on necessary activities

Doubly poor (n=487) Multiple jobs + kids at home = poor well-being

- Defining poverty (utility) as well-being reveals important links between poverty and income + time
  - Conditional well-being not uniform below PIR of 1 (or any other income level) → time matters
- Differences among those with lower than expected well-being
  - FT poor
    - relatively likely to have a difficulty that keeps them from working, and to not have health insurance
    - relatively less likely to own home, have a business, or be fully banked
    - relatively likely to have been food insecure in past month and past year
    - live in counties that spend less on primary and secondary education

- Differences among those with lower than expected well-being
  - idle poor
    - relatively less likely to have multiple children in household, at least one of whom is young (but same as the happy group)
    - most likely to have a limiting difficulty and to be out of labor force, less likely than reference group to have insurance
    - relatively less likely to own home, have a business
    - food security and banking same as reference group
    - live in average counties

- Differences among those with lower than expected well-being
  - doubly poor
    - significantly more likely than all others to be female and have multiple children in household, at least one of whom is young
    - more likely to be employed (7% have more than one job; not shown) but unlikely to have health insurance
    - relatively less likely to own home, but no less likely to have a business
    - high rates of food insecurity and (past year) use of alternative financial services
    - live in counties with low education spending and higher air pollution (bad air days)

Profile differences, versus all others

Descriptives

	Overall		Happy		Idle poor		Doubly poor		40-hr poor	
	mean	SD	mean	SD	mean	SD	mean	SD	mean	SD
Residual well-being	0.00	1.99	0.64	1.46	-0.14	2.41	-0.29	2.12	-0.22	2.16
Well-being ladder	7.12	2.04	7.85	1.55	6.81	2.48	6.80	2.14	6.79	2.23
Discret. time (% median)	106.62	56.72	161.92	24.36	262.52	24.83	33.88	14.63	114.91	21.27
Income (PIR)	4.22	4.43	15.30	7.82	2.15	1.57	1.82	0.88	1.77	0.91
Female	0.54	0.50	0.40	0.49	0.45	0.50	0.67	0.47	0.55	0.50
1 child in HHD	0.17	0.37	0.13	0.34	0.09	0.28	0.22	0.42	0.16	0.36
2 children in HHD	0.16	0.36	0.09	0.29	0.08	0.27	0.22	0.41	0.13	0.34
3+ children in HHD	0.07	0.26	0.04	0.21	0.04	0.20	0.19	0.39	0.10	0.29
Child <6 in HHD	0.17	0.38	0.04	0.21	0.07	0.26	0.33	0.47	0.17	0.38
Metro	0.83	0.37	0.94	0.24	0.74	0.44	0.79	0.41	0.83	0.38
Owns home	0.71	0.45	0.85	0.36	0.69	0.47	0.55	0.50	0.61	0.49
Family business	0.13	0.33	0.29	0.46	0.06	0.23	0.11	0.31	0.08	0.27
Any difficulty	0.12	0.32	0.04	0.21	0.34	0.47	0.07	0.25	0.19	0.39
Veteran	0.10	0.30	0.15	0.36	0.18	0.38	0.05	0.21	0.10	0.30
More than 1 job	0.05	0.21	0.04	0.21	0.00	0.00	0.07	0.26	0.04	0.19
Unemployed/NILF	0.36	0.48	0.37	0.49	0.85	0.36	0.21	0.41	0.50	0.50
2 adults in HHD	0.52	0.50	0.63	0.49	0.40	0.49	0.49	0.50	0.44	0.50
3+ adults in HHD	0.15	0.36	0.18	0.38	0.14	0.35	0.14	0.34	0.15	0.36
Age	49.06	16.84	51.43	16.27	57.98	18.31	41.00	13.81	49.65	18.06
n	5417		68		140		487		1322	
% of sample			1.3%		2.6%		9.0%		24.4%	

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    - Merz and Rathjen (2014) model well-being as a CES function of leisure time and income in Germany, selecting indifference curve based on existing time and income poverty definitions (50% of median)

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Basic time use categories by profile, weekend/holiday

Basic time use categories by profile, weekday