The Gift of Moving: Intergenerational Consequences of a Mobility Shock

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Why do wages differ so much across space?

1. Large moving costs
   - Stop people from flowing to high income (e.g., urban) locations

     e.g. Munshi-Rosenzweig 16; Bryan-Morten 18

2. Sorting of heterogeneous workers
   - High skill workers sort into some locations

     e.g. Young 13; Lagakos-Waugh 13

- How can we tell the difference?
- Large, exogenous relocation shocks are few and far between.

Evidence on Moving Costs

- Structural models of migration
  - Kennan-Walker 11; Munshi-Rosenzweig 16; Bryan-Morten 18;
- Small literature on moving "experiments"
  - Bryan et al. 14: $8.50 bus ticket raises consumption by 30-35%
  - Chetty et al. 16; Chyn 18: Moving away from low income locations
  - Sarvimaki et al. 16: Forced migration in Finland after WWII
  - Sacerdote 12, Deryugina et al 18: Hurricane Katrina
- Suggests large moving costs
  - Do benefits accrue only if one is moving away from a "bad" location?
  - Does everyone benefit from moving?

Our Volcanic Experiment

- Jan 23 1973: Volcanic eruption on tiny Westman Islands off the coast of Iceland
  - All inhabitants forced to leave
  - Eruption destroys 1/3 or houses
  - Inhabitants of destroyed houses less likely to return
- Eruption is a large, quasi-random mobility shock
- We gathered data on exactly which houses were destroyed
- Match it with 34 years of tax data on inhabitants and their children

Preview of Results: Reversal of Fortune

Cohorts younger than 25 at time of eruption:

- Destruction of house led to large *gains*
- Average effect of moving on earnings $27,000 per year
  - Effect on median: $20,000 per year
  - Effect on 95% quantile: $47,000 per year
- Education increased by 3.5 years on average

  Education of their descendants increased by 5 years

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Cohorts older than 25 at time of eruption faired worse:

- Income fell slightly

Suggests intergenerational differences in returns to moving may be an important barrier to mobility

Large Moving Costs

Evidence suggests large barriers to moving (broadly defined)

- If not, control group should have migrated away
- Causal effect on life-time earnings for cohorts 25 and younger is roughly $375,000 in net present value
- Similar to earlier structural estimates (e.g., Kennan-Walker, 11)

Moving Away from Opportunity?

- Westman Islands was (and is) a very high income town (e.g., higher income than capital area)
- Treated group moving **away** from opportunity (from the perseptive of average income)
- How can causal effect be so positive in this case?

Population Trends | Fish Catch | High Income Town

Importance of Comparative Advantage

- Most compelling interpretation is **comparative advantage**
- Westman Islands highly specialized
  - Great place for some (those good at fishing)
  - Bad place for others (computer whiz, great legal mind)
- Present a Roy model with OLG and moving costs:
  - Large gains for compliers (ill suited to live in Westman Islands)
  - Smaller (potentially negative) gains for others
  - Larger gains for younger cohorts (reoptimize education)

Empirical Strategy and Data

A Volcanic Experiment

- Jan 23 1973: Volcanic eruption in tiny Westman Islands off the coast of Iceland
  - Westman Islands had 5200 inhabitants
  - Eruption started 300 yards from edge of town
  - All inhabitants evacuated by sea within 4 hours (only one casualty)

FIGURE 1: Prior to the Eruption (Photo © Mats Wibe Lund)

FIGURE 2: During the Eruption

FIGURE 3: Post Eruption (Photo © Mats Wibe Lund)

FIGURE 4: Destroyed Area: Prior to the eruption

FIGURE 5: Destroyed Area: Post eruption

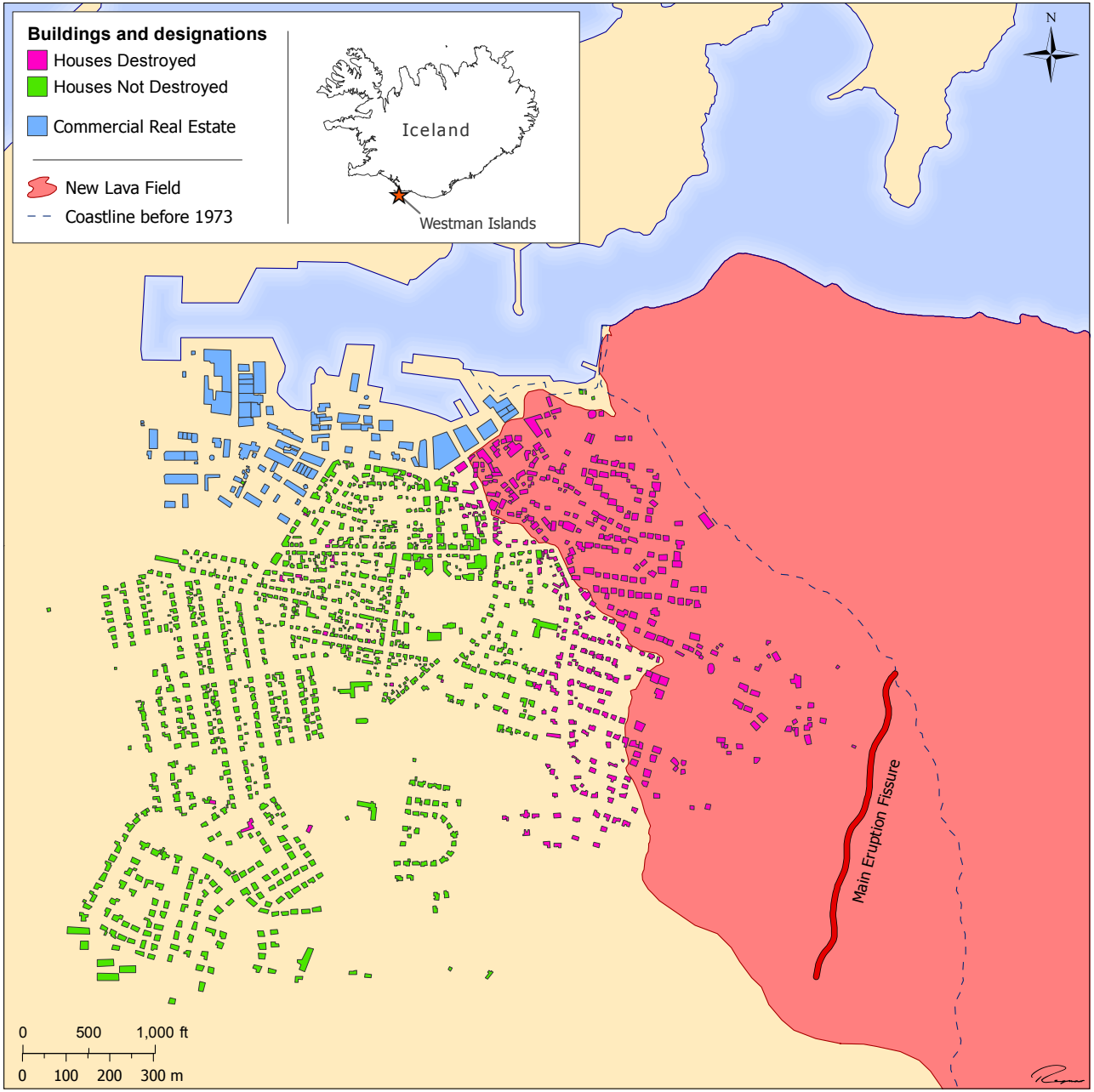

FIGURE 6: Post-Eruption Map of Town

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- Eruption destroys 1/3 or houses
  - Inhabitants start returning in summer/fall, many returned by end of 1975
  - Inhabitants of destroyed houses less likely to return

    Disaster Relief: Families that lost their houses were “cashed out”

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    Disaster Relief: Families that lost their houses were “cashed out”
- Eruption is a large, quasi-random mobility shock

A Shock to Mobility

Table 1: Probability of Moving

	P(Move)	Sample
Overall	0.311	4,807
House Destroyed	0.420	1,341
House Not Destroyed	0.269	3,466

Empirical Strategy

IV Regression:

$$Y_{it} = \alpha + \beta Moved_i + X_i'\gamma + \delta_t + \epsilon_{it} \quad (1)$$

First Stage:

$$Moved_i = \alpha + \phi Destroyed_i + X_i'\gamma + \eta_{it} \quad (2)$$

- Y_{it}: Income or education
- $Moved_i$: Indicator for having moved as of 1975
- $Destroyed_i$: Indicator for living in house that was destroyed

Heterogeneous Effects by Cohort

- Report results separately for cohorts:
  - Younger than 25 at time of eruption
  - 25 and older at time of eruption
  - Descendants
- Also explore other formulations (linear in age, etc.)

Main Data

- Administrative data on:
  - Who lived in Westman Islands at time of eruption (National Registry)
  - Which house each person lived in (National Registry)
  - Which houses were destroyed (Disaster Relief Fund)
  - Value and age of houses (Property Registry)
- Genealogical data to identify all decedents (deCODE Genetics)
- Outcome variables for inhabitants and decedents
  - Income and assets 1981-2014 (from tax records)
  - Education as of 2011 (Statistics Iceland)

First Stage

Table 2: Probability of Moving

	Dependent variable: Moved					
	All		Younger than 25		25 and older	
	(1)	(2)	(3)	(4)	(5)	(6)
Destroyed	0.151***	0.160***	0.114***	0.126***	0.194***	0.202***
	(0.030)	(0.029)	(0.035)	(0.034)	(0.031)	(0.030)
Control Mean	0.269	0.269	0.284	0.284	0.250	0.250
Controls	No	Yes	No	Yes	No	Yes
F-statistic	17.9	21.1	10.9	13.6	25.8	27.7

Notes: Controls: gender, age, change house after 1960, born in the Westman Islands. Robust standard errors clustered by address in parentheses. *** p<0.01, ** p<0.05, * p<0.1

TABLE 3: Summary Statistics and Balance Tests

	Younger than 25		25 and older	
	Control Mean	Treatment vs. Control	Control Mean	Treatment vs. Control
Value of house (2014 $)	65,576	-306	61,321	-111
		(2,146)		(2,420)
House construction year	1943.2	-1.76*	1941.2	-2.45**
		(0.96)		(0.97)
Female (%)	0.48	0.023	0.48	0.002
		(0.022)		(0.022)
Age	11.8	0.22	46.1	0.81
		(0.29)		(0.72)
Married (%)	0.08	-0.006	0.76	0.010
		(0.011)		(0.019)
Nr. of children	0.14	-0.030	1.86	-0.018
		(0.018)		(0.077)
Widowed (%)	0.00	0.00	0.08	-0.01
		(0.00)		(0.01)
Divorced (%)	0.00	-0.00	0.03	-0.01
		(0.00)		(0.01)
Years of schooling	–	–	11.95	0.17
		–		(0.17)
Change house after 1960 (%)	0.61	-0.02	0.46	0.01
		(0.02)		(0.02)
Born in the Westman Islands (%)	0.78	0.05***	0.47	0.03
		(0.02)		(0.02)
Missing (%)	0.02	-0.01	0.12	0.02
		(0.01)		(0.02)
N	1,935		1,782	

Notes: Robust standard errors in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

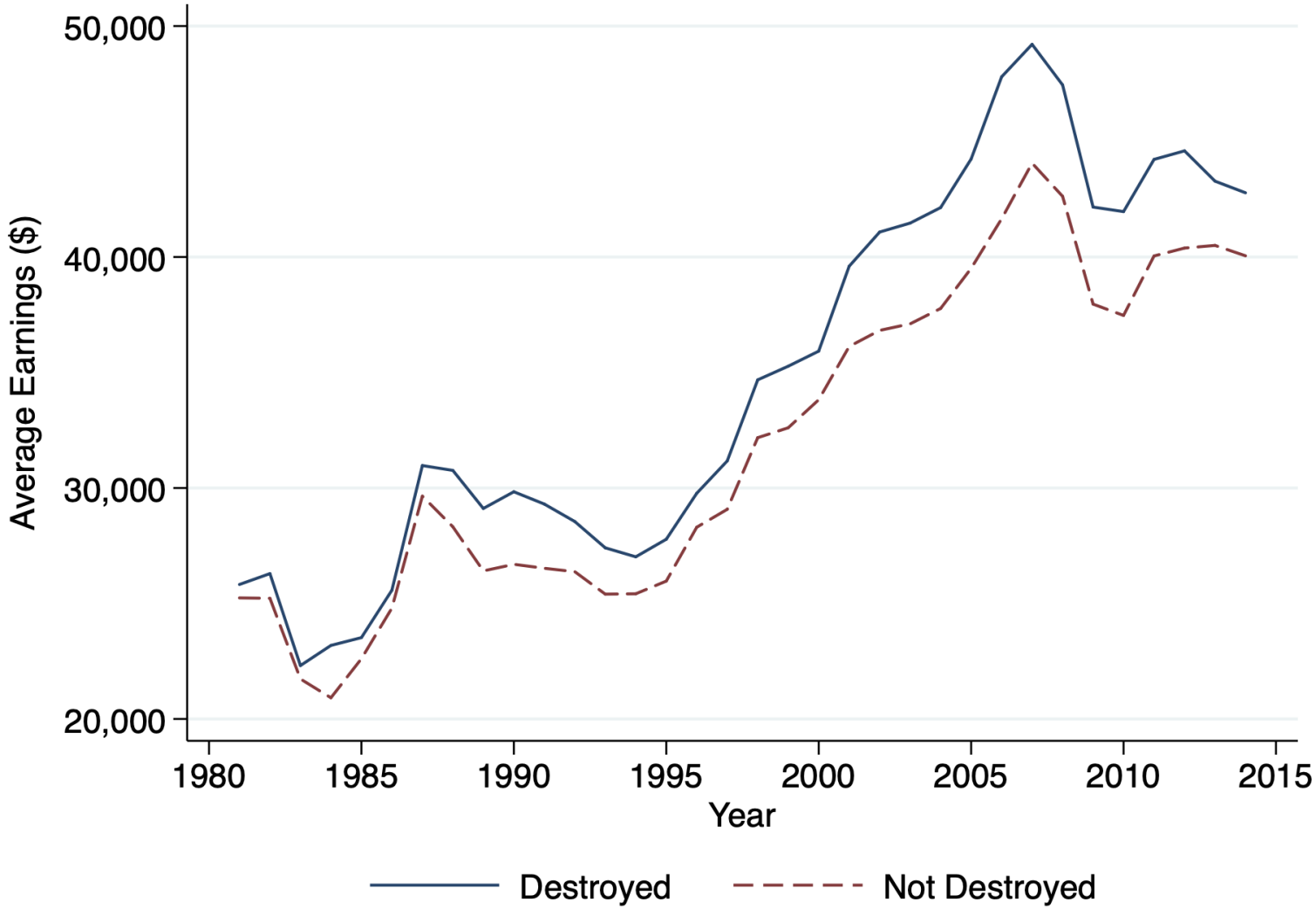
Earnings Effects

Earning Data

- Focus on labor earning from individual tax records
  - Includes wage earnings and proprietor's labor earnings
  - Excludes capital income, transfers, "other income"
    (We also have results on total income. Similar results.)
- Sample period: 1981-2014
- Focus on years when individual is prime age (i.e., 25 to 65)
- Earnings adjusted for inflation (2014 prices) and converted into U.S. dollars (125 ISK = 1 USD)

Earnings by Year

Cohorts Younger than 25 at Time of Eruption



Reduced Form Earnings Effects

Cohorts Younger than 25 at Time of Eruption

	(1)	(2)
Destroyed	3,037**	3,404***
	(1,485)	(1,279)
Controls	No	Yes
Age fixed effects	No	Yes
Year fixed effects	No	Yes
Control mean	33,347	33,347
Observations	68,539	68,539

Notes: Reported in US dollars as of 2014 (125 ISK = 1 USD). Controls: gender, change house after 1960, born in the Westman Islands. Robust standard errors clustered by address in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

IV Earnings Effects

Cohorts Younger than 25 at time of Eruption

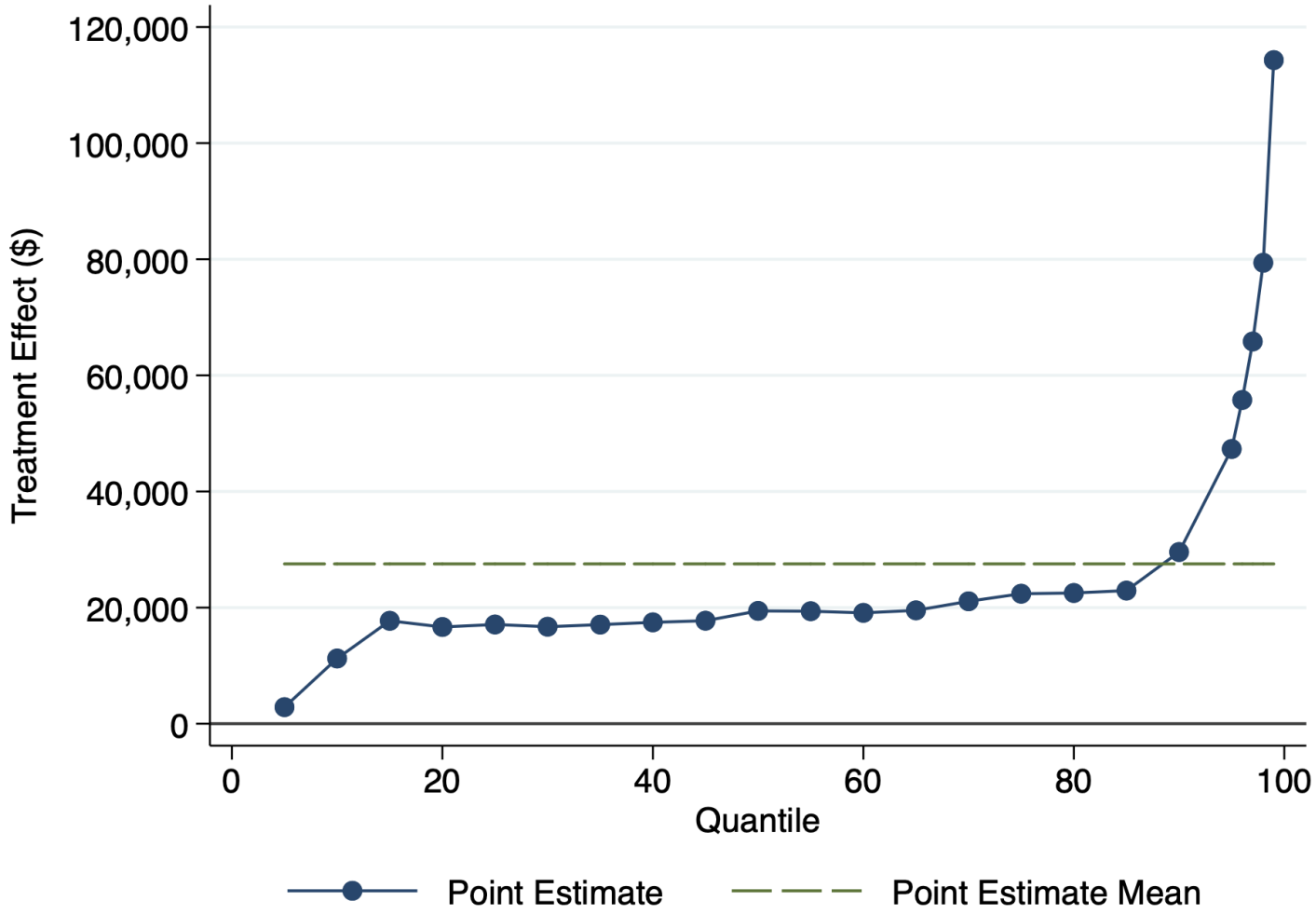
	(1) Wald	(2) IV	(3) OLS	(4) OLS
Moved	26,628*	27,489**	-2,570**	-1,905*
	(15,638)	(13,135)	(1,149)	(1,047)
Controls	No	Yes	No	Yes
Age fixed effects	No	Yes	No	Yes
Year fixed effects	No	Yes	No	Yes
Control mean	33,347	33,347	–	–
Observations	68,539	68,539	68,539	68,539

Notes: Reported in US dollars as of 2014 (125 ISK = 1 USD). Controls: gender, change house after 1960, born in the Westman Islands. Robust standard errors clustered by address in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

5 Year Subsamples | Drop Pension

Earnings Quantile Treatment Effect

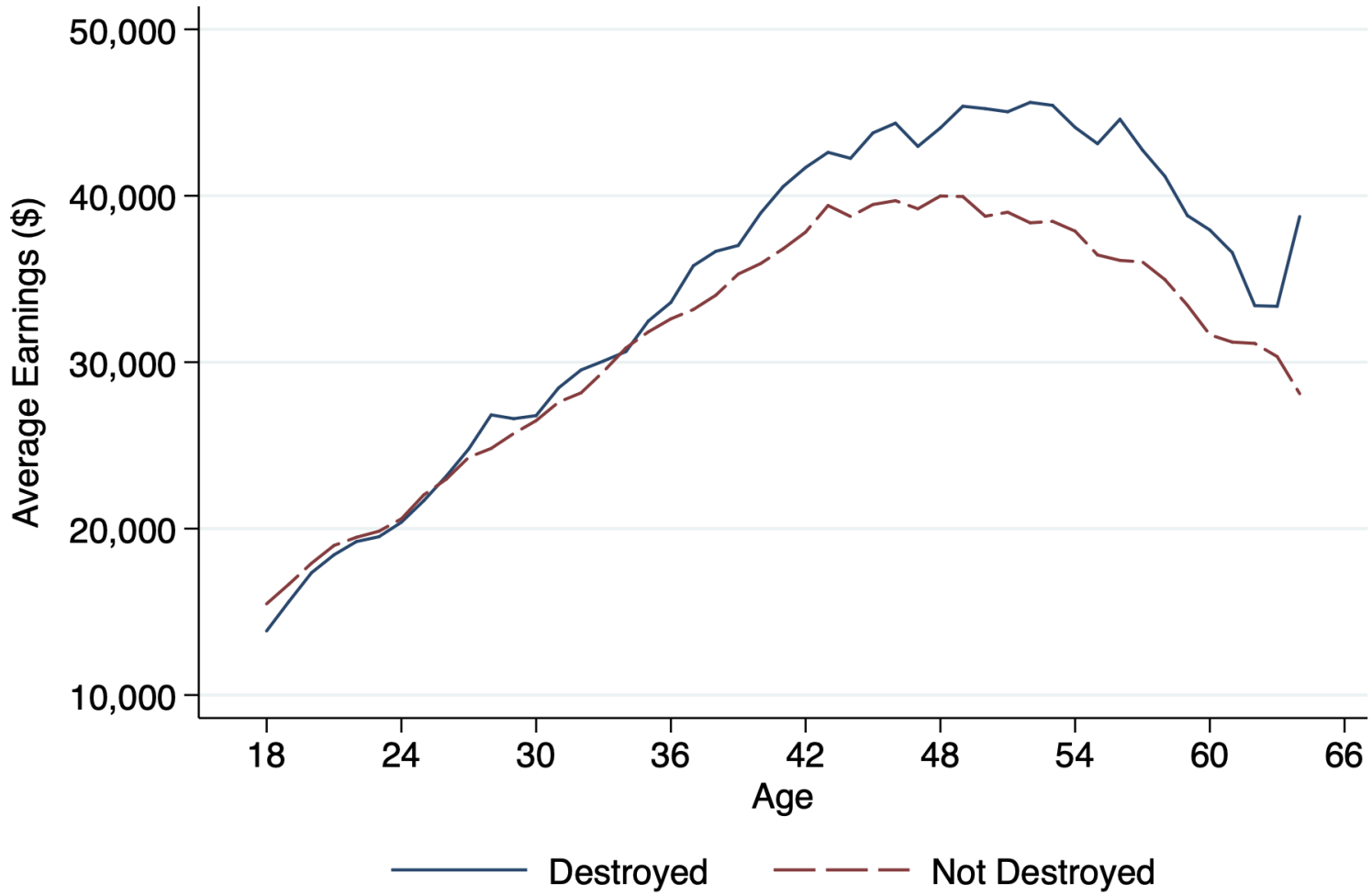
Cohorts Younger than 25 at time of Eruption



Reduced Form | Log Earnings

Age Profile of Reduced Form Earnings Effect

Cohorts Younger than 25 at time of Eruption



No Earnings Effect for Older Cohorts

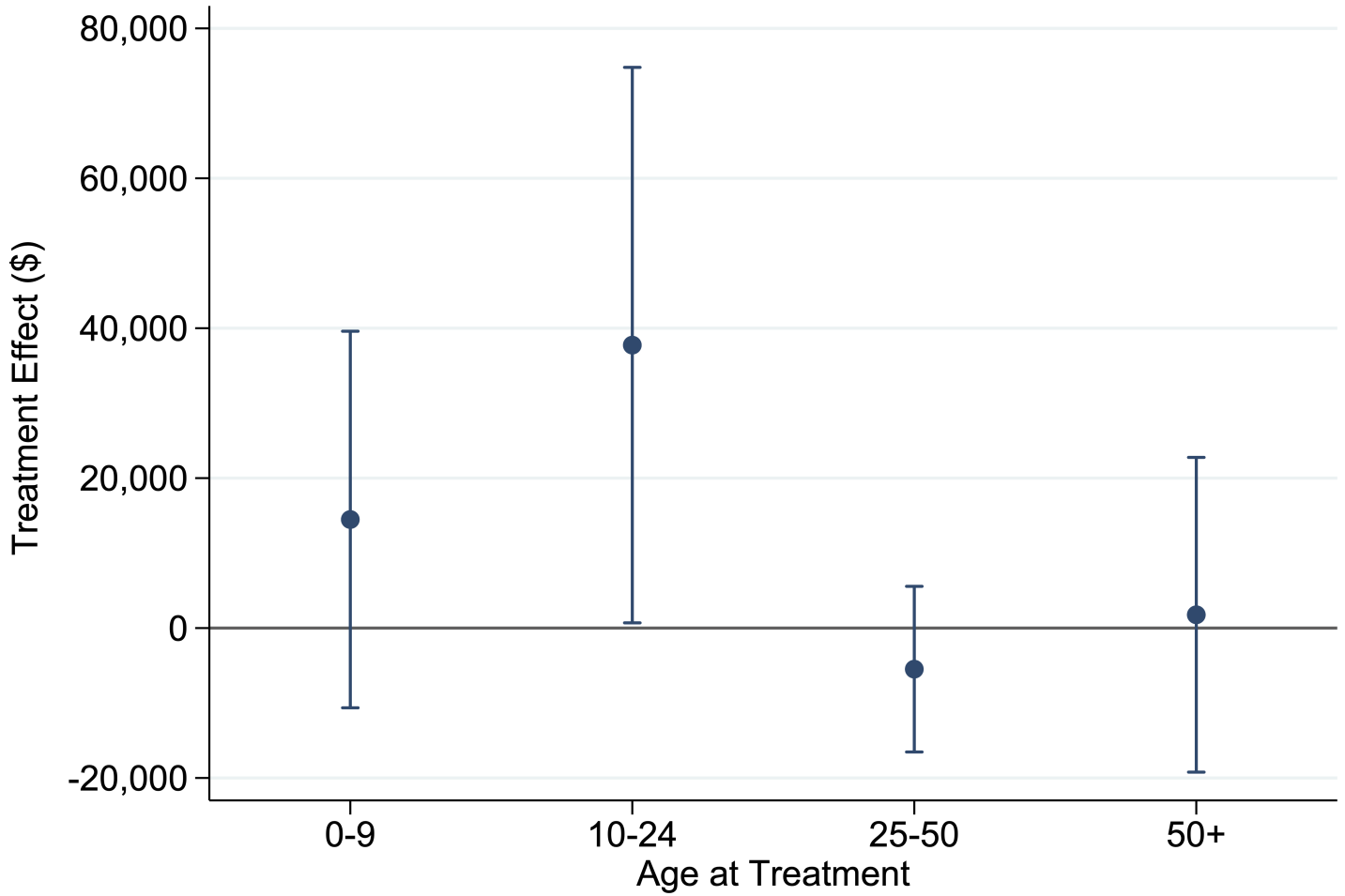
Cohorts 25 and Older at time of Eruption

	(1) Wald	(2) IV	(3) OLS	(4) OLS
Moved	-5,265	-3,930	-3,323***	-3,019***
	(5,149)	(5,377)	(1,029)	(953)
Controls	No	Yes	No	Yes
Age fixed effects	No	Yes	No	Yes
Year fixed effects	No	Yes	No	Yes
Control mean	28,089	28,089	–	–
Observations	30,861	30,861	30,861	30,861

Notes: Controls: gender, change house after 1960, born in the Westman Islands. Robust standard errors clustered by individual in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Quantile Regressions

IV Earnings Effect – Four Age Groups



Education Effects

Large Education Effect for Younger Cohorts

Cohorts Younger than 25 at time of Eruption

Dependent Variable: Years of Schooling				
	(1) IV	(2) IV	(3) OLS	(4) OLS
Moved	3.58*	3.60**	0.123	0.134
	(1.98)	(1.76)	(0.159)	(0.143)
Controls	No	Yes	No	Yes
Control mean	13.51	13.51	–	–
N	2,262	2,262	2,262	2,262

Notes: Controls: gender, cohort, change house after 1960, born in the Westman Islands. Robust standard errors clustered by individual in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Years of Schooling Variable | Mostly Junior College | Returns to Education

Even Larger for Descendants

Children of Younger Cohorts. Born after Eruption.

Dependent Variable: Years of Schooling				
	(1)	(2)	(3)	(4)
	IV	IV	OLS	OLS
Moved	7.25**	5.20**	-0.61***	-0.14
	(3.27)	(2.31)	(0.12)	(0.11)
Controls	No	Yes	No	Yes
Control mean	12.71	12.71	–	–
N	3,207	3,207	3,207	3,207

Notes: Controls: gender, cohort. Robust standard errors clustered by individual in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Descendants First Stage Earnings Effect

No Education Effects for Older Cohorts

Cohorts 25 and Older at time of Eruption

Dependent Variable: Years of Schooling				
	(1)	(2)	(3)	(4)
	IV	IV	OLS	OLS
Moved	0.82	1.17	0.11	0.11
	(0.82)	(0.80)	(0.16)	(0.16)
Controls	No	Yes	No	Yes
Control mean	11.95	11.95	–	–
N	1,101	1,101	1,101	1,101

Notes: Controls: gender, cohort, change house after 1960, born in the Westman Islands. Robust standard errors clustered by individual in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Interpretation

Interpretation

1. Large moving costs
   - Compensating differentials?
2. Comparative advantage
   - Simple Roy model
   - Evidence of comparative advantage
   - Contrast vs. absolute advantage (AKM)
3. Informational frictions and intergenerational bargaining
4. Returns to education

Net Present Value of Moving

Adopt the view of a 18 year old complier at the time of the eruption

- Age profile of effects of moving we estimate
- Assume the future is discounted at 4% per year
- Causal effect on life-time earnings is roughly $375,000 in net present value

Suggests large barriers to moving (broadly defined)

- Otherwise the control group should have moved away

Compensating Differentials?

- Not from prices
  - Goods prices higher in the Westman islands, less variety
- Most likely source is cultural factors
  - But hard to square with pattern of effects
  - Effect on income smallest for older cohorts; grows for younger cohorts, unborn (who may never have lived in Westman Islands)
  - Would expect cultural affinities to have opposite pattern

But hard to rule out compensating differentials beyond the shadow of a doubt

Other Life Outcomes Improved by Lava Shock

Cohorts younger than 25 at time of eruption:

- 9% less likely receive (early) pension (e.g. due to disability)
- 3% less likely to die before age 50 (imprecisely estimated)
- 17% more likely to get married (imprecisely estimated)
- No change in number of children

Cohorts older than 25 at time of eruption:

- 2% less likely to die before age 50
- No other significant effects on these outcomes

Results for Younger Cohorts | Results for Older Cohorts | Earnings effect dropping pension

Moving Away from Opportunity?

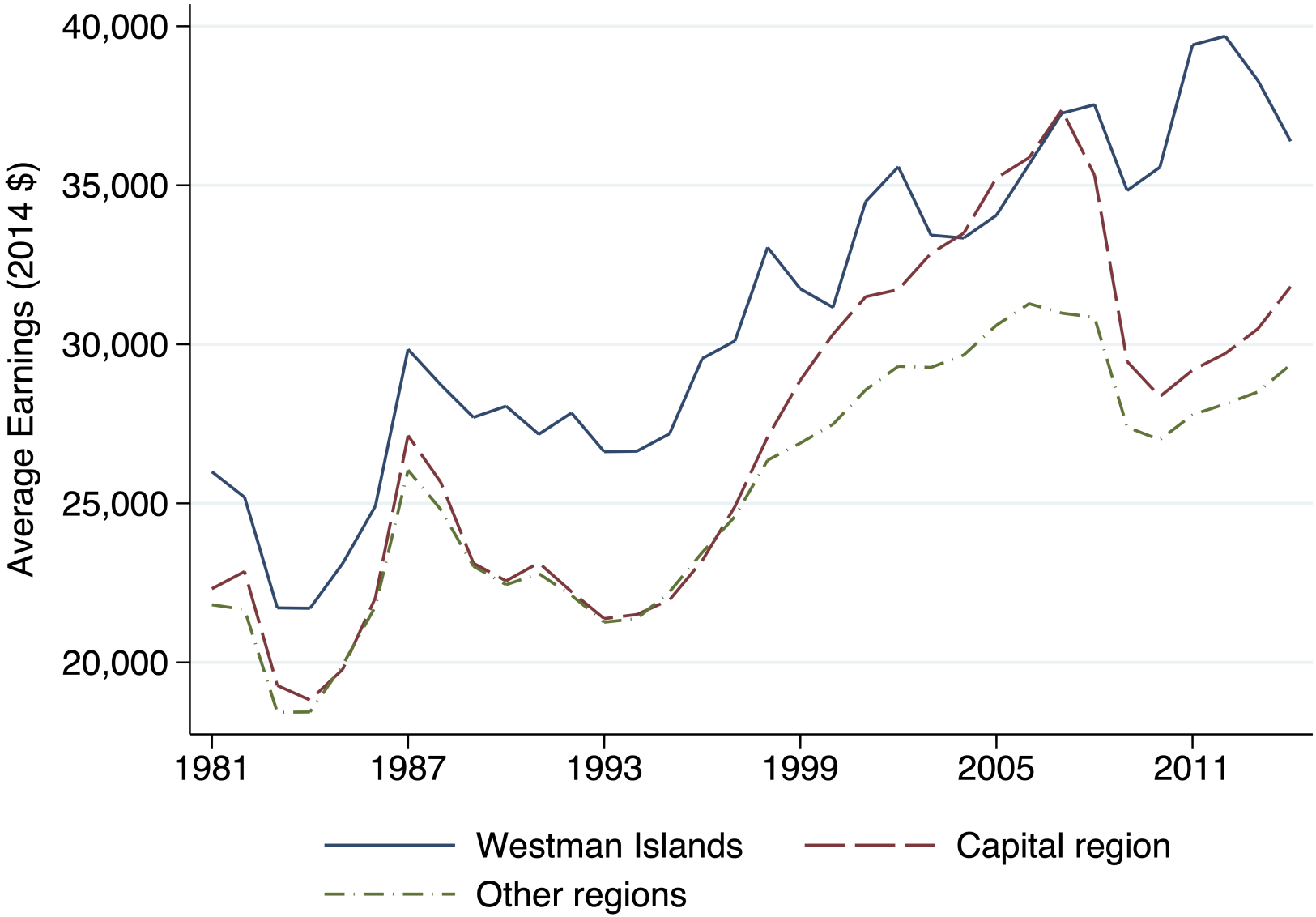
- Westman islands was (and is) a high income place
  - Contrasts vs. MTO, which is about moving to a *richer* place

Moving Away from Opportunity?

- Westman islands was (and is) a high income place
  - Contrasts vs. MTO, which is about moving to a *richer* place

- Why would moving away from a high income town make you richer?

Westman Islands High Income Fishing Town

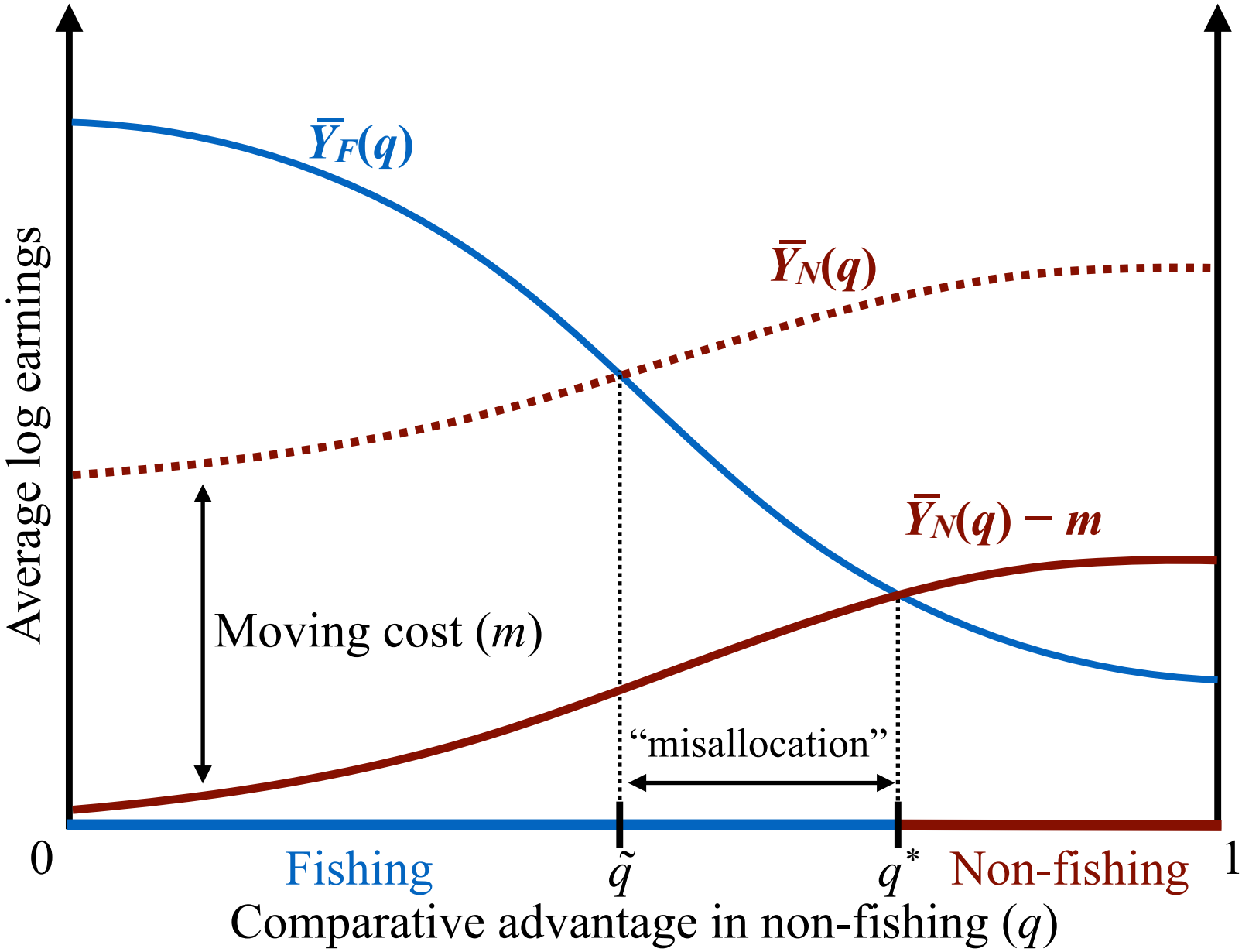


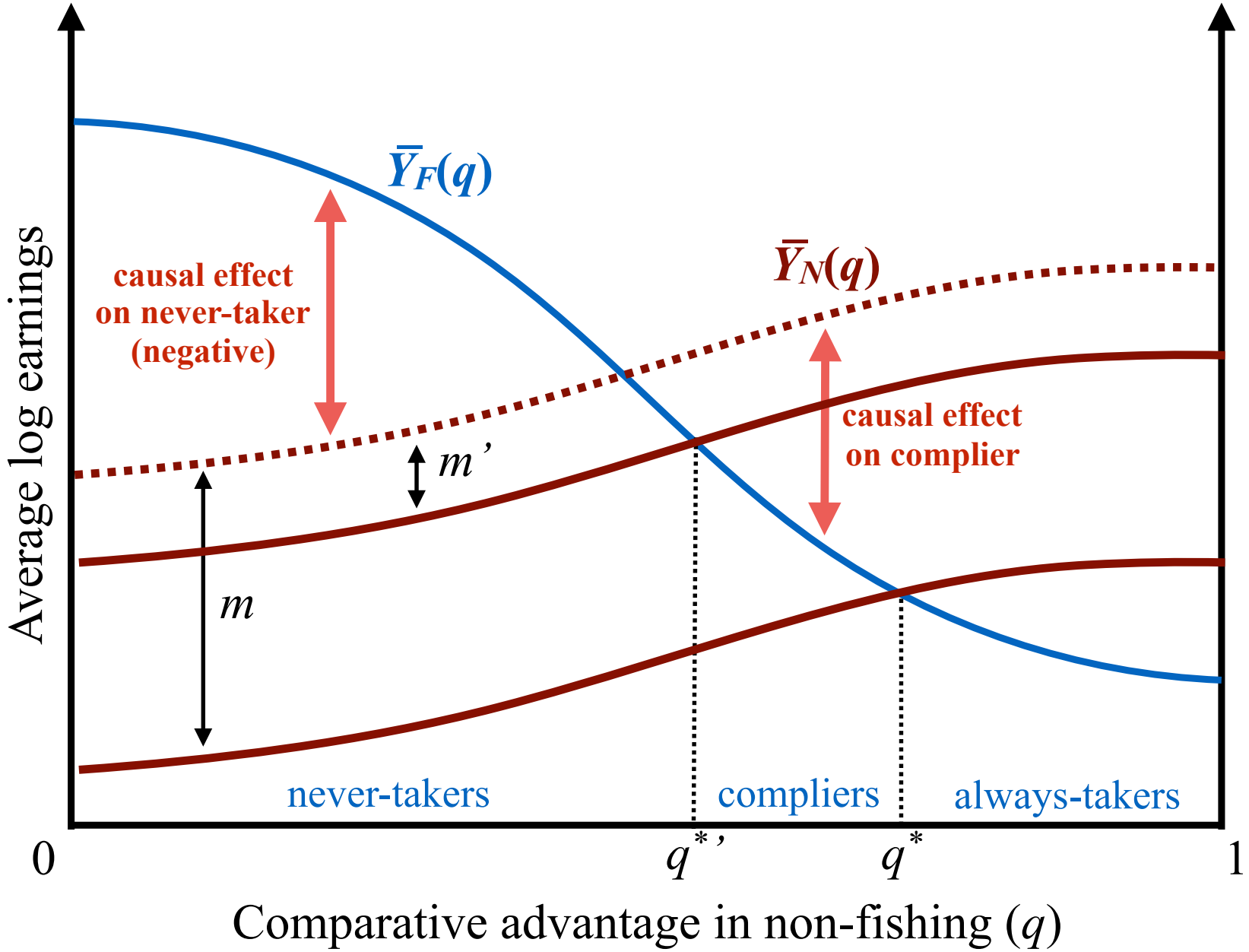
Specialization

- Like many small places, Westman Islands is highly specialized
  - 70% Fishing and Fish processing Specialization
- But all sorts of people are born in the Westman Islands
- Some workers “stuck” in Westman Islands, despite comparative advantage in industries located elsewhere

Simple Roy Model

- Two regions and two sectors
- Westman Islands: Only fishing
- Mainland of Iceland: Only non-fishing
- Workers have heterogeneous comparative advantage in two sectors
- Wages are sum of absolute advantage and comparative advantage
- Closely related to Adao (2015)


$\bar{Y}_F(q)$
$\bar{Y}_N(q)$
$\bar{Y}_N(q) - m$
Average log earnings
Moving cost (m)
"misallocation"
0
Fishing
$\tilde{q}$
q^*
Non-fishing
1
Comparative advantage in non-fishing (q)


$\bar{Y}_F(q)$
$\bar{Y}_N(q)$
causal effect
on never-taker
(negative)
causal effect
on complier
m'
m
never-takers
compliers
always-takers
Average log earnings
0
$q^{*\prime}$
q^*
1
Comparative advantage in non-fishing (q)

Intuition

- IV estimates reflect causal effects of moving for "compliers" (who have comparative advantage in non-fishing)
- Can explain large causal effects of moving even for moving away from a "good" place

Implications

- Misallocation may be large even if average wage differences are small
- If everyone moved, causal effect would be much smaller (perhaps even negative)
- Consistent with IV>OLS

Suggestive Evidence

- Educational attainment in the Westman Islands is particularly low
- While fishing pays high wages, requires little formal education
- Complier characteristics indicate that compliers had particularly well educated parents
    - Cannot identify individual compliers; but can estimate their average characteristics when instrument is binary

Low Educational Attainment

Complier Characteristics of Younger Cohorts

Cohorts Younger than 25 at time of Eruption

Variable (X)	$\Pr[X_i = 1]$	$\Pr[X_i = 1 \mid \text{Complier}]$	$\frac{\Pr[X_i=1 \mid \text{Complier}]}{\Pr[X_i=1]}$
Female	0.49	0.34	0.69 (0.20)
Age ($>$ median)	0.51	0.40	0.79 (0.18)
Change house after 1960	0.60	0.75	1.25 (0.25)
Born in Westman Islands	0.80	0.82	1.03 (0.13)
House value ($>$ median)	0.50	0.61	1.21 (0.37)
House year ($>$ median)	0.51	0.52	1.02 (0.32)
Parents education ($>$ compulsory)	0.50	0.75	1.51 (0.36)
Parents married	0.88	1.05	1.19 (0.10)

Notes: Standard errors in parentheses. *Parents education* = 1 if parents have more than compulsory education.

Contrast vs. Absolute Advantage: AKM

Abowd, Kramarz and Margolis (1999):

$$y_{i,j} = a_i + b_j + \epsilon_{i,j}$$

- a_i is worker effect
- b_j is firm/location effect

Implications:

- IV estimates identify $b_{Westman} << 0$
- Must assume $a_{Westman} >> 0$ to match average wages
- Logically consistent, but hard to square with conventional measures of (general purpose) human capital Poor Test Scores
- Comparative advantage seems more plausible in our setting

Information and Bargaining

- Evidence suggests that benefits of move accrue to children
- Decision to move made by partents
- Limited altruism may play a role
- Also, decision to move depends on *perceived* not actual returns
  - Information friction may be particularly large when industry structure differs between origin and destination

Returns to Education?

- Can education alone explain effects?
- Probably not
  - Education alone implies huge returns (mean of 23% per year)
  - But not a “pure” measure
    - Heterogeneity important
    - Conflates change in education with change in location
    - Endogenous change in location/career may yield higher returns

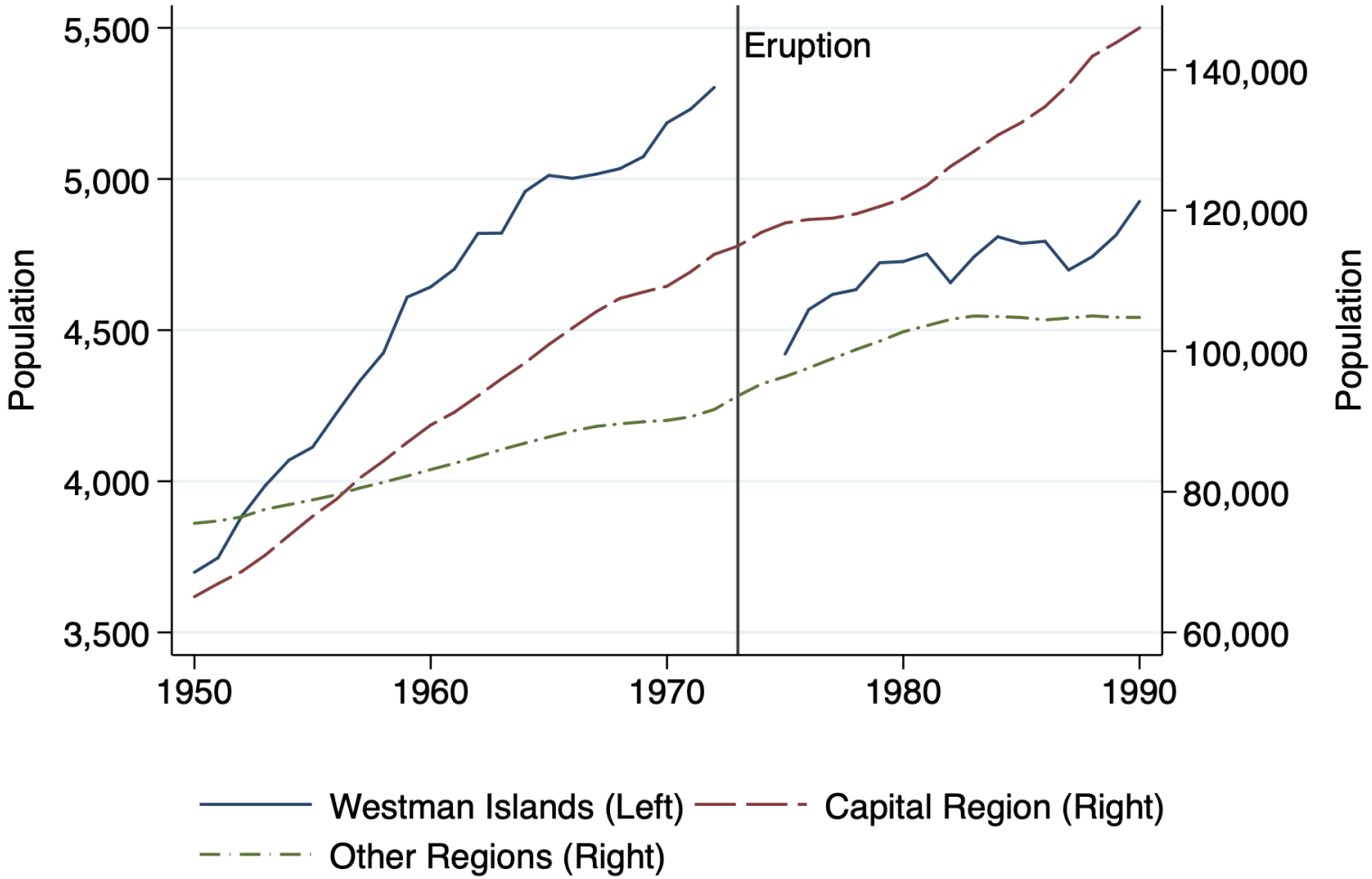
Returns to Education

Conclusions

- Evidence of large moving costs that prevent labor from flowing to highest return activities
- Costs born by parents, while benefits accrue to children
- Large effects of moving away from a *high income* town
  - Suggests importance of comparative advantage (perhaps particularly so in response to large shocks?)
- Potentially large misallocation even if differences in average income small

Appendix

Westman Islands Population Over Time



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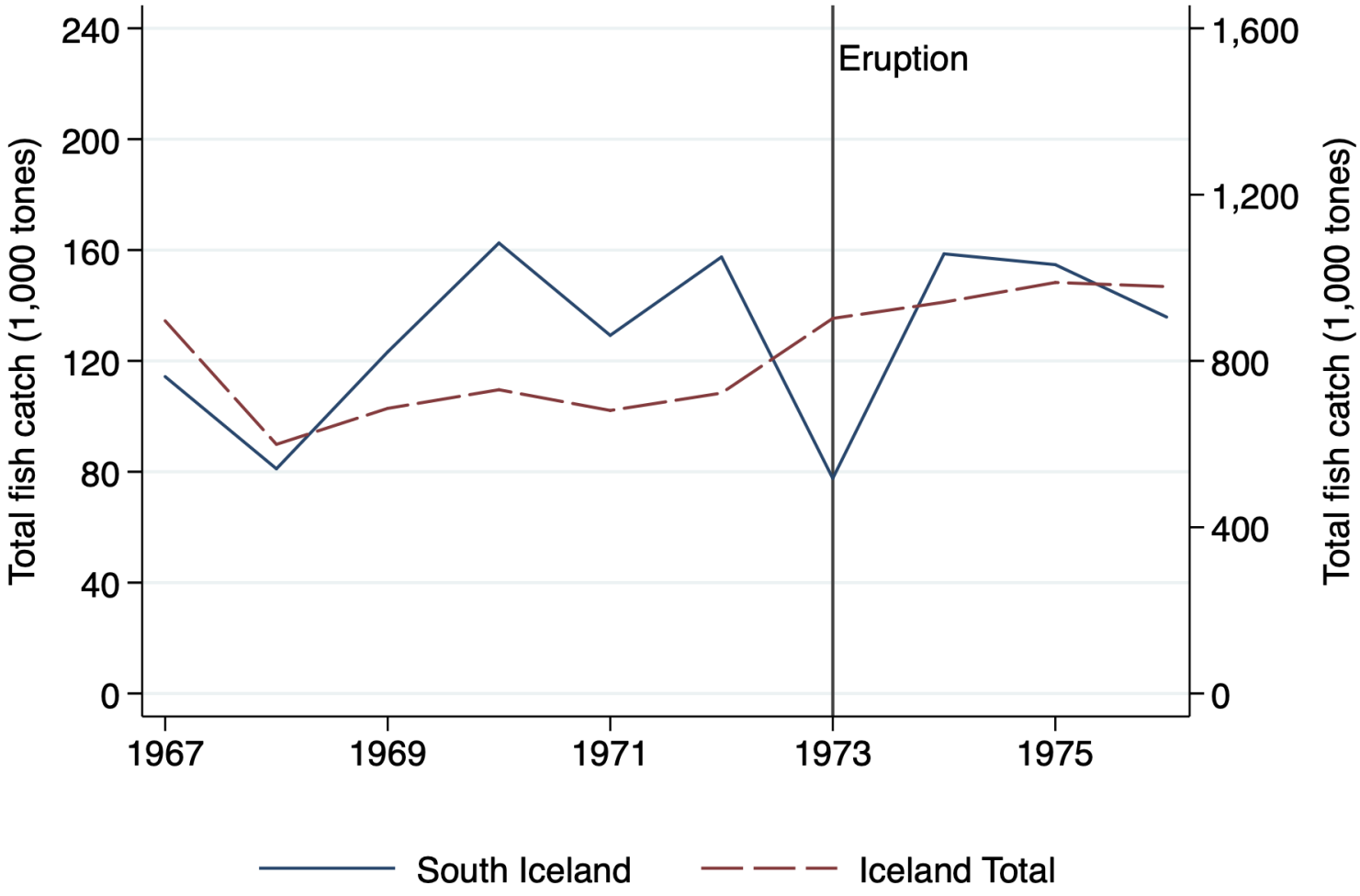
Westman Islands – Fish Catch Over Time



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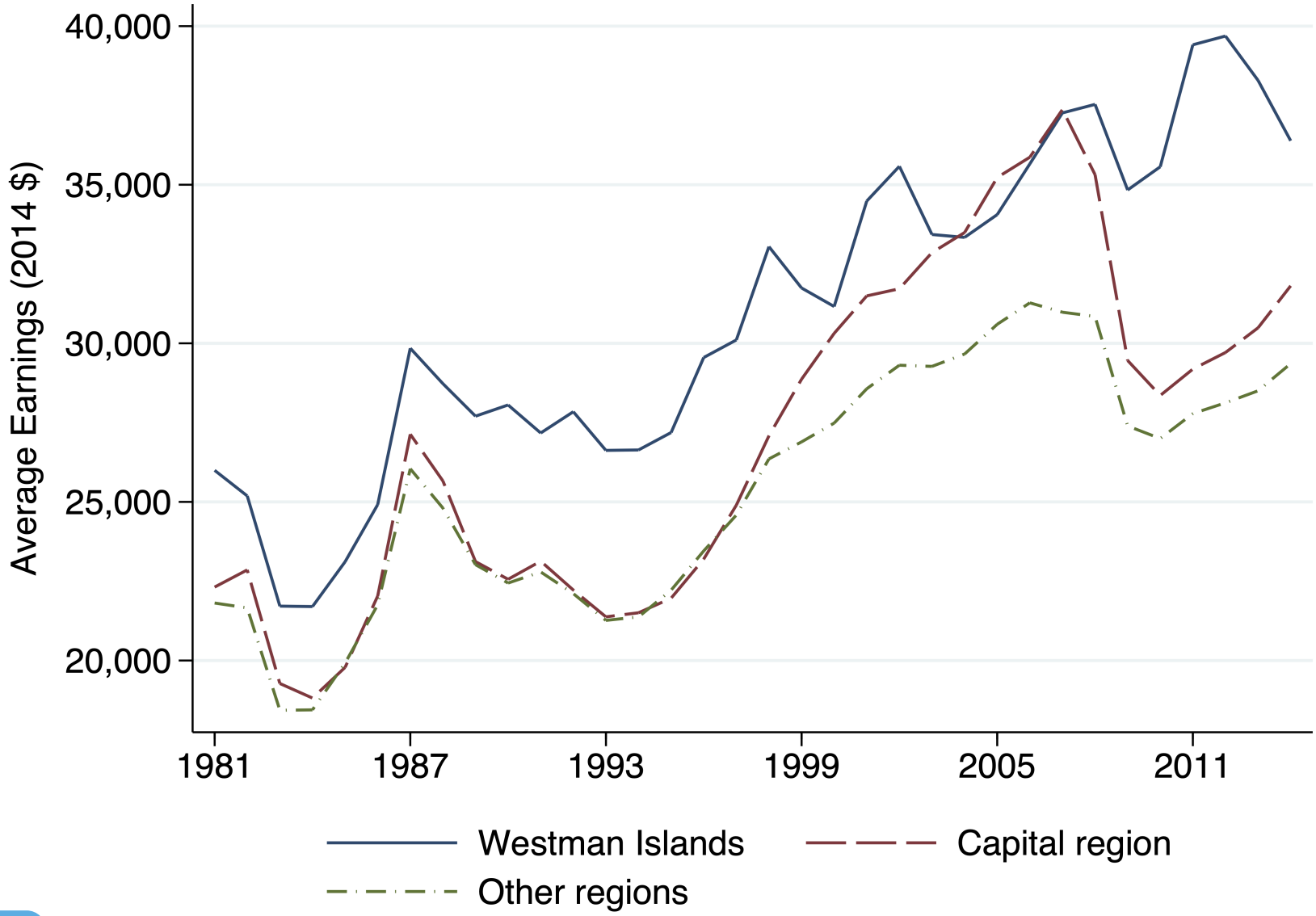
Westman Islands High Income Fishing Town



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Treatment Effect on Other Outcomes

Cohorts younger than 25 at time of eruption:

- 16% more likely to have positive earnings
- 9% less likely to take an early pension
- 3% less likely to die before age 50 (imprecisely estimated)
- 17% more likely to get married (imprecisely estimated)
- No change in number of children

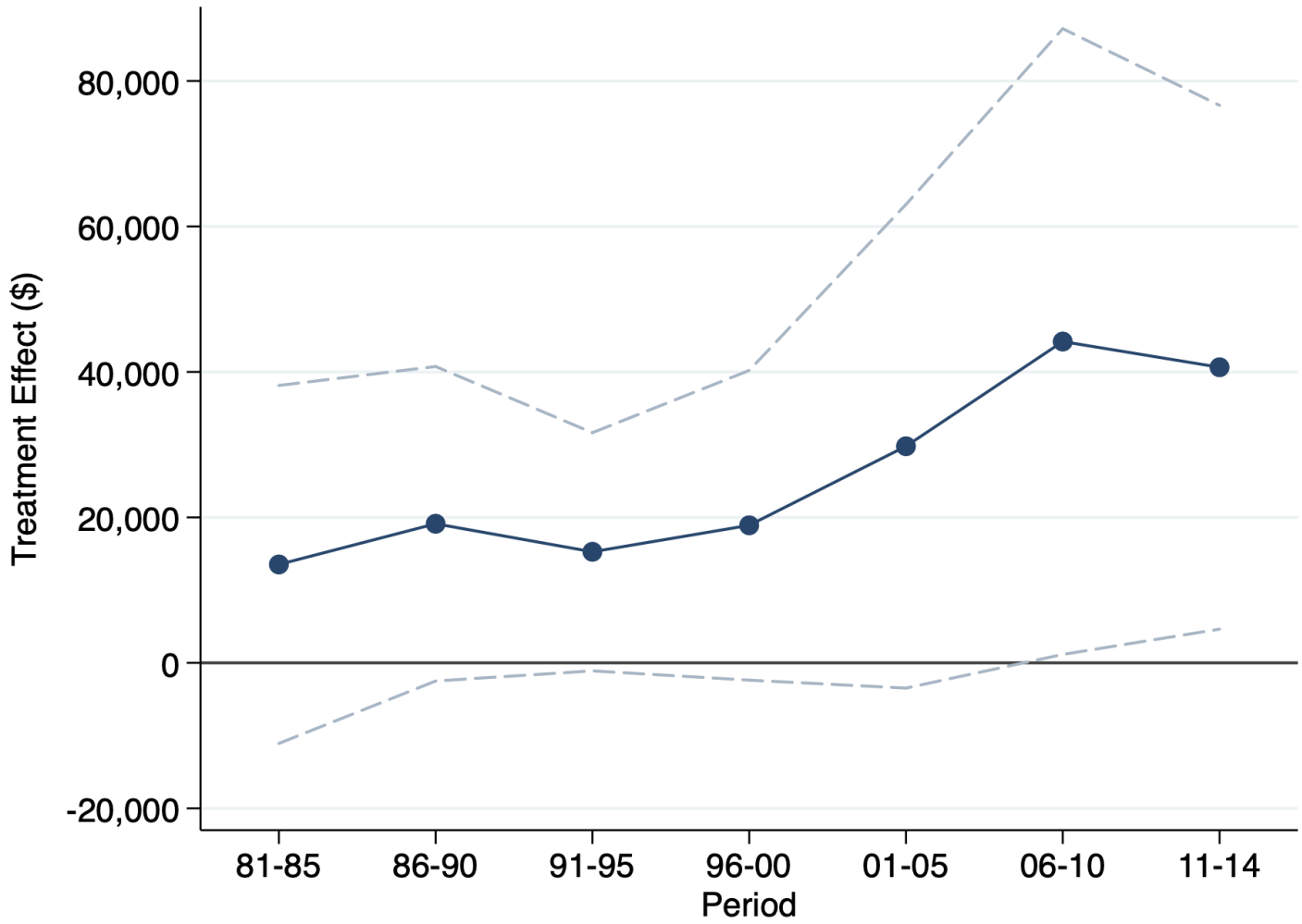
Cohorts older than 25 at time of eruption:

- 2% less likely to die before age 50
- No other significant effects on these outcomes

Results for Younger Cohorts | Results for Older Cohorts | Back

IV Effect on Earnings by 5 Year Subsamples

Cohorts Younger than 25 at time of Eruption



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IV Effects for Earnings – Drop Pension > 0

Cohorts Younger than 25 at time of Eruption

	(1) IV	(2) IV	(3) OLS	(4) OLS
Moved	22,459	24,299***	-2,528**	-1,879**
	(14,560)	(12,240)	(1,131)	(1,015)
Controls	No	Yes	No	Yes
Age fixed effects	No	Yes	No	Yes
Year fixed effects	No	Yes	No	Yes
Control mean	34,297	34,297	–	–
Observations	62,172	62,172	62,172	62,172

Notes: Reported in US dollars as of 2014 (125 ISK = 1 USD). The dependent variable is labor earnings, but set to "missing" in all years when pension > 0 and age < 67. Controls: gender, change house after 1960, born in the Westman Islands. Robust standard errors clustered by individual in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Back to Earnings Effect | Back to Other Life Outcomes

IV Effects for Log Earnings

Cohorts Younger than 25 at time of Eruption

	(1) IV	(2) IV	(3) OLS	(4) OLS
Moved	0.812**	0.866***	-0.060	-0.031
	(0.387)	(0.324)	(0.041)	(0.038)
Controls	No	Yes	No	Yes
Observations	2,570	2,570	2,570	2,570

Notes: Reported in natural logarithms of US dollars as of 2014 (125 ISK = 1 USD). Controls: gender, change house after 1960, born in the Westman Islands. Robust standard errors clustered by individual in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

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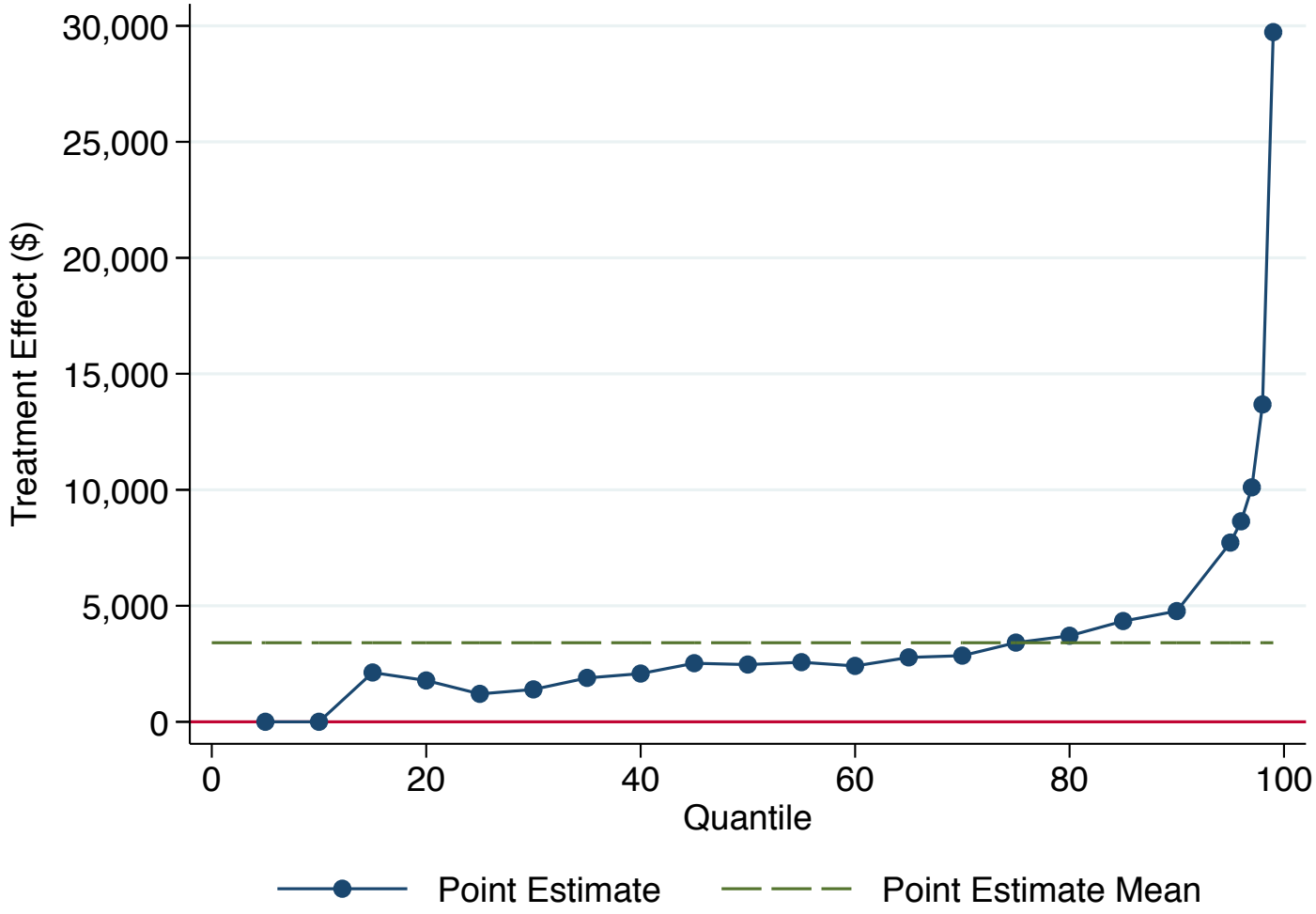
Reduced Form Effect on Earnings

Cohorts Younger than 25 at time of Eruption



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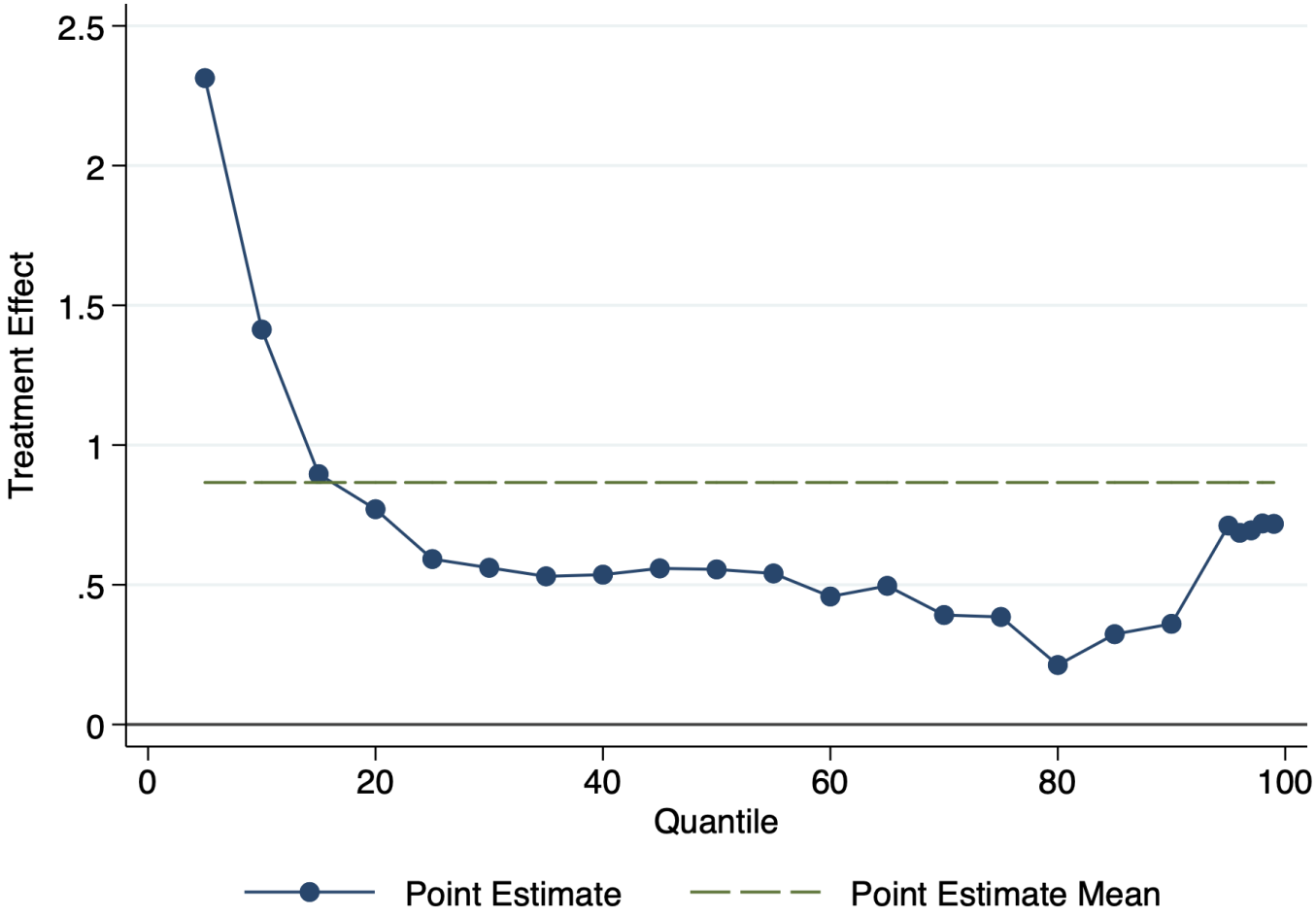
Quantile Treatment Effect for Log Earnings

Cohorts Younger than 25 at time of Eruption



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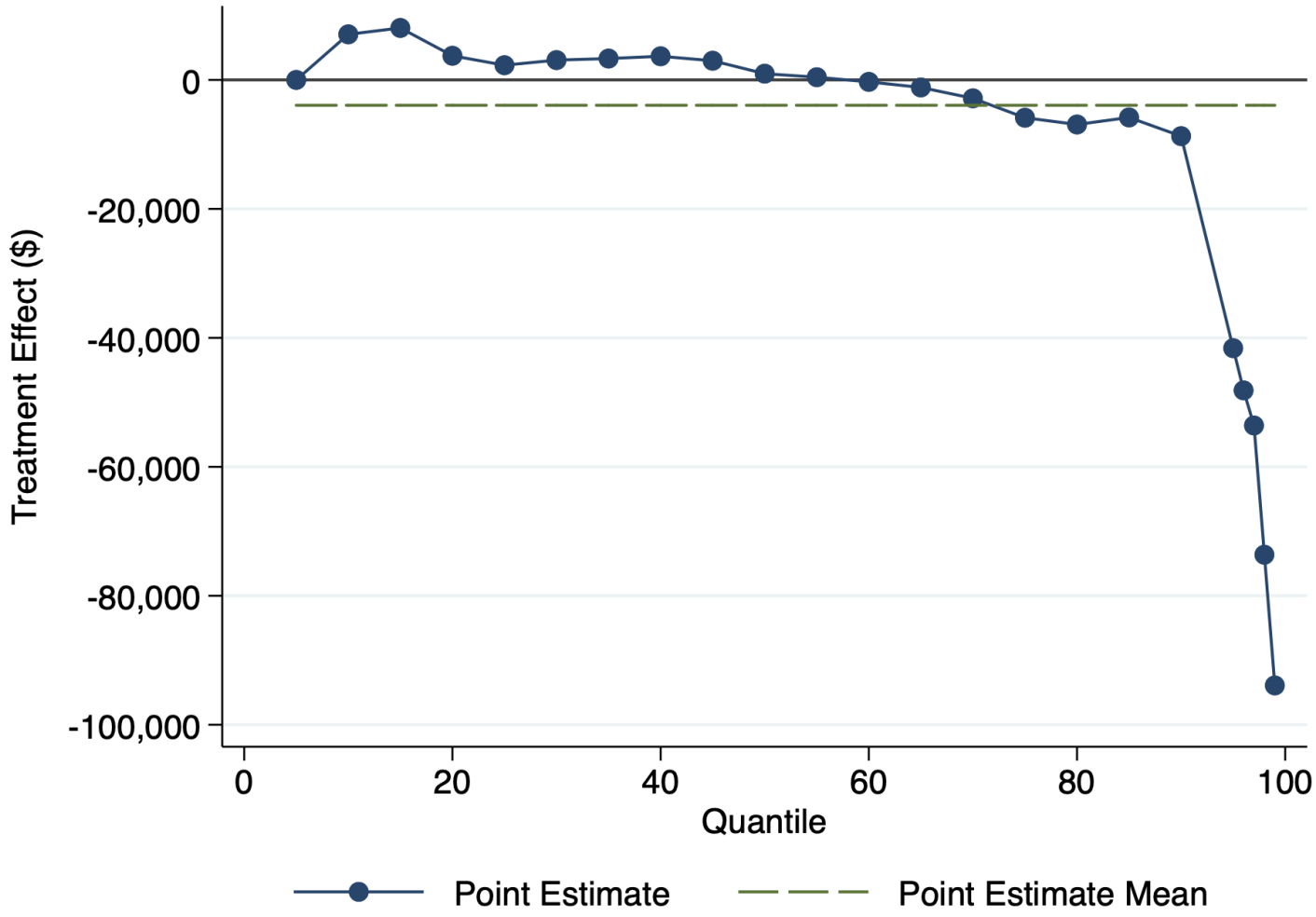
Earnings Treatment Quantile Effect

Cohorts 25 and Older at time of Eruption



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Education Variable

Highest level of completed education is measured by the International Standard Classification of Education (ISCED) – Map this measure into years of schooling:

- **Level 2**: Primary and secondary school (age 6-16) $\rightarrow$ 10 years
- **Level 3**: Junior college (age 16–20) $\rightarrow$ 14 years
- **Level 4**: Post-JC, non-tertiary education (0.5-2 years) $\rightarrow$ 15 years
- **Level 5**: Bachelor's and master's degrees $\rightarrow$ 18 years
- **Level 6**: Doctoral Degrees $\rightarrow$ 22 years

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Effects Come from Junior College

Cohorts Younger than 25 at time of Eruption

	IV	IV	IV	IV
	Prob(Junior College degree)		Prob(University degree)	
Moved	0.636**	0.648***	0.233	0.225
	(0.318)	(0.284)	(0.235)	(0.210)
Controls	No	Yes	No	Yes
N	2,262	2,262	2,262	2,262

Notes: Controls: gender, cohort, change house after 1960, born in the Westman Islands. Robust standard errors clustered by individual in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

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Returns to Education?

- Suppose only channel is education
  - Mean estimates imply 23% return to year of schooling (0.82 / 3.6 = 0.23)

    Median estimates imply 17% return to year of schooling (0.69 / 4 = 0.17)

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- But typical study looks at returns to education with no shock to mobility
- Returns to education may be much higher with no barriers to mobility

Back to Education Effects Back to Returns to Education

Descendants

- Born after the eruption, between 1973 and 1996 (18 or older in 2014)
- Define treatment and control groups based on where parents lived at time of eruption:
  - Parent from house that was destroyed (D)
  - Parent from house that was not destroyed (N)
  - Parent from another region (A)

	Parent's Status ({father, mother})	Size
Treatment	{D, D}, {D, A}, {A, D}	965
Control	{N, N}, {N, A}, {A, N}	2,775
Excluded	{D, N}, {N, D}	282
Total		4,022

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First Stage for Descendants

Table 4: Probability of Moving

	(1)	(2)
Destroyed	0.058***	0.058***
	(0.017)	(0.017)
Control Mean	0.621	0.621
Controls	No	Yes
F-statistic	10.4	12.3

*** p<0.01, ** p<0.05, * p<0.1

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Earnings Effects for Descendants

	(1) IV	(2) IV	(3) OLS	(4) OLS
Moved	29,070	27,034	-7,038***	-5,471***
	(25,205)	(22,234)	(1,262)	(1,156)
Controls	No	Yes	No	Yes
Age fixed effects	No	Yes	No	Yes
Year fixed effects	No	Yes	No	Yes
Control mean	31,681	31,681	–	–
Observations	20,192	20,192	20,192	20,192

Notes: Controls: gender. Robust standard errors clustered by individual in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

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Specialized in a Single Industry 2008-2014

Table 5: Payroll Taxes by Industry

	Westman Islands	Capital Region	Other Regions
Fishing and Agriculture	23.2%	1.2%	13.7%
Fish and Food Processing	46.5%	3.4%	15.6%
Construction	2.5%	4.2%	8.5%
Manufacturing	3.7%	6.2%	10.8%
Trade and Transport	5.4%	18.3%	10.7%
Hospitality and Recreation	1.7%	3.6%	5.0%
Information Services	0.3%	6.6%	0.7%
Professional Services	1.0%	8.9%	0.4%
Finance	2.0%	10.7%	2.3%
Government	12.8%	34.4%	26.5%
Other	0.9%	2.4%	4.4%

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Low Educational Attainment

Table 6: Education

	Westman Islands	Capital Region	Other Regions
Lower secondary education	40%	25%	41%
Post-secondary non-tertiary education	39%	36%	36%
University education	20%	39%	22%

Notes: Data from the 2011 Census. People aged 25-64 in 2011.

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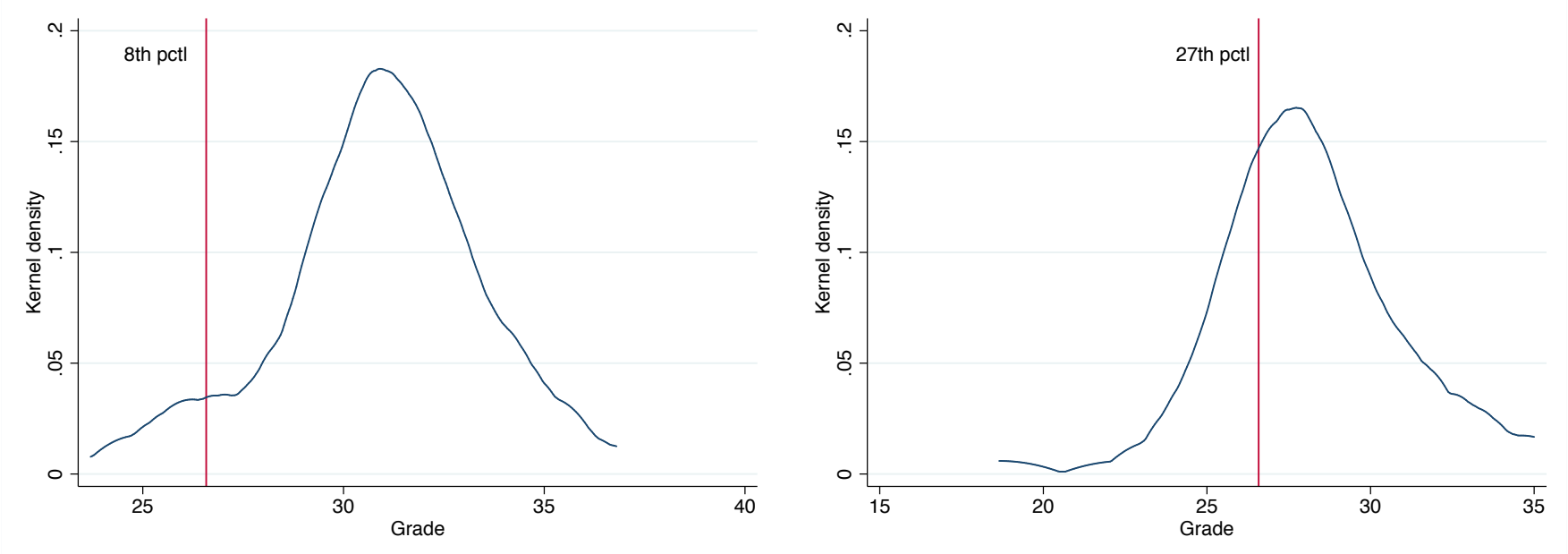
Poor School Quality



(A) Capital Region

(B) Other Regions

Figure 7: Results from Standardized Tests in Math

Distribution of average grade by school for 2010-2014 on 10th grade standardized math test. National average score is 30.

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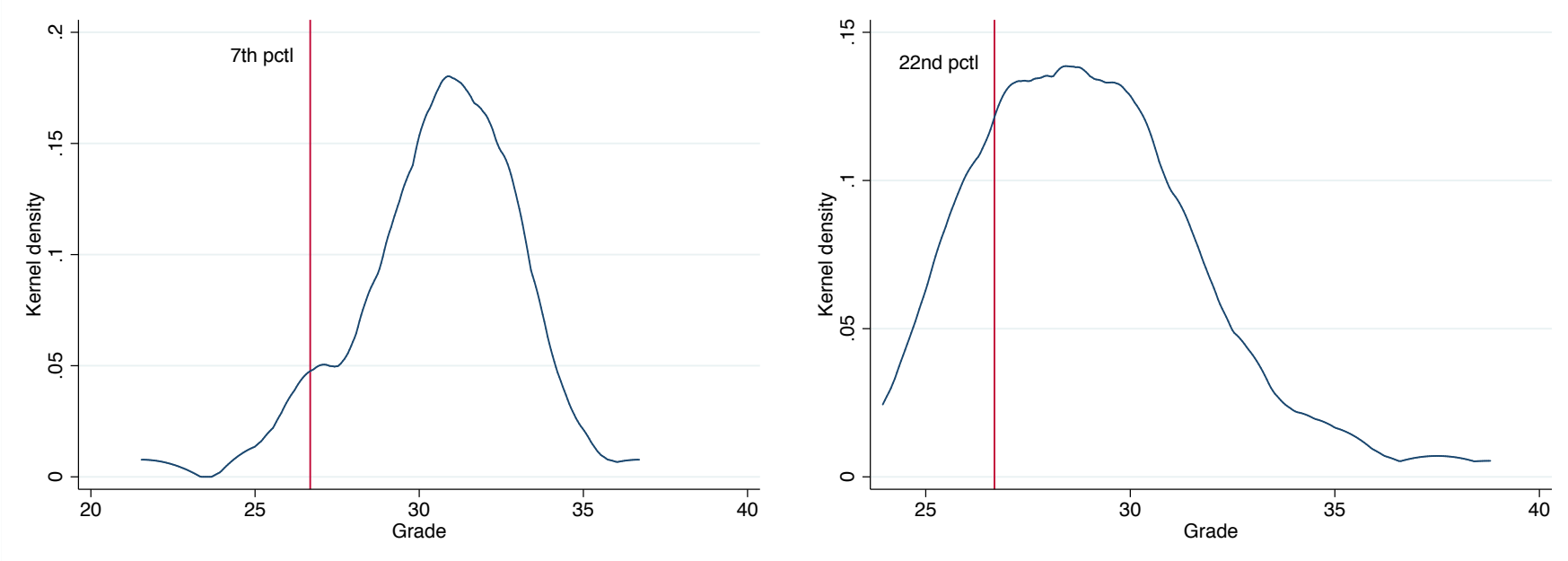
Poor School Quality



(A) Capital Region

(B) Other Regions

Figure 8: Results from Standardized Test in Icelandic

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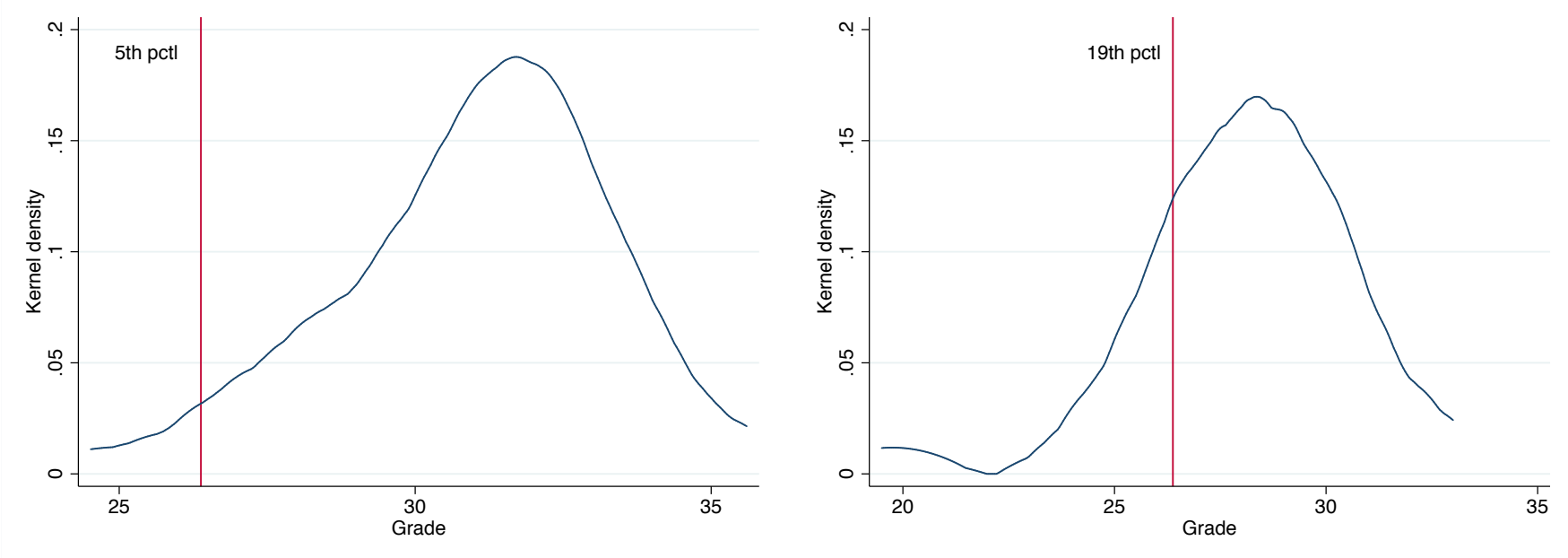
Poor School Quality



(A) Capital Region

(B) Other Regions

Figure 9: Results from Standardized Test in English

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IV Earnings Effect – Four Age Groups

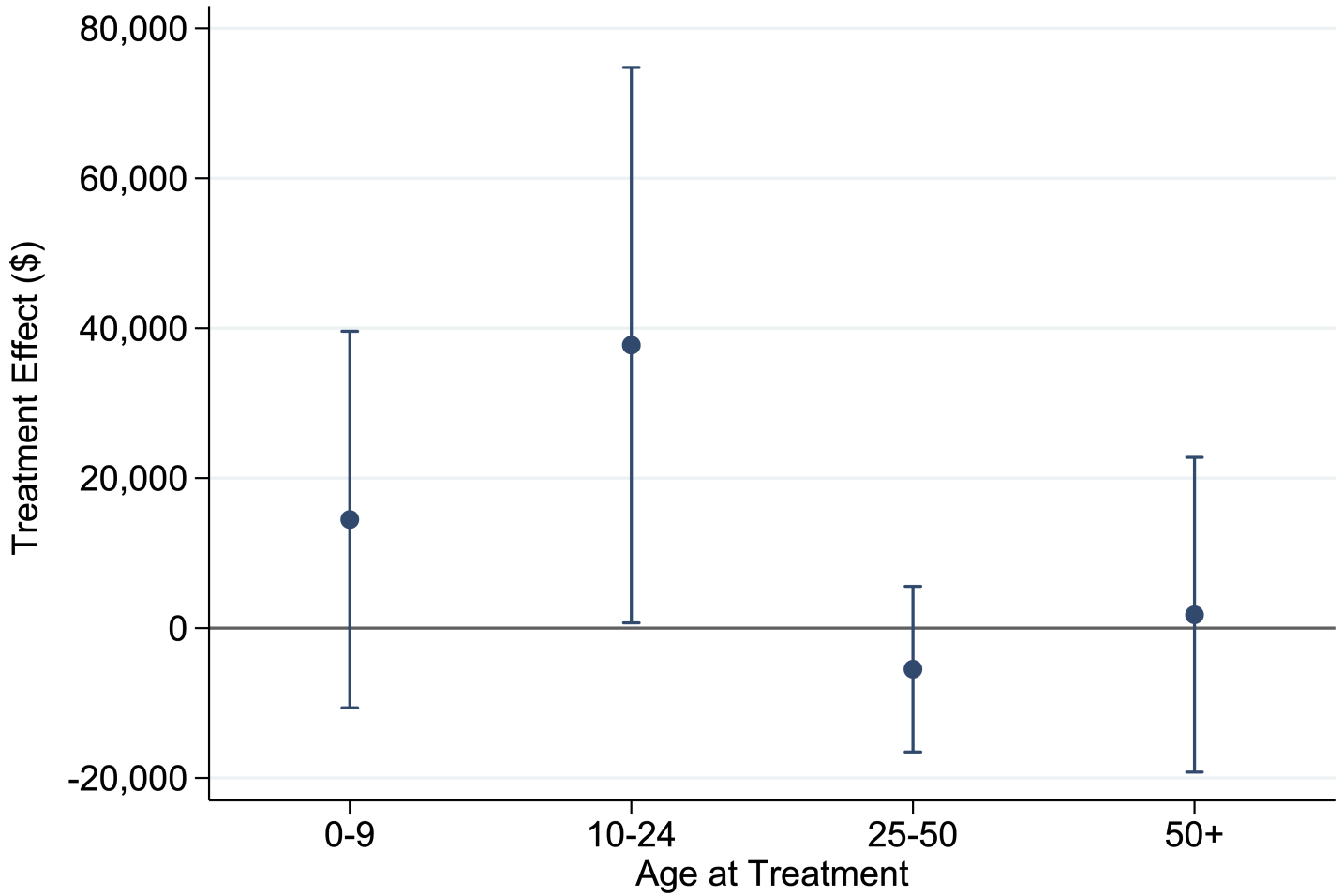

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TABLE 7: Mean earnings difference between education groups

	2004-2014
Junior College vs. Compulsory education	36%
University vs. Compulsory education	78%

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Other Economic and Socioeconomic Outcomes

Cohorts Younger than 25 at time of Eruption

	IV	OLS	Not-Destroyed Group Mean
	(1)	(2)	(3)
Pension Recipient	-0.087	0.000	0.084
	(0.058)	(0.006)	
Early Death	-0.030	-0.010*	0.033
	(0.035)	(0.005)	
Married	0.165	-0.038**	0.628
	(0.141)	(0.016)	
Number of Children	0.086	-0.100*	2.30
	(0.435)	(0.055)	

Notes: Each coefficient estimate corresponds to a regression of the dependent variable indicated in the top panel on *Moved*. *Pension Recipient* is a dummy for receiving pension income in a given year. *Early Death* is a dummy for dying before age 50. The regression with *Early Death* as the dependent variable is estimated only for those born before 1965, since this group has reached age 50 by the end of our sample period. *Married* is an indicator of being registered as married in the National Registry. *Number of Children* is number of children born after the eruption, i.e., in 1973 or later. The regressions control for gender, a dummy for having changed houses after 1960, a dummy for being born in the Westman Islands, year dummies, and age dummies. Robust standard errors clustered by address are reported in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

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Other Economic and Socioeconomic Outcomes

Cohorts 25 and Older at time of Eruption

	IV	OLS	Not-Destroyed Group Mean
	(1)	(2)	(3)
Pension Recipient	0.000	-0.020**	0.40
	(0.048)	(0.009)	
Early Death	-0.018*	0.000	0.008
	(0.010)	(0.001)	
Married	0.106	0.005	0.700
	(0.102)	(0.021)	
Number of Children	0.137	-0.170**	1.08
	(0.307)	(0.059)	
Earnings >0	0.016	-0.023**	0.622
	(0.050)	(0.011)	

Notes: Each coefficient estimate corresponds to a regression of the dependent variable indicated in the top panel on *Moved*. *Pension Recipient* is a dummy for receiving pension income in a given year. *Early Death* is a dummy for dying before age 50. The regression with *Early Death* as the dependent variable is estimated only for those born before 1965, since this group has reached age 50 by the end of our sample period. *Married* is an indicator of being registered as married in the National Registry. *Number of Children* is number of children born after the eruption, i.e., in 1973 or later. The regressions control for gender, a dummy for having changed houses after 1960, a dummy for being born in the Westman Islands, year dummies, and age dummies. Robust standard errors clustered by address are reported in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

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