Investing in Disadvantaged Young Children is an Economically Efficient Policy

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- Why should society invest in disadvantaged young children?
- The traditional argument for doing so is made on the grounds of fairness and social justice.
- It is an argument founded on equity considerations.
- Another argument can be made.
- It is based on economic efficiency.
- It is more powerful than the equity argument, in part because the gains from making such investments can be quantified and they are large.

- There are many reasons why investing in disadvantaged young children has a high economic return.
- It is a rare public policy initiative that promotes fairness and social justice and at the same time promotes productivity in the economy and in society at large.
- Investing in disadvantaged young children is such a policy.
- Early interventions for disadvantaged children promote schooling, raise the quality of the workforce, enhance the productivity of schools and reduce crime, teenage pregnancy and welfare dependency.

- They raise earnings and promote social attachment. Focusing solely on earnings gains, returns to dollars invested are as high as 15-17%.

- How is it possible to avoid the equity-efficiency trade-off that plagues so many policies—for example, tax policy or welfare policy?

- The reason lies in the importance of skills in the modern economy and the dynamic nature of the skill acquisition process.

- A large body of research in social science, psychology and neuroscience shows that skill begets skill.
- Learning begets learning. The earlier the seed is planted and watered, the faster and larger it grows.
- There is substantial evidence of critical or sensitive periods in the lives of young children.
- Environments that do not stimulate the young and fail to cultivate both cognitive and socioemotional skills, place children at an early disadvantage.

- Once a child falls behind, he or she is likely to remain behind.
- Remediation for impoverished early environments becomes progressively more costly the later it is attempted.
- The track record for criminal rehabilitation, adult literacy and late-teenage public job training programs is remarkably poor.
- Impoverished early environments are powerful predictors of adult failure on a number of social and economic dimensions.

- Impoverishment is not so much about money as it is about resources of cognitive and socioemotional stimulation given to young children.

- Experimental interventions that enrich early childhood environments produce more successful adults.

- These interventions raise both cognitive and noncognitive skills.

- However, the case for early interventions is not based solely on the intervention data, but on a variety of experimental and nonexperimental studies.

My Argument in a Nutshell

I. Life cycle skill formation is dynamic in nature. Skill begets skill; motivation begets motivation. If the seed is not planted and watered early, it will produce a stunted adult.

II. Many major economic and social problems can be traced to low levels of skill and ability in the population.

III. Abilities are multiple in nature.

IV. Much public policy discussion focuses on cognitive ability and especially IQ.

V. Socioemotional skills are also important for success in life.

VI. Motivation, perseverance and tenacity feed into performance in society at large and even affect scores on achievement tests.

VII. Early family environments are major predictors of both cognitive and socioemotional abilities.

VIII. The previous point is a major source of concern because family environments in the U.S. and many other countries around the world have deteriorated over the past 40 years.

IX. Experiments support the evidence that adverse family environments promote adult failure.

X. If we intervene early enough, we can affect both cognitive and socioemotional abilities.

XI. Early interventions promote schooling, reduce crime, promote workforce productivity and reduce teenage pregnancy.

XII. These interventions have high benefit-cost ratios and rates of return.

XIII. Early interventions have much higher returns than other later interventions such as reduced pupil-teacher ratios, public job training, convict rehabilitation programs, tuition subsidies or expenditure on police.

1 Some Problems Facing Many Western Societies and Their Roots in Early Disadvantage

- Consider some major problems facing many societies.
- First, there is a slowdown in the growth of labor force quality in the U.S. and many other countries.
- The U.S. will add many fewer college graduates to its workforce in the next 20 years than it did in the last 20 years (see Table 1).

Table 1

Educational Characteristics of the Labor Force[a]

	Labor Force, Age 25 and Over				
Education	1980	(change)	2000	(change)	2020[b]
Less than HS	17.3	-5.3	12.0	0.9	12.9
HS Only	31.5	6.3	37.8	3.8	41.6
Some post-HS	13.5	19.4	32.9	6.2	39.1
At Least College Degree	17.3	18.5	35.8	7.7	43.5
% College Graduates	*21.7%*	*47.8%*	*30.2%*	*41.4%*	*31.7%*
Total	**79.8**	**38.7**	**118.5**	**18.6**	**137.1**

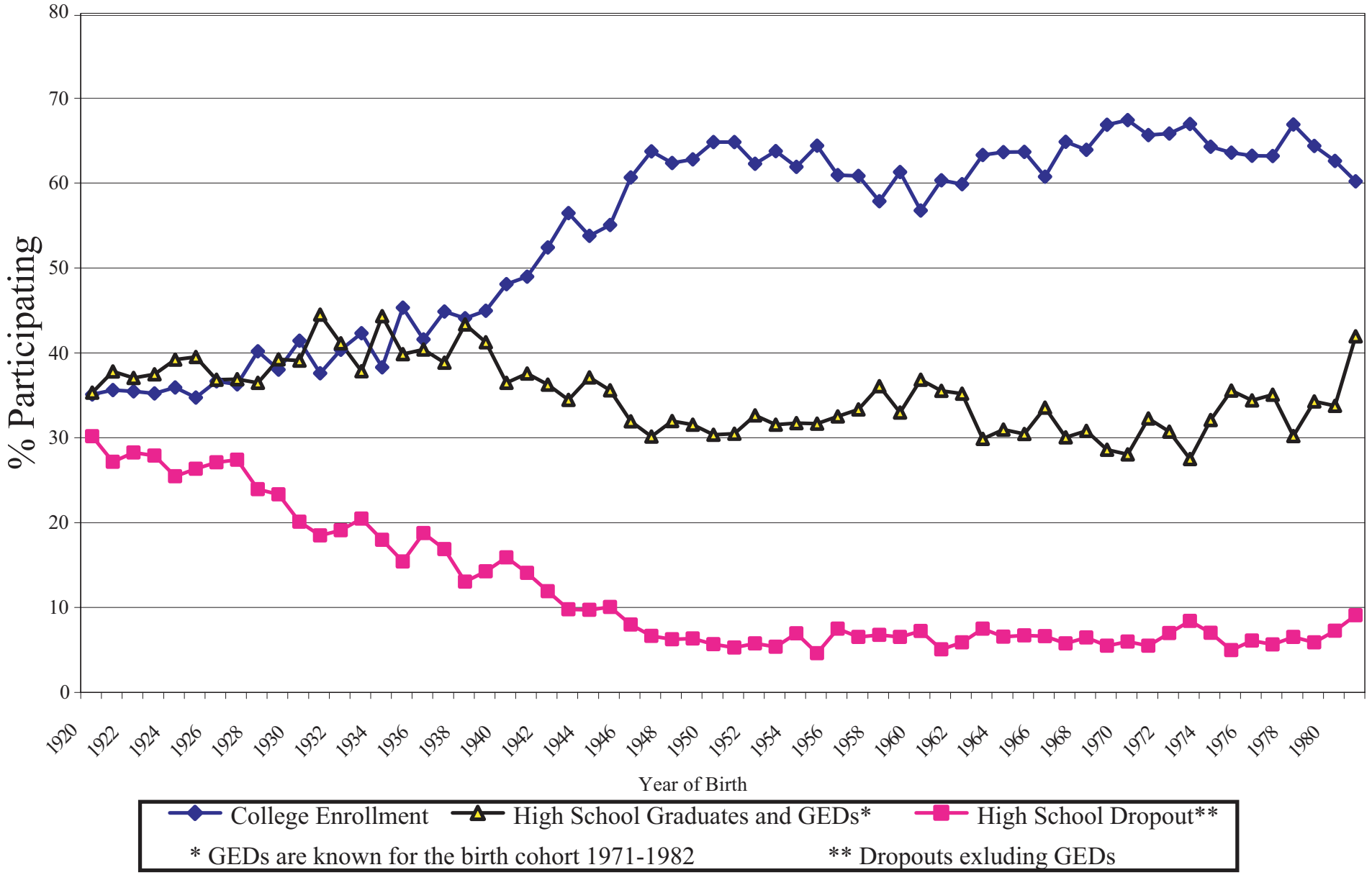
Source: Ellwood (2001). (a) All figures in millions of workers; (b) Projected.

- The percentage of each cohort of Americans who attend college has stalled out in recent decades after a spectacular early growth in the first half of the twentieth century (see Figure 1).

Figure 1

Schooling Participation Rates by Year of Birth: Data from CPS 2000

A. Whites

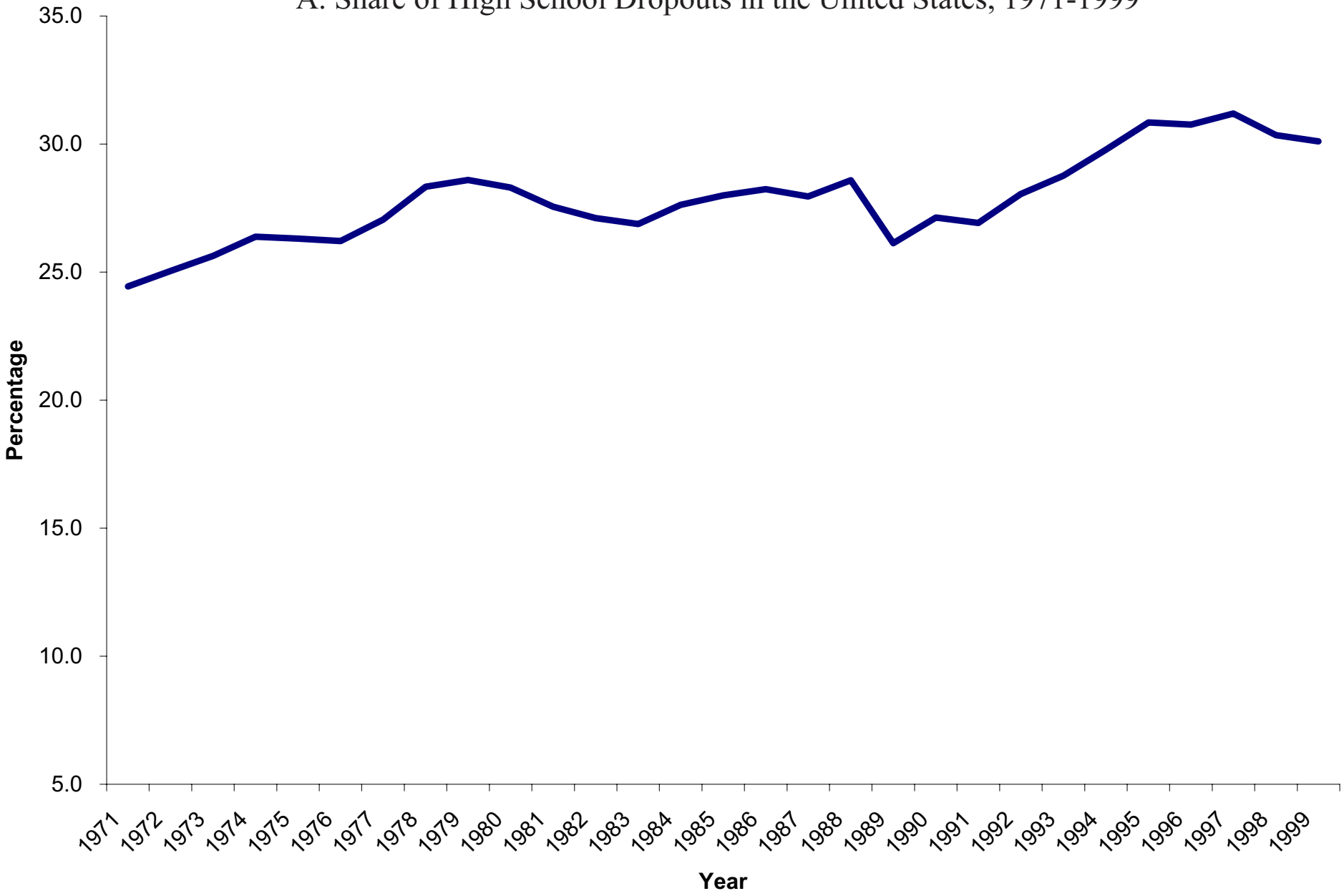


- Properly counted, the high school dropout rate is increasing at a time when the return to schooling has increased (see Figure 2).

Figure 2

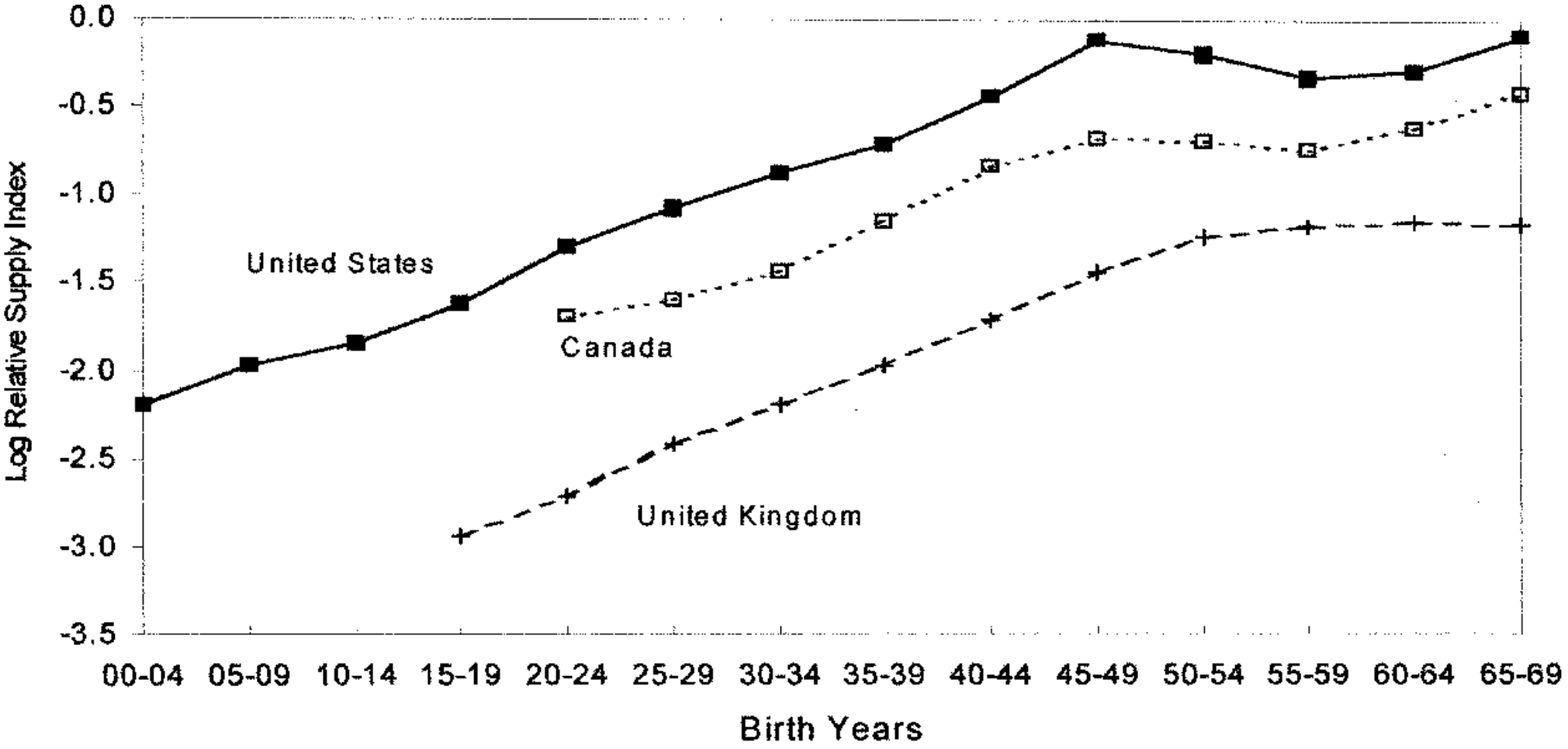
Educational Statistics by Category Over Time

A. Share of High School Dropouts in the United States, 1971-1999



- This increase in the dropout rate is occurring among native populations, and is not solely due to immigrants.
- There are counterparts to this phenomenon around the world.

Figure 3



Relative Supply of College-Educated Workers by Cohort

- Crime is another social problem.
- Anderson (1999) finds that the net cost of crime in American society is $1.3 trillion per year, with a per capita cost of $4,818 per year.
- Crime is a worldwide problem.
- Violent and property levels remain high, despite large declines in recent years.
- Crime reduction is extremely expensive, and spending on the criminal justice system is still increasing.

2 Ability and Outcomes

- Much public policy discussion is focused on cognitive test score measurements, even though cognitive test scores miss important aspects of human development.
- Cognitive and noncognitive (socioemotional) abilities are both important in explaining schooling, crime and a variety of other outcomes.
- Noncognitive ability is neglected in many public policy discussions regarding early childhood.
- Yet noncognitive ability is a major determinant of socioeconomic success, as Figures 5a–5f reveal.

- They show how outcomes are affected as we move people from the bottom to the top of the distribution of both cognitive and noncognitive skills.

- These figures show how performance on many socioeconomic dimensions is critically affected by both cognitive and noncognitive skills.

- Both are equally important.

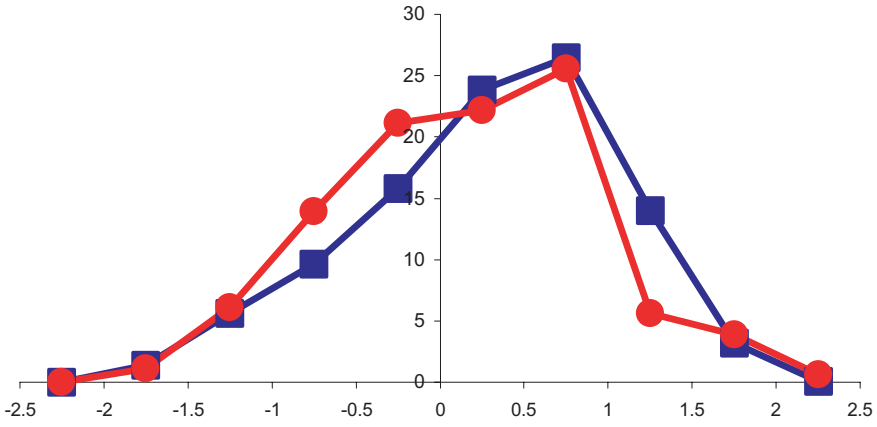
- First consider evidence from the GED program.

- The GED program exam certifies high school dropouts to be the equivalents of ordinary high school graduates who persevere through high school and do not drop out.

Figure 4

Density of age adjusted AFQT scores,
GED recipients and high school graduates with twelve years of schooling

(a) White males



(b) White females

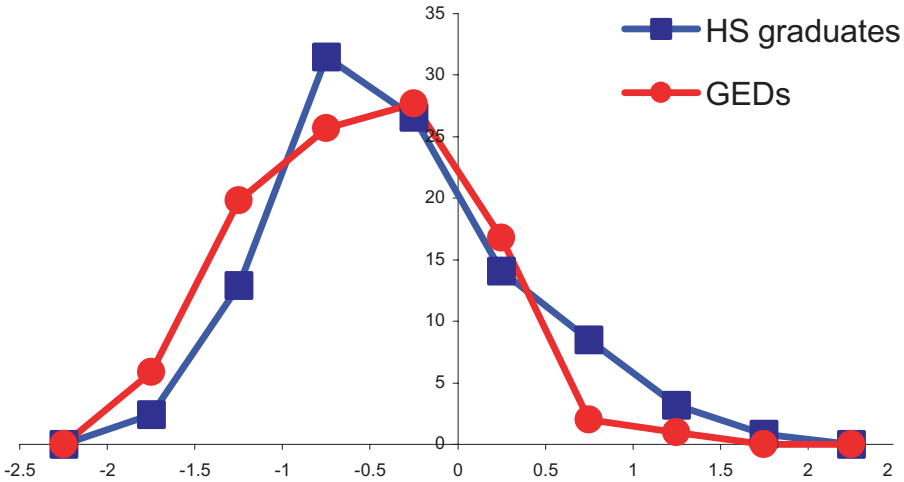


Figure 4b

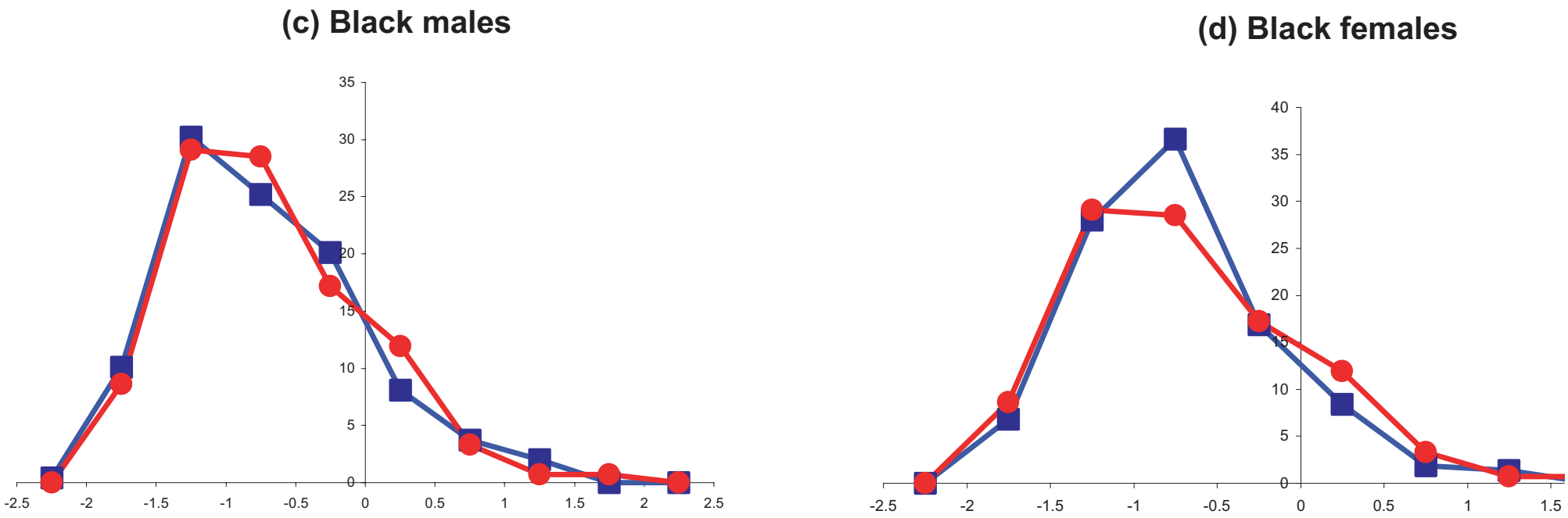
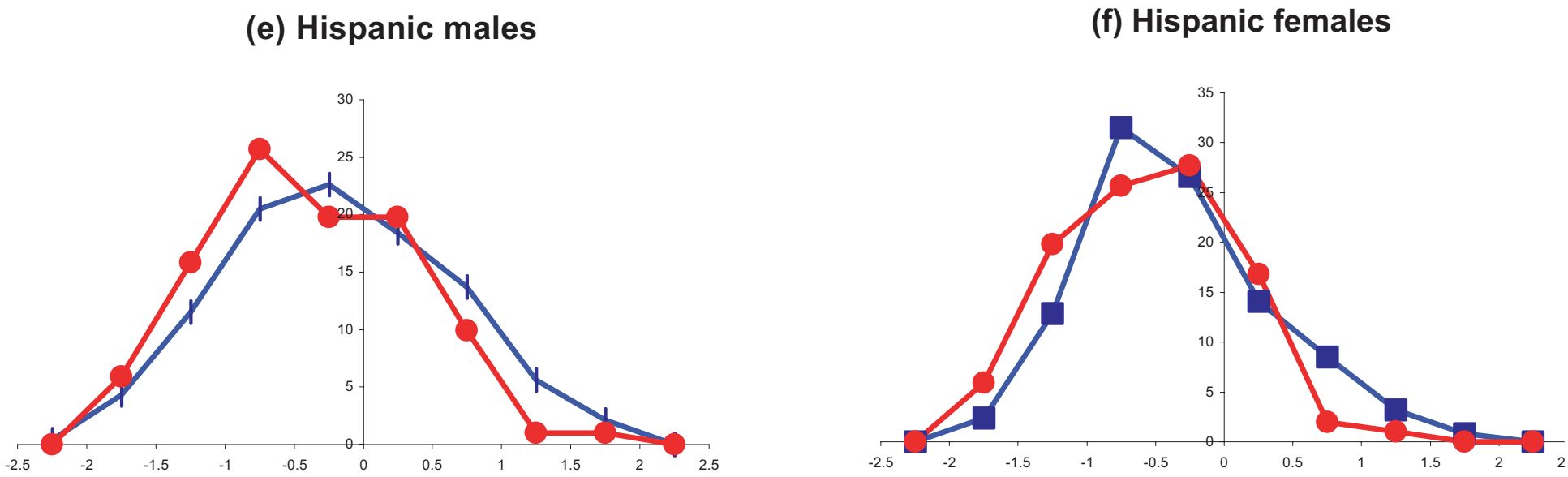

(c) Black males
35
30
25
20
15
10
5
0
-2.5
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
2.5
(d) Black females
40
35
30
25
20
15
10
5
0
-2.5
-2
-1.5
-1
-0.5
0
0.5
1
1.5

Figure 4c



Source: Heckman, Hsee and Rubinstein (2001).

Table 2

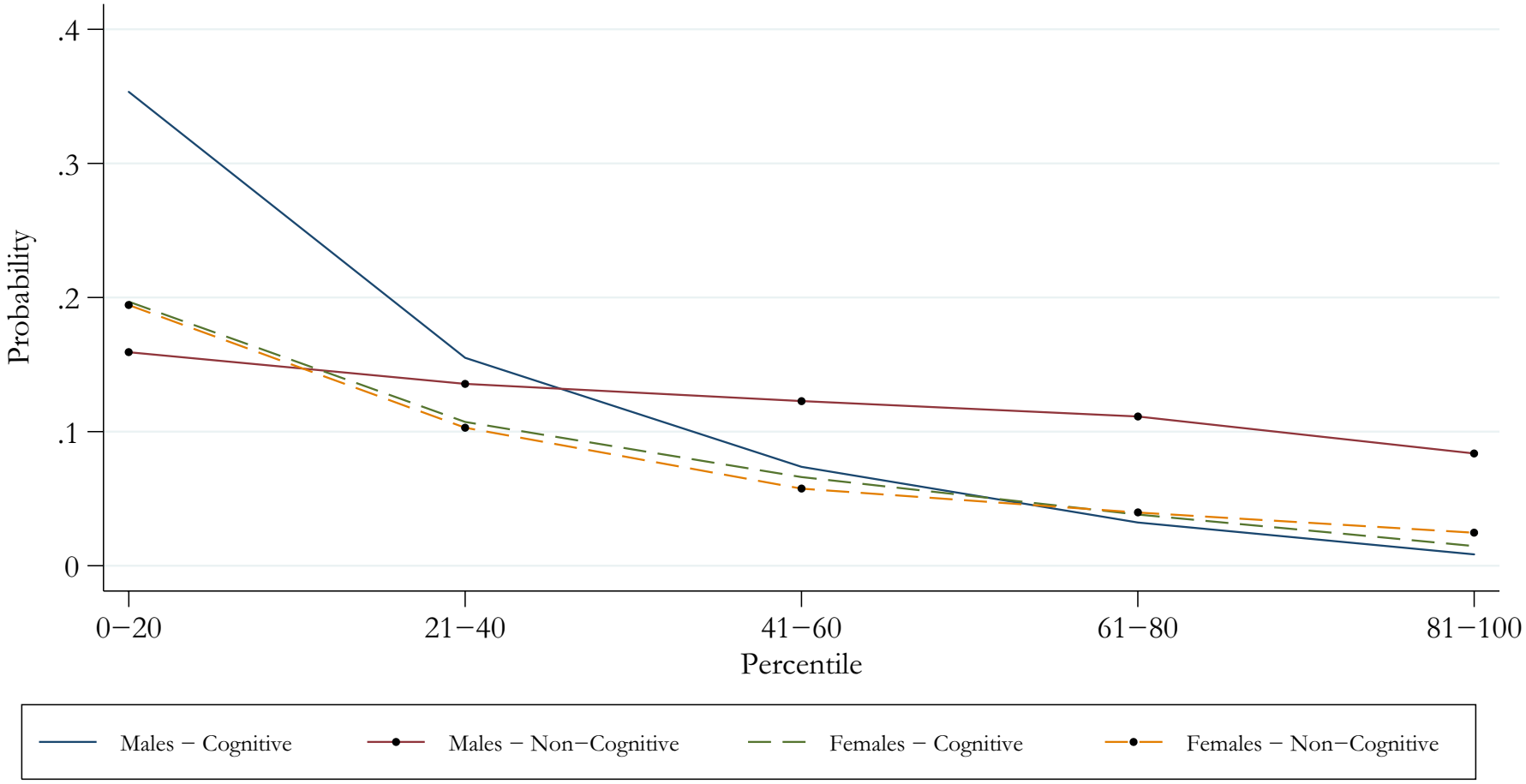
How Does the Labor Market Treat GED Recipients?

A First Glance at the Data
High School Dropouts, GED Recipients and High School Graduates

	OLS		
Variable	**(i)**	**(ii)**	**(iii)**
High school dropout	**-0.273**	**-0.193**	**-0.022**
	(0.024)	(0.026)	(0.033)
GED degree	**-0.181**	**-0.187**	**-0.107**
	(0.039)	(0.038)	(0.038)
Armed Forces Qualifying Test*		0.106	0.074
		(0.013)	(0.014)
Years of schooling			0.070
			(0.011)
Training			0.029
			(0.005)

Figure 5a

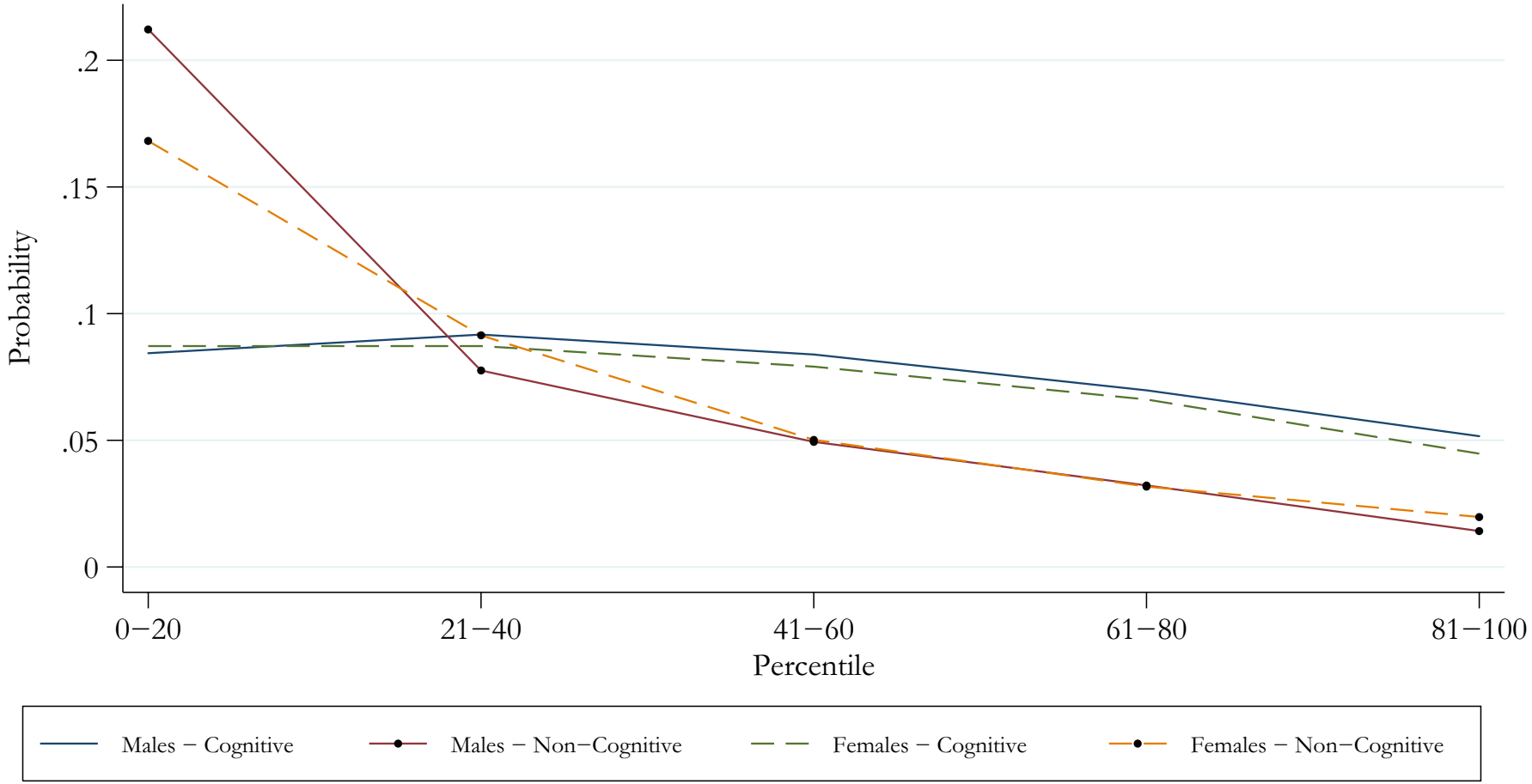
Probability of Being a High School Dropout, by Ability



Note: This figure plots the probability of a given behavior associated with moving up in one ability distribution for someone after integrating out the other distribution. For example, the lines with markers show the effect of increasing noncognitive ability after integrating the cognitive ability. Source: Heckman, Stixrud, and Urzua (2006).

Figure 5b

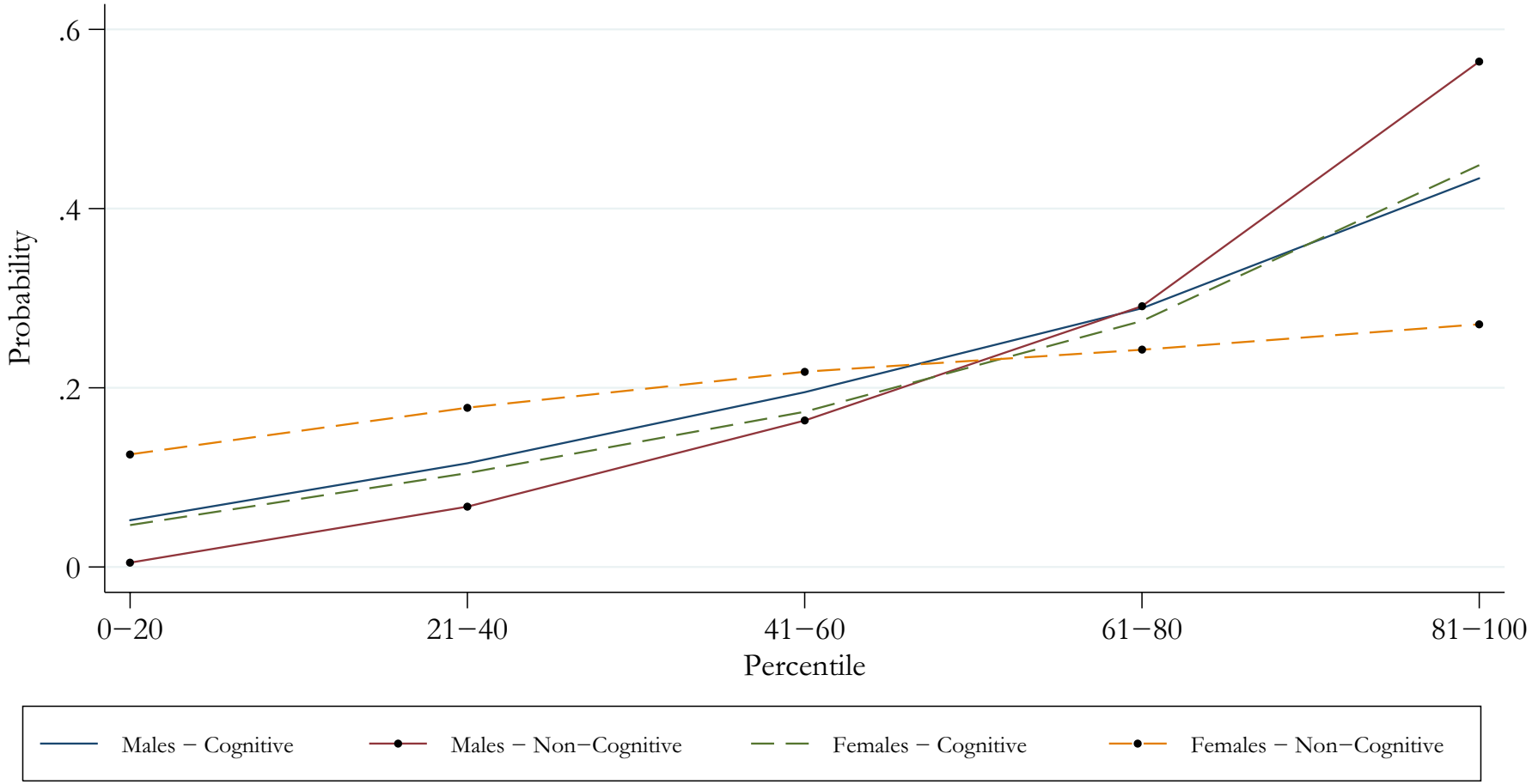
Probability of Highest Attainment = GED, by Ability



Note: This figure plots the probability of a given behavior associated with moving up in one ability distribution for someone after integrating out the other distribution. For example, the lines with markers show the effect of increasing noncognitive ability after integrating the cognitive ability. Source: Heckman, Stixrud, and Urzua (2006).

Figure 5c

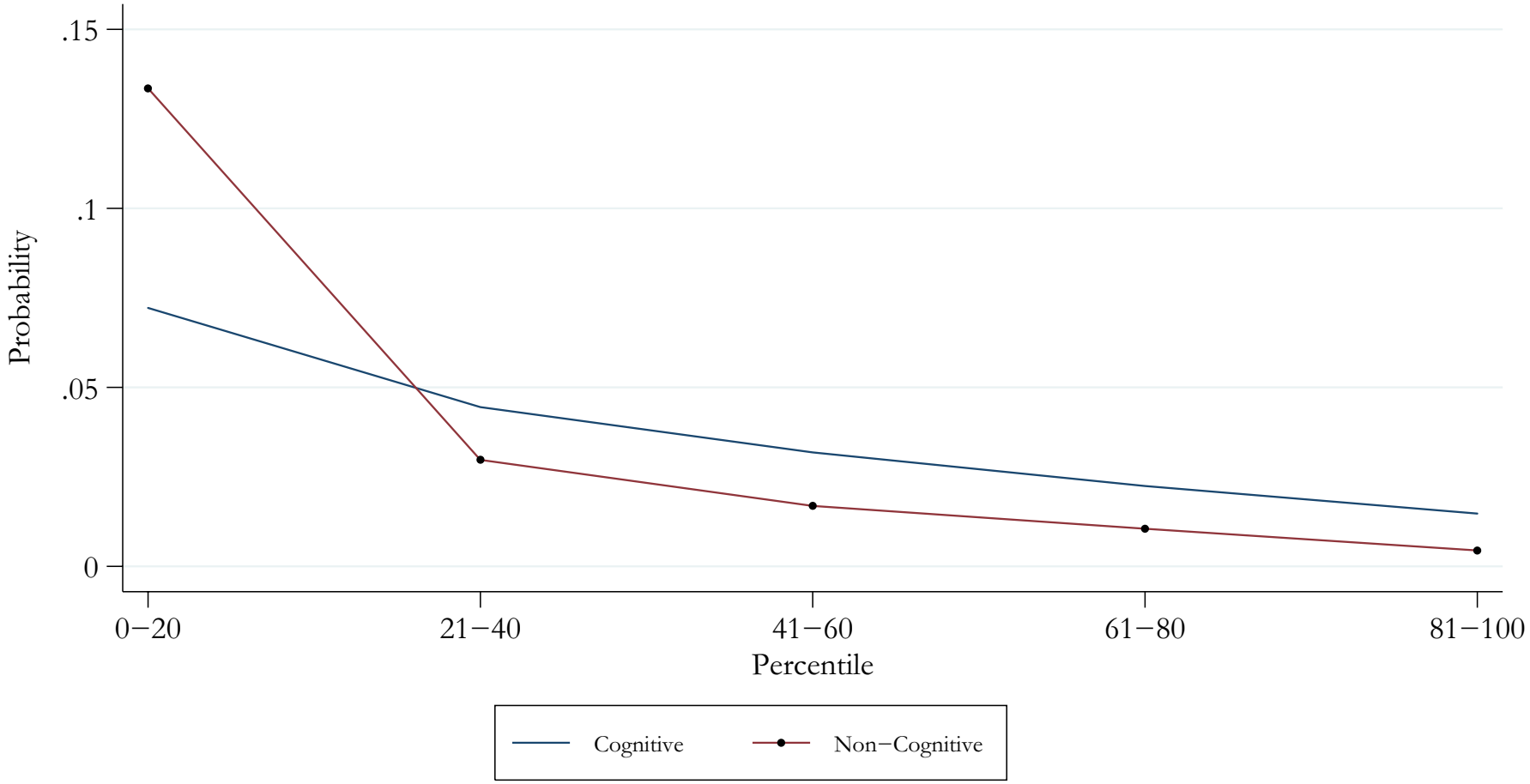
Probability of Being a 4−yr College Graduate, by Ability



Note: This figure plots the probability of a given behavior associated with moving up in one ability distribution for someone after integrating out the other distribution. For example, the lines with markers show the effect of increasing noncognitive ability after integrating the cognitive ability. Source: Heckman, Stixrud, and Urzua (2006).

Figure 5d

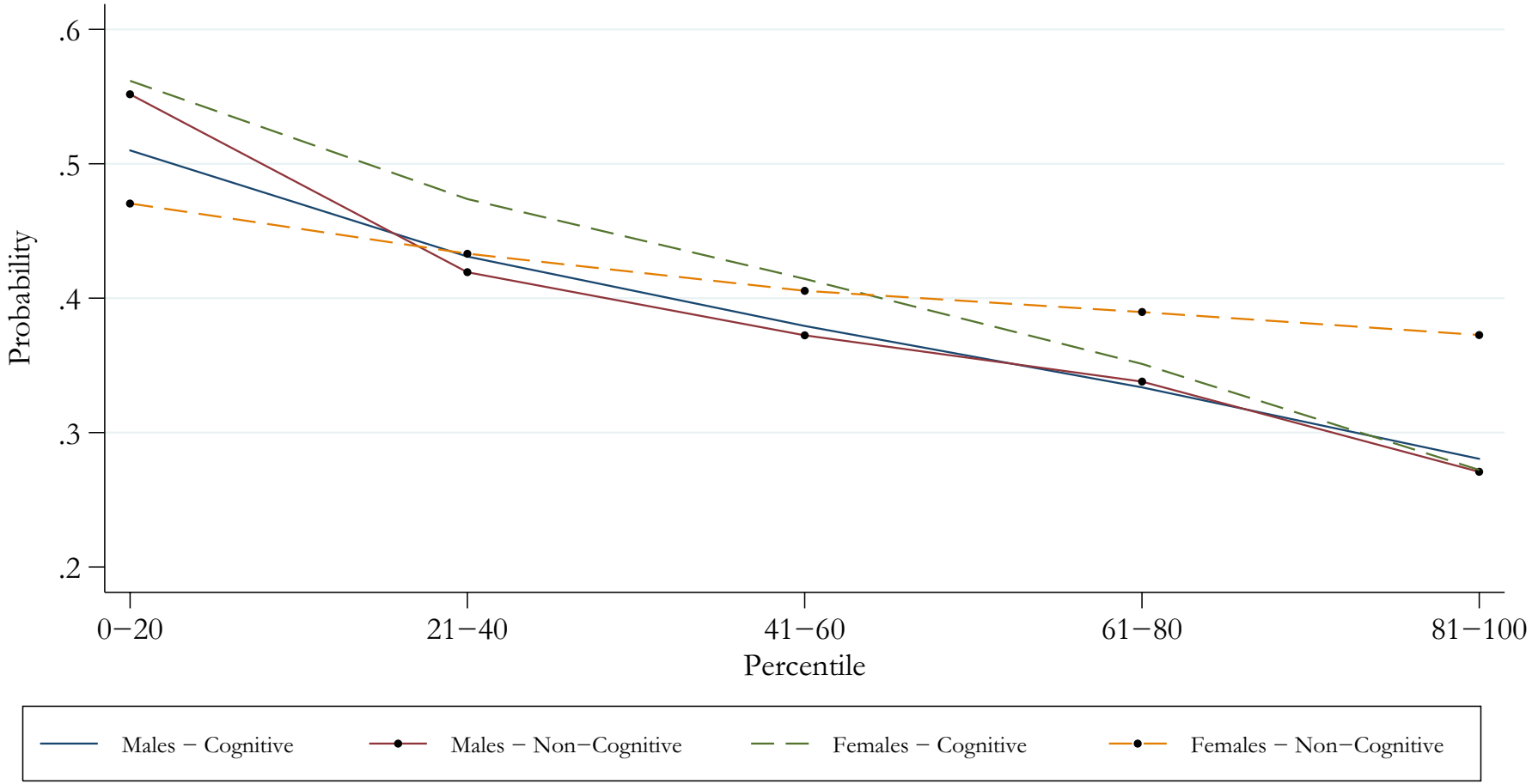
Ever in Jail by Age 30, by Ability -- Males



Note: This figure plots the probability of a given behavior associated with moving up in one ability distribution for someone after integrating out the other distribution. For example, the lines with markers show the effect of increasing noncognitive ability after integrating the cognitive ability. Source: Heckman, Stixrud, and Urzua (2006).

Figure 5e

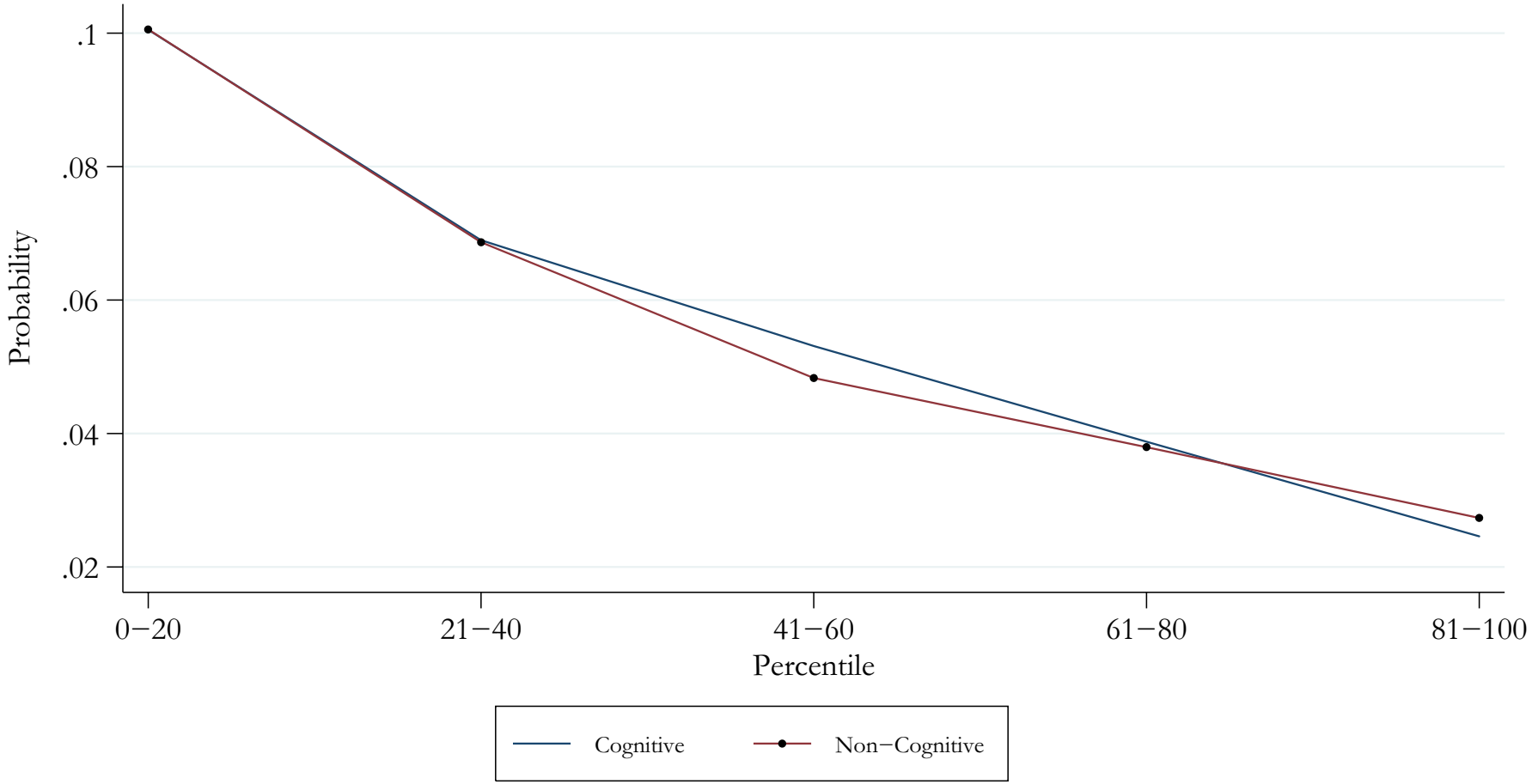
Daily Smoker at Age 18, by Ability



Note: This figure plots the probability of a given behavior associated with moving up in one ability distribution for someone after integrating out the other distribution. For example, the lines with markers show the effect of increasing noncognitive ability after integrating the cognitive ability. Source: Heckman, Stixrud, and Urzua (2006).

Figure 5f

Probabilty of Being Single with Children −− Females



Note: This figure plots the probability of a given behavior associated with moving up in one ability distribution for someone after integrating out the other distribution. For example, the lines with markers show the effect of increasing noncognitive ability after integrating the cognitive ability. Source: Heckman, Stixrud, and Urzua (2006).

Results for Wages

Figure 6A. Mean Log Wages by Age 30 - Males
i. By Decile of Cognitive and Non-Cognitive Factors

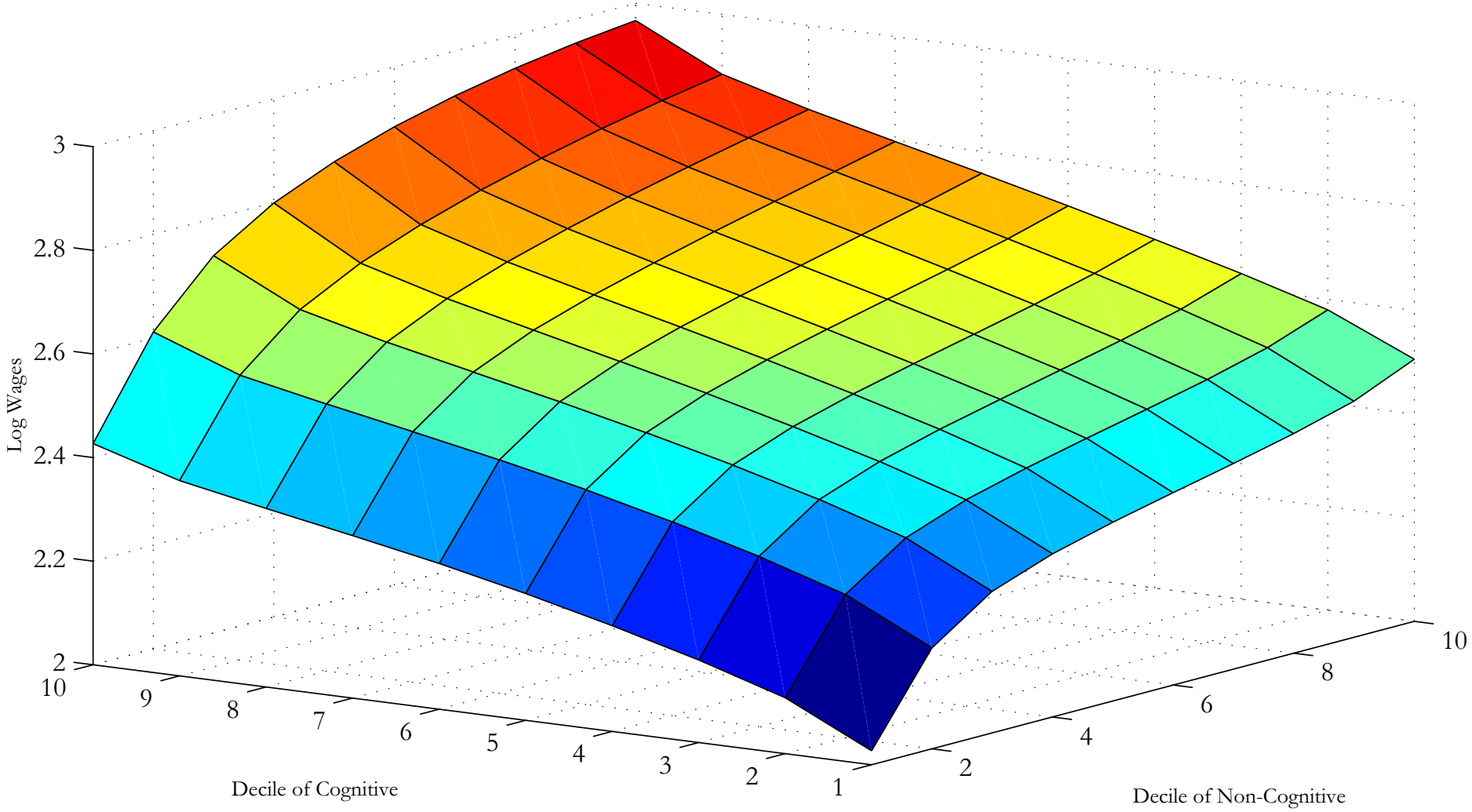
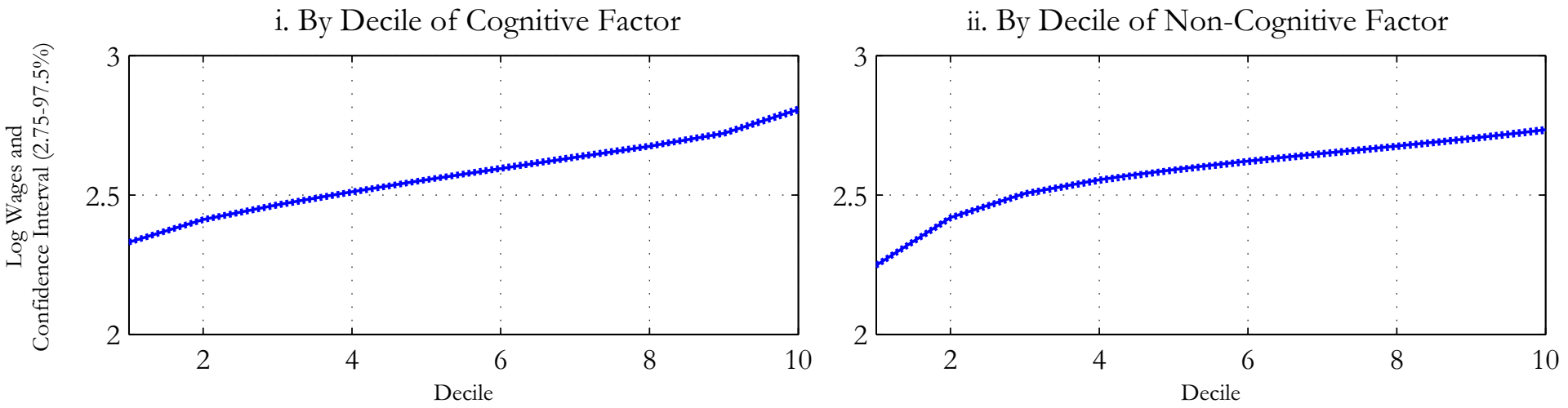


Figure 6B. Mean Log Wages by Age 30 - Males



Notes: The data are simulated from the estimates of the model and our NLSY79 sample. We use the standard convention that higher deciles are associated with higher values of the variable. The confidence intervals are computed using bootstrapping (50 draws).

Figure 7A. Mean Log Wages by Age 30 - Females
i. By Decile of Cognitive and Non-Cognitive Factors

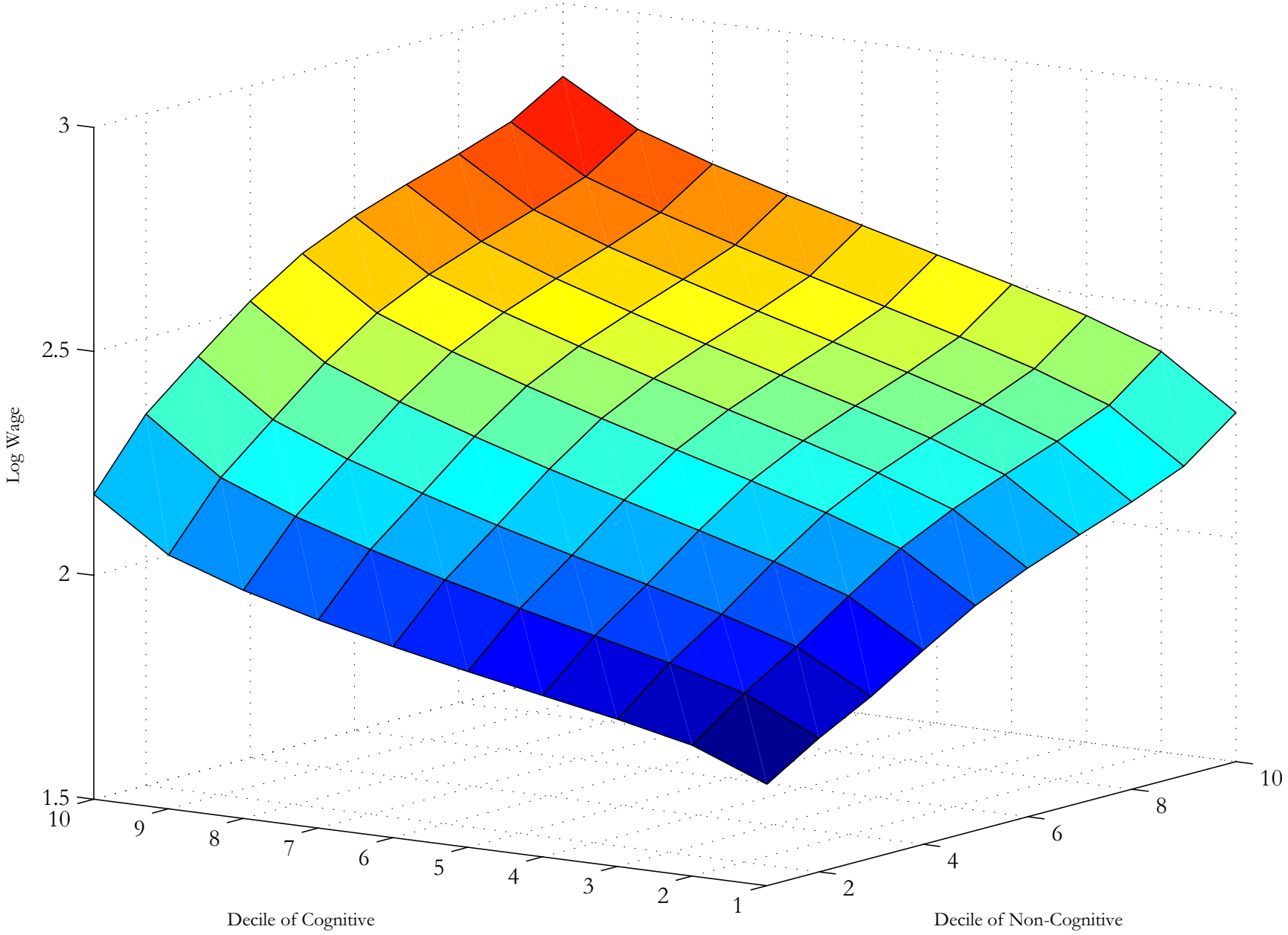
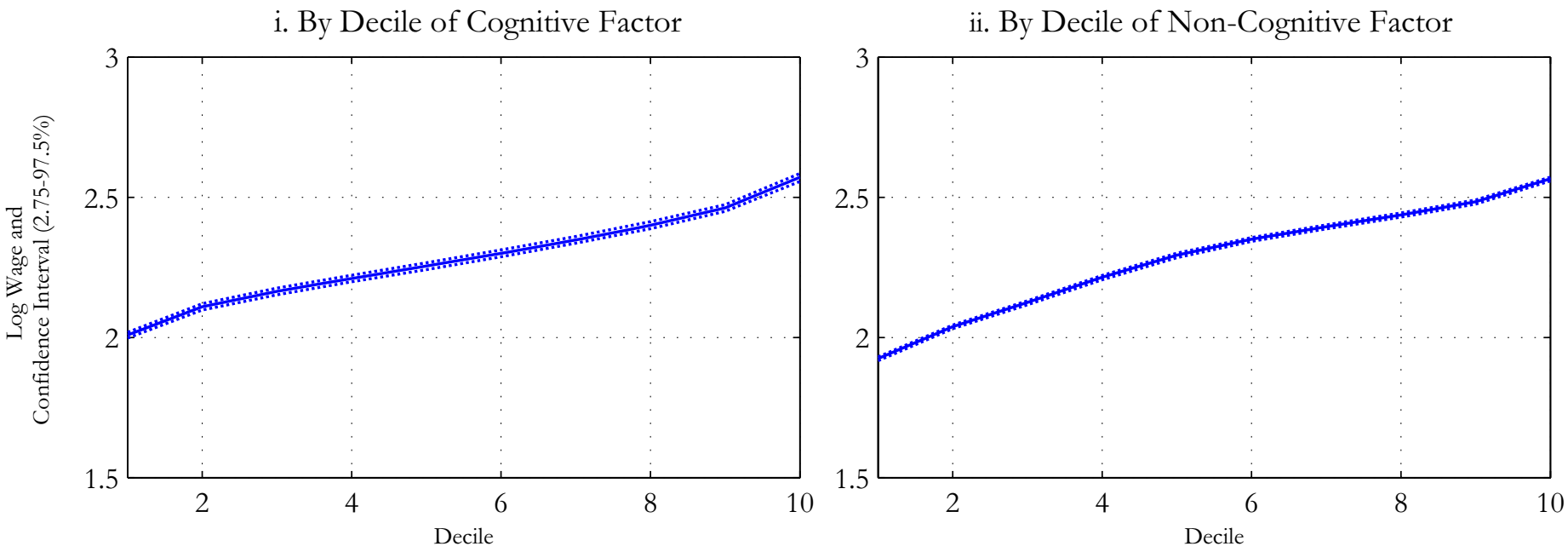


Figure 7B. Mean Log Wages by Age 30 - Females



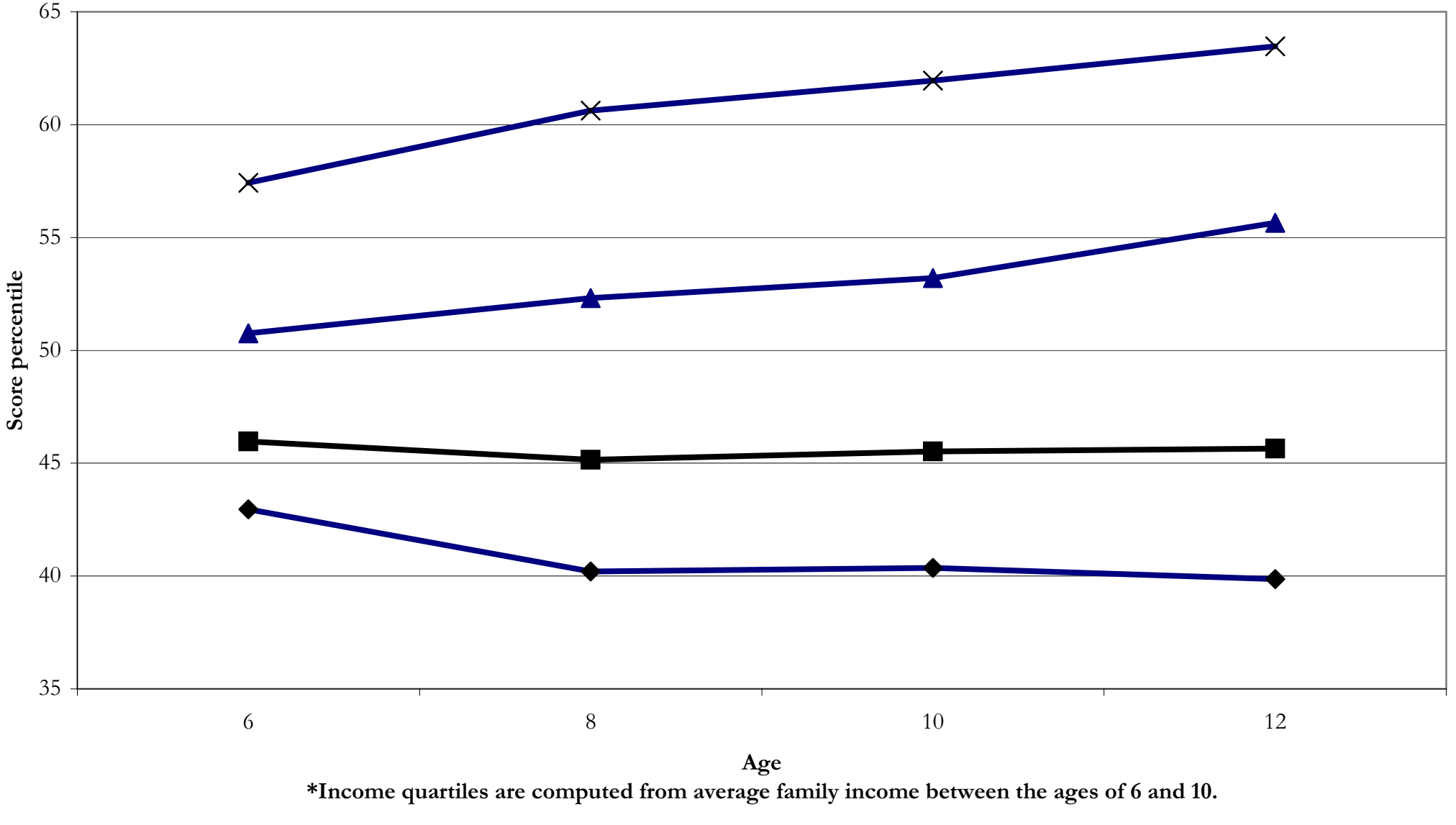
Notes: The data are simulated from the estimates of the model and our NLSY79 sample. We use the standard convention that higher deciles are associated with higher values of the variable. The confidence intervals are computed using bootstrapping (50 draws).

3 Gaps in Ability Open up Early

- Going across income groups, gaps in cognitive ability widen slightly in the early years of schooling.
- They stay constant after age 8.
- Research shows that schooling environments play only a small role in accounting for these gaps or in widening or narrowing them.
- They start early and persist.
- Once we control for early family environments, the gaps narrow.

Figure 8a
Children of NLSY

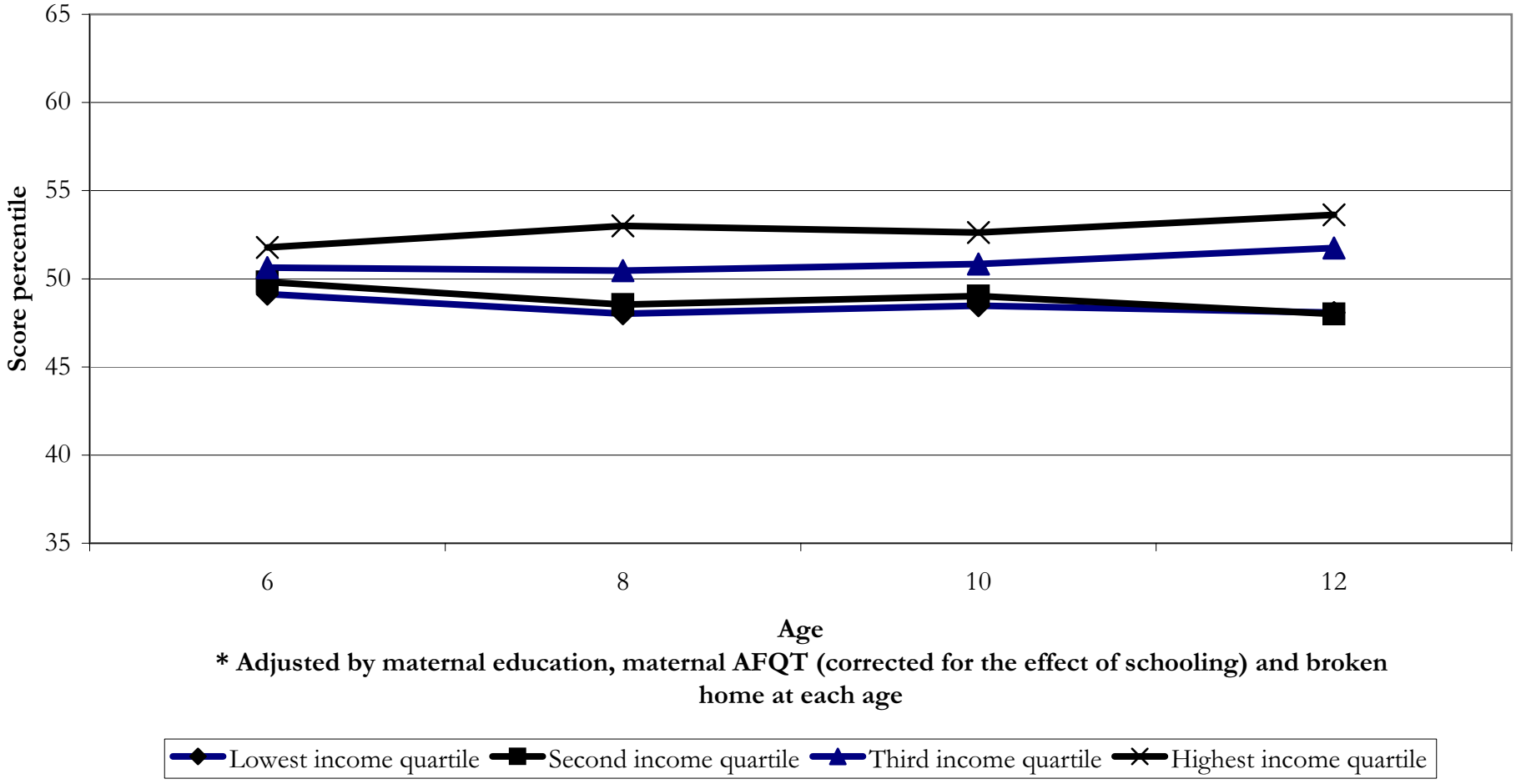
Average percentile rank on PIAT-Math score, by income quartile*



***Income quartiles are computed from average family income between the ages of 6 and 10.**

Figure 8b
Children of NLSY

Adjusted average PIAT-Math score percentiles by income quartile*



*** Adjusted by maternal education, maternal AFQT (corrected for the effect of schooling) and broken home at each age**

- Similar phenomena characterize noncognitive skills.
- Gaps by family income appear early and persist.
- Schooling quality plays only a small role in accounting for gaps or their stability.
- Controlling for early family environments largely eliminates these gaps.

Figure 8c
Children of NLSY

Average percentile rank on anti-social score, by income quartile*

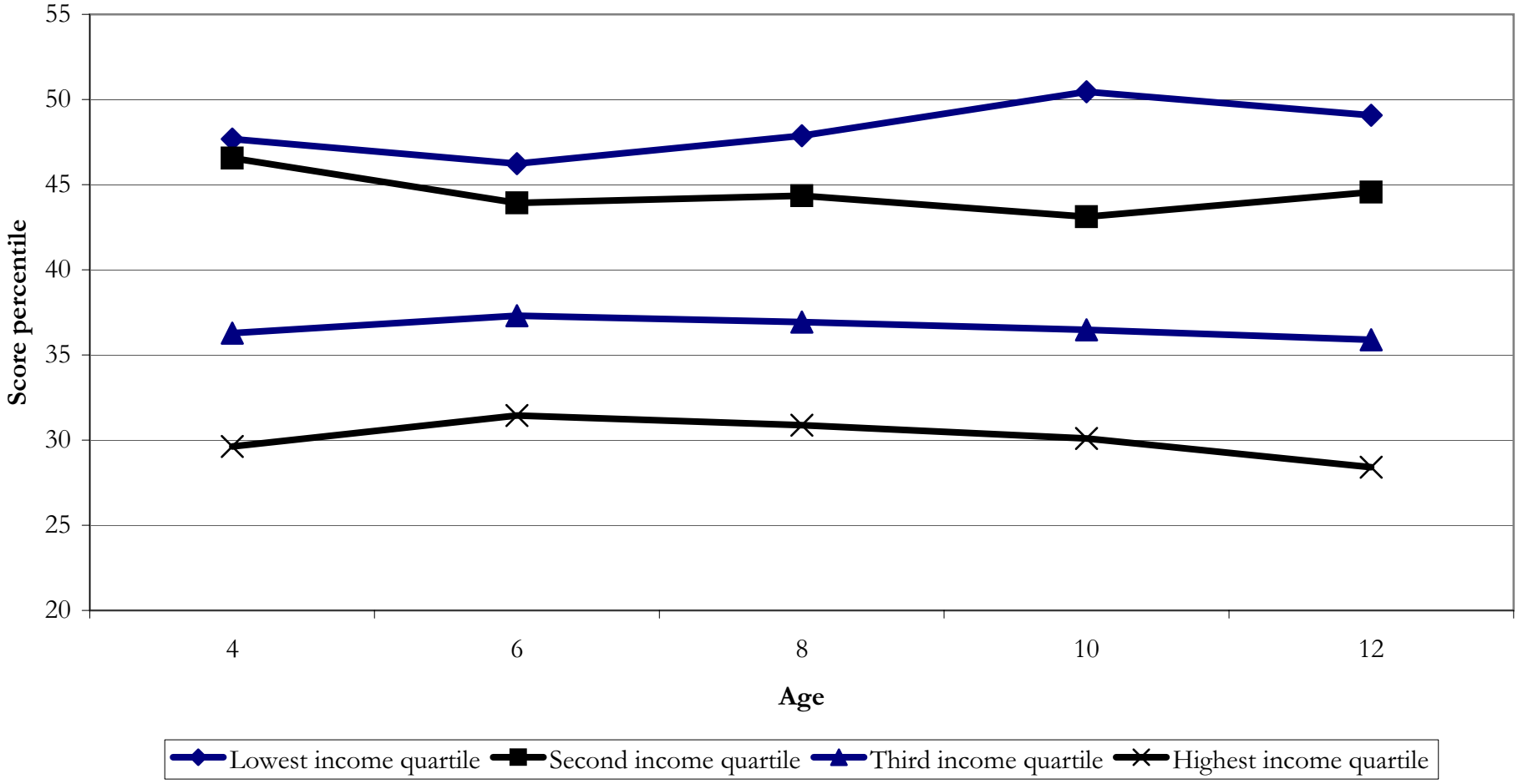
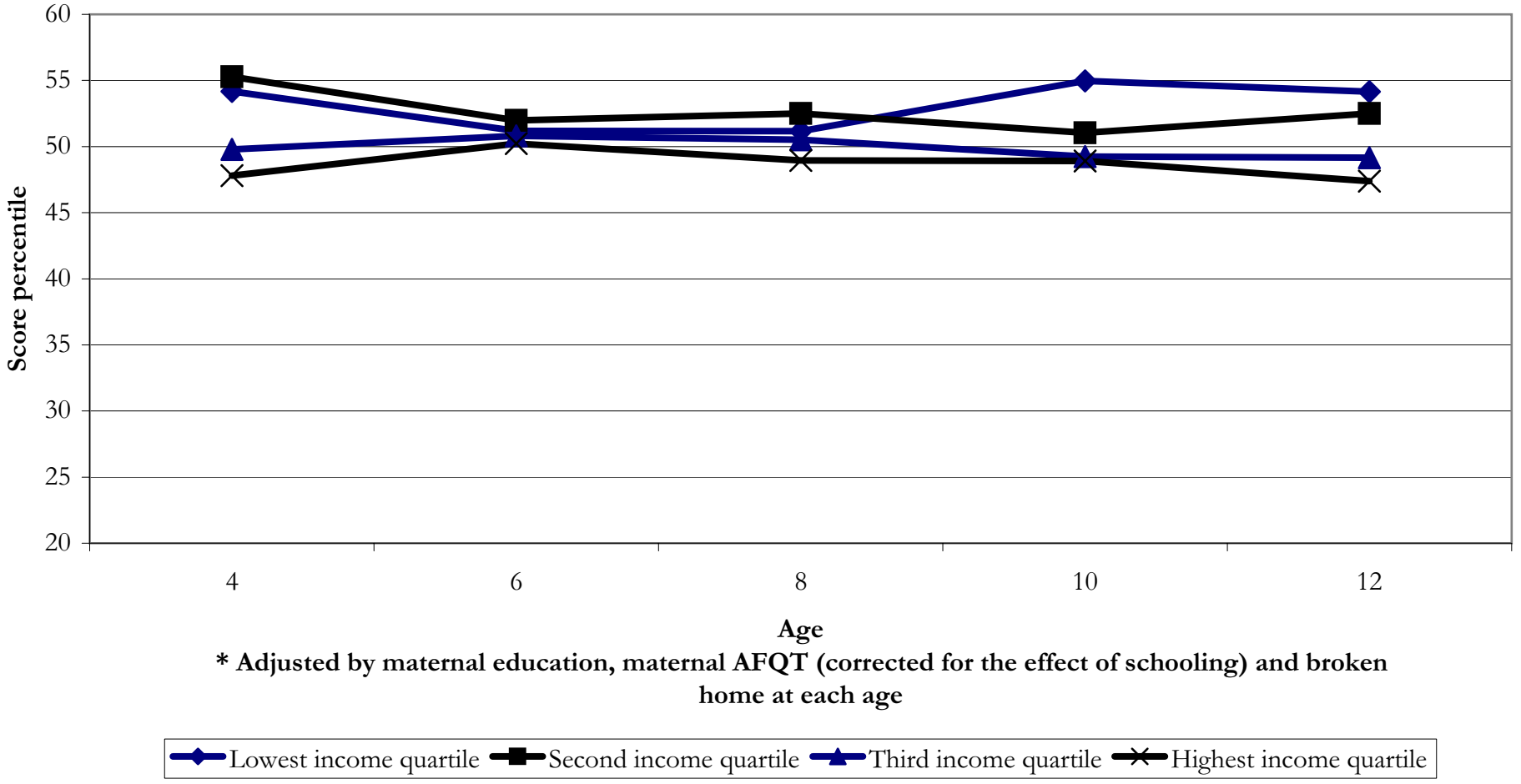


Figure 8d
Children of NLSY

Adjusted average anti-social score percentile by income quartile*



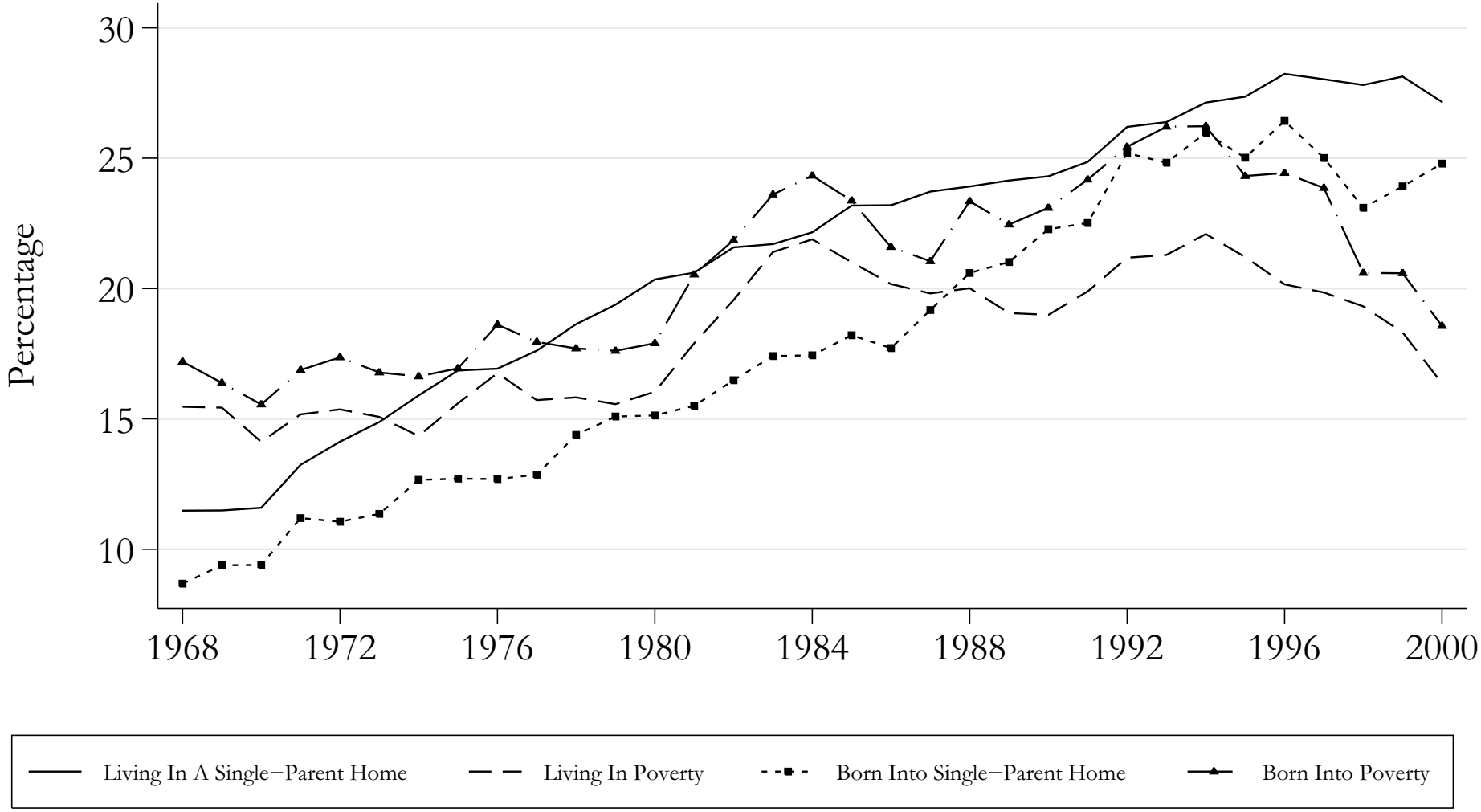
*** Adjusted by maternal education, maternal AFQT (corrected for the effect of schooling) and broken home at each age**

4 Early Family Environments

- Early family environments are major predictors of abilities (both cognitive and noncognitive).
- This is a source of concern because they have deteriorated over the past 30 years.
- Relatively more U.S. children are born into disadvantaged environments compared to 40 years ago (see Figure 9).

Figure 9

Percentage Of All Children Born Or Living In Adverse Environments In Each Year, 1968–2000



Source: Current Population Survey Annual March Supplement, 1968–2000. Poverty is defined as living in a household with income below the federal poverty line, which is adjusted for age and number of family members. Single–parent homes include cohabiting partners.

- Experiments indicate that these empirical relationships are causal. Improvements in family environments affect both cognitive and noncognitive skills.

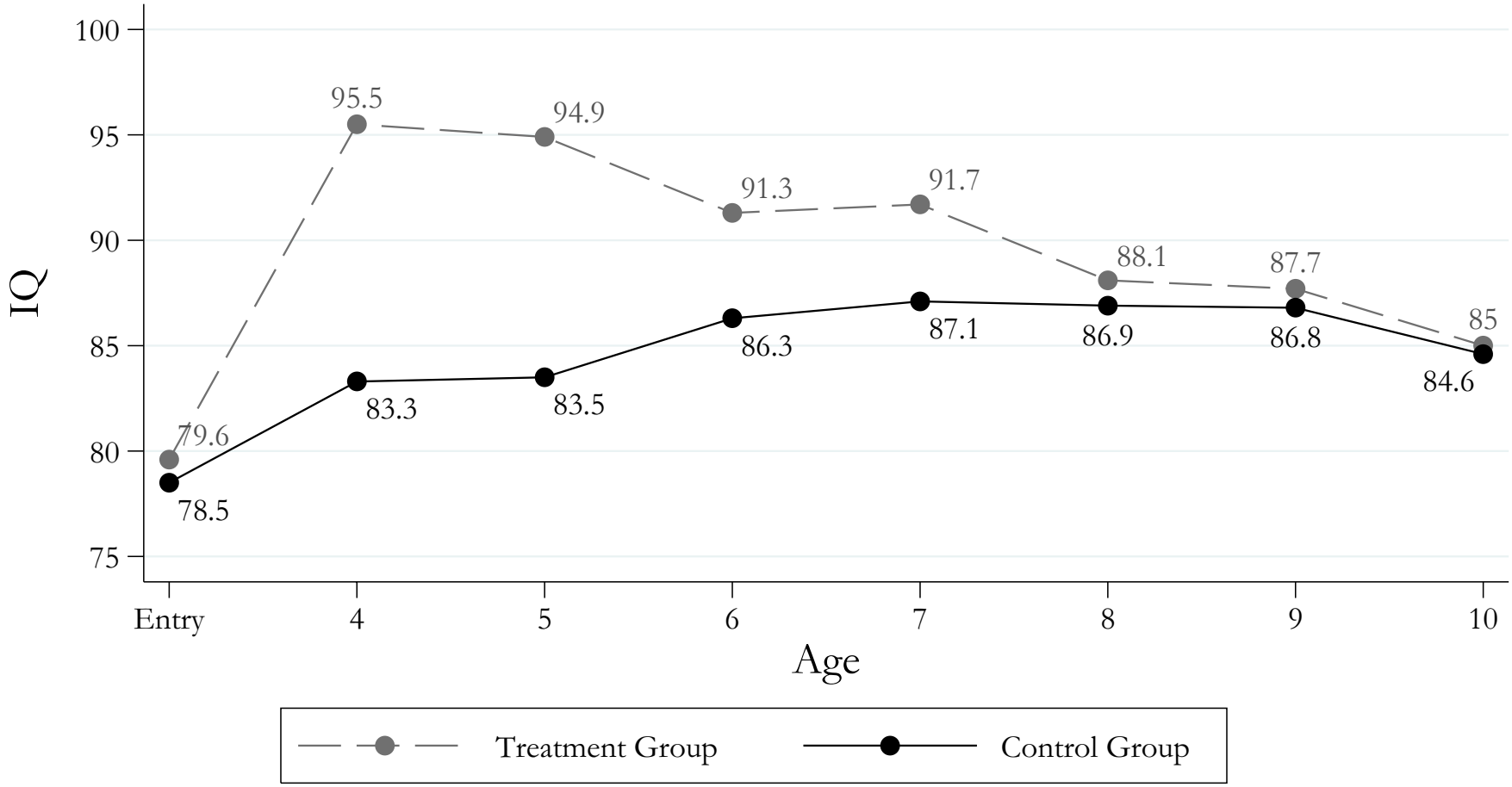
- A great deal of public policy discussion around the world focuses on cognitive test score measurements.

- Head Start was deemed a failure because it did not raise IQ.

- But such a judgement is premature.
- Consider the Perry Preschool Program.
- This was an experimental intervention in the lives of disadvantaged minority children with subnormal IQs.
- The Perry intervention group had no higher IQ scores than the treatment group (see Figure 10a).
- Yet, in a follow up to age 40, the Perry treatment children had higher achievement test scores than did the control children.
- On many dimensions, the Perry treatment children are far more successful than the controls (see Figures 10b–10d).

Figure 10a

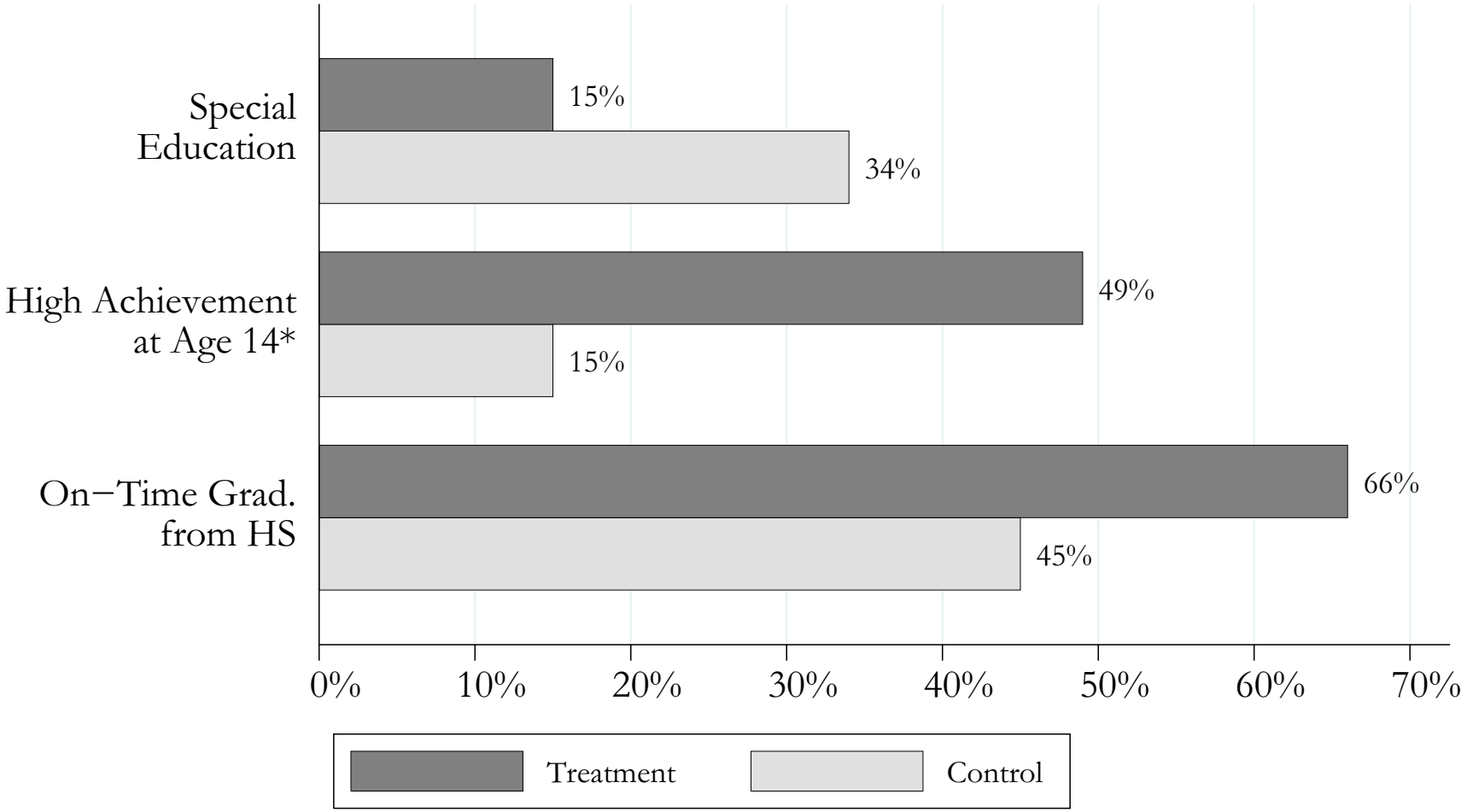
Perry Preschool Program: IQ, by Age and Treatment Group



Source: Perry Preschool Program. IQ measured on the Stanford–Binet Intelligence Scale (Terman & Merrill, 1960). Test was administered at program entry and each of the ages indicated.

Figure 10b

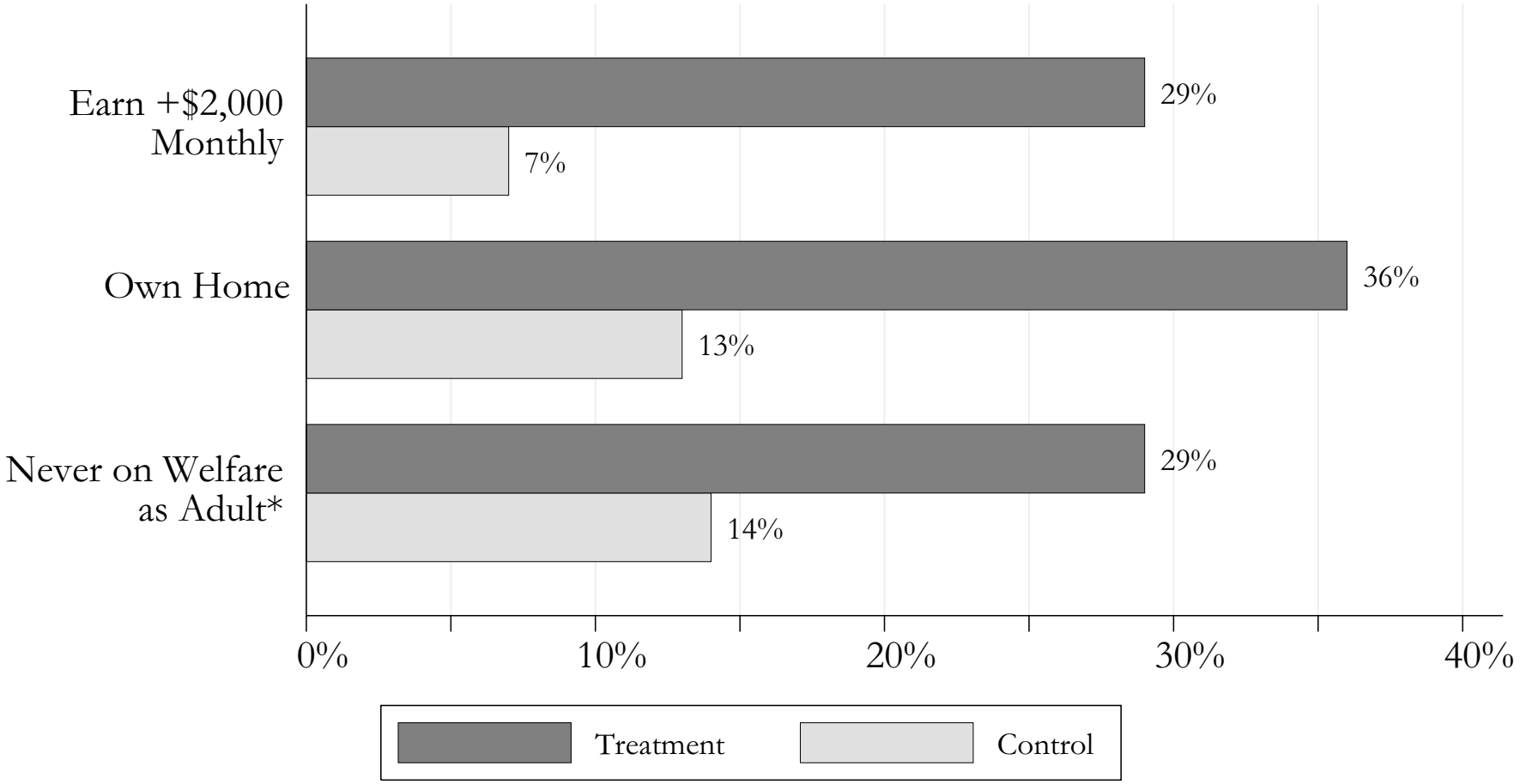
Perry Preschool Program: Educational Effects, by Treatment Group



Source: Barnett (2004). *High achievement defined as performance at or above the 10th percentile.

Figure 10c

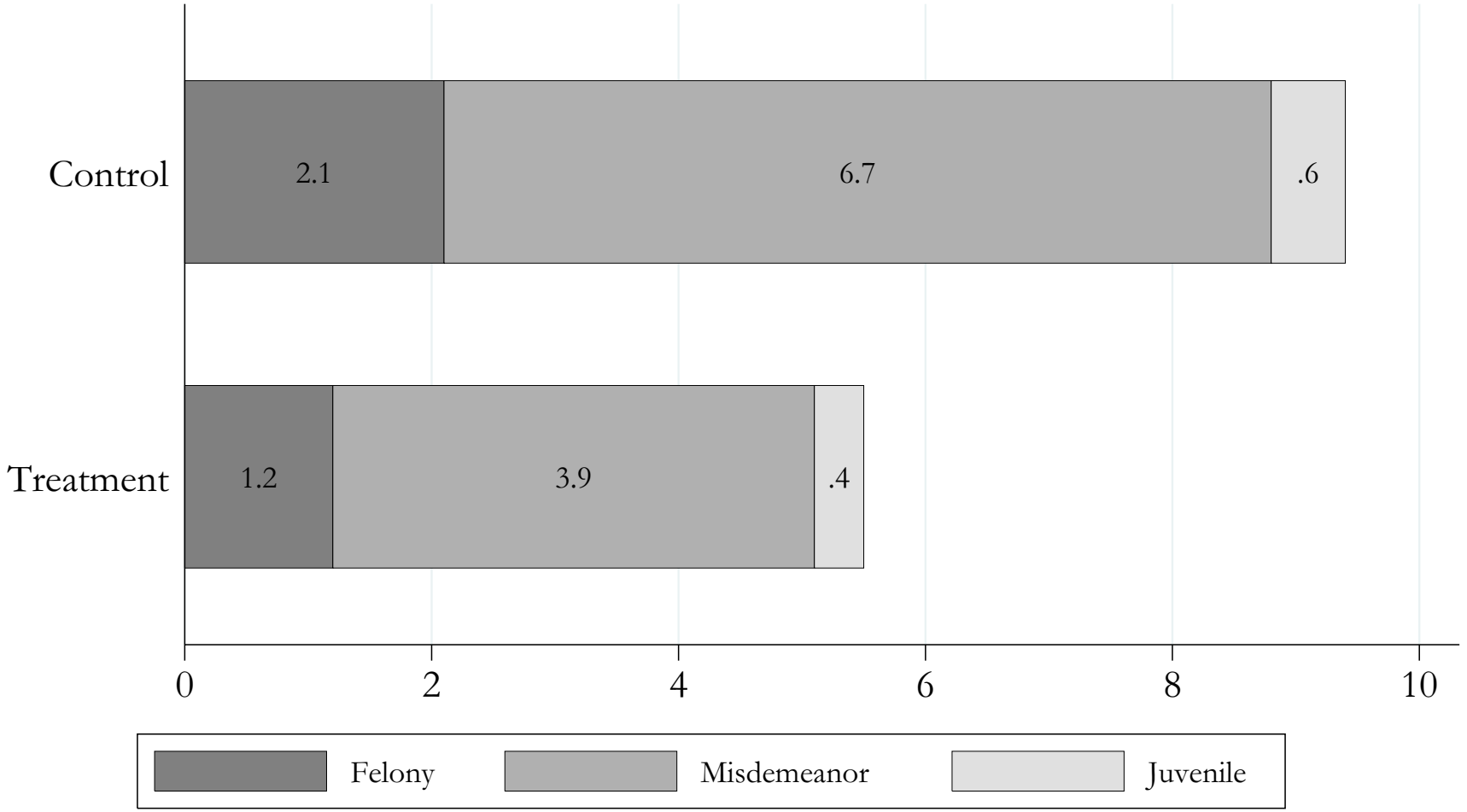
Perry Preschool Program: Economic Effects at Age 27, by Treatment Group



Source: Barnett (2004). *Updated through Age 40 using recent Perry Preschool Program data, derived from self−report and all available state records.

Figure 10d

Perry Preschool Program: Arrests per Person before Age 40, by Treatment Group



Source: Perry Preschool Program. Juvenile arrests are defined as arrests prior to age 19.

- Early interventions can partially compensate for early disadvantage.
- Perry intervened relatively late (at ages 4-6) in the life of the developing child.
- Earlier interventions like the Abecederian program that starts at 4 months permanently raise the IQ and the noncognitive skills of the treatment group over the control group.
- The economic benefits of the Perry Program are substantial.
- Rates of return are 15-17% (see Rolnick and Grunewald, 2003).

- The benefit-cost ratio is eight to one.
- Similar returns are obtained for other early intervention programs.

5 Can We Look to the Schools to Remedy Early Disadvantage?

- A major finding from the research literature is that schools and school quality contribute little to the emergence of test score gaps among children.

- The Coleman (1966) report of the 1960s showed that families and not schools were the major sources of inequality in student performance.

- By the second grade, gaps in test scores across socioeconomic groups are stable by age, suggesting that later schooling has little effect in reducing or widening the gaps that appear early.

- Carneiro and Heckman (2003) perform a cost-benefit analysis of classroom size reduction on adult earnings.

- While smaller classes raise the adult earnings of students, the earnings gains do not offset the costs of hiring additional teachers.

- Because of the dynamics of human skill formation, the abilities and motivations that children bring to school play a far greater role in promoting performance in school than do the traditional inputs that receive so much attention in public policy debates.

6 Tuition Policy

- Evidence from Carneiro and Heckman (2002, 2003) suggests that resources available to children in their college going years play only a small role in socioeconomic and ethnic differentials in attending college.

- At most 8% of the families in American cannot afford to send their children to school.

- While policies targeted to this 8% are cost-effective, the major source of the gaps in college attendance is gaps in the abilities that children have in their late teens.

- These ability gaps are formed much earlier in life.

7 Remediation

- America is a second chance society.
- Americans believe in the possibility of redemption and renewal.
- American bankruptcy laws and educational policy reflect a fundamental optimism about the possibility of human change.
- However, the track record of criminal rehabilitation programs, adult literacy programs and public job training programs is poor.

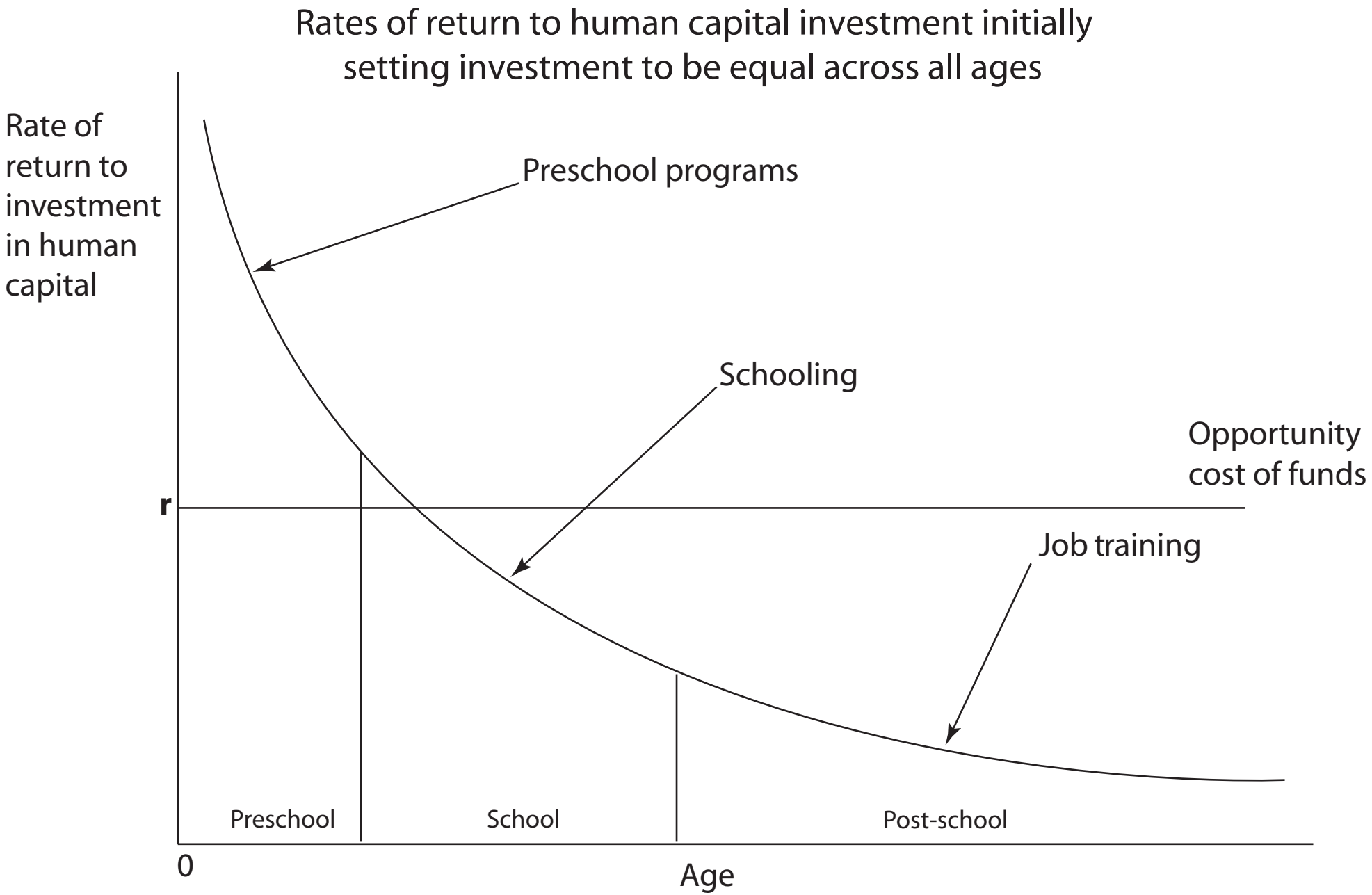
- Recent studies of adult literacy programs show that the main reason they fail is that people do not stick with the programs.
- A failure of noncognitive skills.
- A few selectively targeted versions of these programs may yield modest benefits.
- None of these late-stage remediation programs raise participants out of poverty.
- The dynamics of human skill formation as analyzed in Cunha and Heckman (2003) and Cunha, Heckman, Lochner, and Masterov (2006) reveal that later compensation for deficient early family environments is very costly.

- Lack of early skill and motivation begets lack of future skill and motivation.

- If we wait too long to compensate for the accident of birth, it becomes economically inefficient to invest in the skills of the disadvantaged.

- A serious tradeoff exists between equity and efficiency for adolescent and young adult skill policies.
- There is no such tradeoff for policies targeted toward disadvantaged young children.
- Figure 11 captures the findings of a large literature.

Figure 11



Rates of return to human capital investment initially setting investment to be equal across all ages

- The economic returns to early interventions are high.
- The returns to later interventions are lower.
- The reason is the technology of skill formation.
- Skill begets skill and early skill makes later skill acquisition easier.
- Remedial programs in the adolescent and young adult years are much more costly in producing the same level of skill attainment in adulthood.
- Most are economically inefficient.
- Children from advantaged environments by and large receive substantial early investment.

- Children from disadvantaged environments more often do not.

- There is a strong case for public support for funding interventions in early childhood for **disadvantaged** children although the interventions do not have to be conducted in public centers.

- Vouchers for use in private providers might allay the concerns of many parents who want to determine the values held by their children and yet who want to enrich their children's early cognitive and noncognitive stimulation.

8 Summary

Summarizing the argument,

I. Life cycle skill formation is dynamic in nature. Skill begets skill; motivation begets motivation. If the seed is not planted and watered early, it will produce a stunted adult.

II. Many major economic and social problems can be traced to low levels of skill and ability in the population.

III. Abilities are multiple in nature.

IV. Much public policy discussion focuses on cognitive ability and especially IQ.

V. Socioemotional skills are also important for success in life.

VI. Motivation, perseverance and tenacity feed into performance in society at large and even affect scores on achievement tests.

VII. Early family environments are major predictors of both cognitive and socioemotional abilities.

VIII. The previous point is a major source of concern because family environments in the U.S. and many other countries around the world have deteriorated over the past 40 years.

IX. Experiments support the evidence that adverse family environments promote adult failure.

X. If we intervene early enough, we can affect both cognitive and socioemotional abilities.

XI. Early interventions promote schooling, reduce crime, promote workforce productivity and reduce teenage pregnancy.

XII. These interventions have high benefit-cost ratios and rates of return.

XIII. Early interventions have much higher returns than other later interventions such as reduced pupil-teacher ratios, public job training, convict rehabilitation programs, tuition subsidies or expenditure on police.