

Online Appendix for
Are Resource Booms a Blessing or a Curse?
Evidence from People (not Places)

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A Online Appendix

1. Analysis of Linear Pre-Trends
2. First-Stage Estimates
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A.1 Analysis of Linear Pre-Trends

Table A.1: Analysis of Pre-trends - Linear

	Y= Total Income		Y=Taxable Income	
	Under 55	All Ages	Under 55	All Ages
	(1)	(2)	(3)	(4)
Boom HH in 1973 * Year	-85 (643)	-423 (658)	6 (927)	-317 (796)
Observations	8,399	11,732	8,425	11,759
R-Squared	0.872	0.881	0.879	0.879

Notes: The standard errors (in parentheses) are clustered at the household head level. * p<0.1 ** p<0.05 *** p<0.01. All models include household head, state, and year fixed effects and controls for family size and marriage. The sample includes observations from 1969-1974. The omitted time period is 1969.

A.2 First-Stage Estimates

Table A.2: First-Stage Estimates

	Boom HH * 1975-1979 (1)	Boom HH * 1980-1984 (2)	Boom HH * 1985-1988 (3)	Boom HH * 1989-1992 (4)
Boom HH in 1973 * 1975-1979	0.895*** (0.022)	0.007** (0.004)	0.001 (0.002)	0.000 (0.002)
Boom HH in 1973 * 1980-1984	0.013*** (0.005)	0.884*** (0.025)	0.003 (0.002)	-0.001 (0.002)
Boom HH in 1973 * 1985-1988	0.011* (0.006)	0.011* (0.006)	0.877*** (0.030)	-0.002 (0.003)
Boom HH in 1973 * 1989-1992	0.012 (0.008)	0.009 (0.007)	0.000 (0.004)	0.876*** (0.034)
Observations	49,501	49,501	49,501	49,501
First Stage F-Stat.	597.928	384.293	253.520	170.243
Conditional F-Stat.	2,094.985	2,227.044	2,115.117	1,916.598

Notes: First stage IV coefficients from column (2) of Table 3. Each column reports the results from the first stage for the corresponding endogenous variable, as indicated by the column headings. The standard errors (in parentheses) are clustered at the household head level. * p<0.1 ** p<0.05 *** p<0.01. All models include household head, state, and year fixed effects and controls for family size and marriage. The omitted period is 1969-1974. “First Stage F-Statistic” reports the reduced-form F-statistic from the first stage while the “Conditional F-Statistic” accounts for the multiple endogenous variables (Sanderson and Windmeijer, 2016).

A.3 Robustness Checks

Table A.3: Regression Estimates of Effects on Total Income: Boom Definition Based on Threshold of 2.0% Oil Employment Share in 1980

	Under 55		All Ages		Non-Retired	
	OLS (1)	IV (2)	OLS (3)	IV (4)	OLS (5)	IV (6)
Boom HH * 1975-1979	4,876*** (1,744)	3,580* (1,890)	4,498*** (1,491)	3,587** (1,565)	3,928*** (1,490)	2,863* (1,585)
Boom HH * 1980-1984	5,080** (2,387)	4,669* (2,672)	5,590*** (1,955)	5,036** (2,087)	4,578** (2,068)	3,891* (2,257)
Boom HH * 1985-1988	-8,830*** (2,766)	-8,523** (3,417)	-3,343 (2,145)	-3,663 (2,475)	-8,989*** (2,343)	-9,901*** (2,785)
Boom HH * 1989-1992	-8,570*** (3,230)	-8,693** (3,896)	-2,019 (2,456)	-2,149 (2,804)	-8,484*** (2,787)	-9,484*** (3,237)
Observations	49,501	49,501	72,664	72,664	59,487	59,487
R-Squared	0.768	0.768	0.761	0.761	0.784	0.784

Notes: The standard errors (in parentheses) are clustered at the household head level. * p<0.1 ** p<0.05 *** p<0.01. All models include household head, state, and year fixed effects and controls for family size and marriage. The even number columns show IV results where the instrument for “Boom HH” is “Boom HH in 1973.” The omitted period is 1969-1974.

Table A.4: Regression Estimates of Effects on Total Income: Boom Definition Based on Threshold of 3.0% Oil Employment Share in 1980

	Under 55		All Ages		Non-Retired	
	OLS (1)	IV (2)	OLS (3)	IV (4)	OLS (5)	IV (6)
Boom HH * 1975-1979	6,267*** (1,962)	5,133** (2,153)	5,336*** (1,710)	4,473** (1,801)	5,468*** (1,680)	4,585** (1,789)
Boom HH * 1980-1984	7,540*** (2,679)	6,997** (3,033)	7,712*** (2,190)	6,847*** (2,353)	7,495*** (2,263)	6,879*** (2,481)
Boom HH * 1985-1988	-7,093** (3,011)	-7,965** (3,753)	-1,777 (2,358)	-2,822 (2,733)	-6,530** (2,553)	-7,931*** (3,071)
Boom HH * 1989-1992	-6,549* (3,481)	-8,631** (4,131)	-465 (2,696)	-1,838 (3,030)	-6,376** (3,019)	-8,574** (3,466)
Observations	49,501	49,501	72,664	72,664	59,487	59,487
R-Squared	0.768	0.768	0.761	0.761	0.784	0.784

Notes: The standard errors (in parentheses) are clustered at the household head level. * p<0.1 ** p<0.05 *** p<0.01. All models include household head, state, and year fixed effects and controls for family size and marriage. The even number columns show IV results where the instrument for “Boom HH” is “Boom HH in 1973.” The omitted period is 1969-1974.

Table A.5: Regression Estimates of Effects on Total Income: Excludes Observations in Counties with 1% to 2.5% Oil Employment Share in 1980

	Under 55		All Ages		Non-Retired	
	OLS (1)	IV (2)	OLS (3)	IV (4)	OLS (5)	IV (6)
Boom HH * 1975-1979	6,393*** (1,893)	5,209** (2,086)	5,509*** (1,648)	4,494** (1,744)	5,383*** (1,614)	4,499*** (1,728)
Boom HH * 1980-1984	7,528*** (2,597)	7,863*** (2,865)	7,801*** (2,114)	7,448*** (2,241)	7,285*** (2,179)	7,299*** (2,343)
Boom HH * 1985-1988	-7,251** (2,936)	-6,017* (3,333)	-1,784 (2,285)	-1,664 (2,513)	-6,935*** (2,467)	-6,769** (2,769)
Boom HH * 1989-1992	-6,582* (3,421)	-7,723** (3,912)	-284 (2,615)	-1,203 (2,896)	-6,658** (2,919)	-7,963** (3,294)
Observations	47,851	47,851	70,111	70,111	57,396	57,396
R-Squared	0.771	0.771	0.763	0.763	0.787	0.787

Notes: The standard errors (in parentheses) are clustered at the household head level. * p<0.1 ** p<0.05 *** p<0.01. All models include household head, state, and year fixed effects and controls for family size and marriage. The even number columns show IV results where the instrument for “Boom HH” is “Boom HH in 1973.” The omitted period is 1969-1974.

Table A.6: Regression Estimates of Effects on Total Income: Includes Separate Year Effects for Urban and Rural Areas

	Under 55		All Ages		Non-Retired	
	OLS (1)	IV (2)	OLS (3)	IV (4)	OLS (5)	IV (6)
Boom HH * 1975-1979	6,095*** (1,912)	4,757** (2,123)	5,407*** (1,651)	4,355** (1,759)	5,267*** (1,635)	4,334** (1,764)
Boom HH * 1980-1984	8,007*** (2,604)	7,464** (2,975)	8,376*** (2,121)	7,372*** (2,312)	8,029*** (2,204)	7,530*** (2,441)
Boom HH * 1985-1988	-6,234** (2,953)	-6,912* (3,660)	-417 (2,311)	-1,421 (2,684)	-5,347** (2,514)	-6,467** (3,015)
Boom HH * 1989-1992	-5,916* (3,452)	-7,893* (4,064)	460 (2,629)	-936 (2,976)	-5,562* (2,958)	-7,420** (3,414)
Observations	49,501	49,501	72,664	72,664	59,487	59,487
R-Squared	0.769	0.769	0.762	0.762	0.785	0.785

Notes: The standard errors (in parentheses) are clustered at the household head level. * p<0.1 ** p<0.05 *** p<0.01. All models include household head and state fixed effects, separate year fixed effects for urban and rural areas, and controls for family size and marriage. The even number columns show IV results where the instrument for “Boom HH” is “Boom HH in 1973.” The omitted period is 1969-1974.

Table A.7: Regression Estimates of Effects on Total Income: Excludes State Fixed Effects

	Under 55		All Ages		Non-Retired	
	OLS (1)	IV (2)	OLS (3)	IV (4)	OLS (5)	IV (6)
Boom HH * 1975-1979	5,908*** (1,905)	4,939** (2,104)	5,047*** (1,641)	4,441** (1,754)	5,050*** (1,620)	4,384** (1,747)
Boom HH * 1980-1984	6,958*** (2,585)	6,826** (2,988)	7,347*** (2,098)	6,842*** (2,298)	7,000*** (2,175)	6,727*** (2,425)
Boom HH * 1985-1988	-7,699*** (2,912)	-8,234** (3,734)	-2,043 (2,270)	-2,796 (2,692)	-7,102*** (2,462)	-8,211*** (3,041)
Boom HH * 1989-1992	-6,721** (3,422)	-8,909** (4,178)	-300 (2,616)	-1,557 (3,015)	-6,569** (2,923)	-8,669** (3,474)
Observations	49,501	49,501	72,664	72,664	59,487	59,487
R-Squared	0.766	0.766	0.758	0.758	0.782	0.782

Notes: The standard errors (in parentheses) are clustered at the household head level. * p<0.1 ** p<0.05 *** p<0.01. All models include household head and year fixed effects and controls for family size and marriage. The even number columns show IV results where the instrument for “Boom HH” is “Boom HH in 1973.” The omitted period is 1969-1974.

Table A.8: Regression Estimates of Effects on Total Income: Excludes Observations from Households that Changed Counties During the Sample

	Under 55 (1)	All Ages (2)	Non-Retired (3)
Boom HH * 1975-1979	4,413* (2,264)	3,735* (1,913)	4,082** (1,775)
Boom HH * 1980-1984	5,067* (2,994)	5,203** (2,292)	5,268** (2,344)
Boom HH * 1985-1988	-9,017** (3,794)	-2,806 (2,627)	-7,714*** (2,918)
Boom HH * 1989-1992	-12,444*** (4,187)	-3,468 (2,988)	-10,335*** (3,431)
Observations	28,305	43,692	36,595
R-Squared	0.804	0.786	0.812

Notes: The standard errors (in parentheses) are clustered at the household head level. * p<0.1 ** p<0.05 *** p<0.01. All models include household head, state, and year fixed effects and controls for family size and marriage. All models show OLS results (in this sample, the OLS estimates are identical to the IV estimates). The omitted period is 1969-1974.

Table A.9: Regression Estimates of Effects on Total Income: Adjusts for Inflation Using Regional CPIs

	Under 55		All Ages		Non-Retired	
	OLS (1)	IV (2)	OLS (3)	IV (4)	OLS (5)	IV (6)
Boom HH * 1975-1979	5,538*** (1,817)	4,121** (1,998)	4,780*** (1,583)	3,732** (1,674)	4,628*** (1,548)	3,634** (1,657)
Boom HH * 1980-1984	6,267** (2,486)	5,612** (2,833)	6,686*** (2,028)	5,740*** (2,196)	6,102*** (2,090)	5,539** (2,308)
Boom HH * 1985-1988	-7,911*** (2,879)	-8,805** (3,633)	-2,475 (2,237)	-3,620 (2,623)	-7,449*** (2,417)	-8,824*** (2,946)
Boom HH * 1989-1992	-6,649* (3,402)	-8,743** (4,030)	-509 (2,582)	-1,855 (2,925)	-6,666** (2,889)	-8,595** (3,347)
Observations	49,501	49,501	72,664	72,664	59,487	59,487
R-Squared	0.769	0.057	0.762	0.046	0.785	0.052

Notes: The standard errors (in parentheses) are clustered at the household head level. * p<0.1 ** p<0.05 *** p<0.01. All models include household head, state, and year fixed effects and controls for family size and marriage. The second column shows IV results where the instrument for “Boom HH” is “Boom HH in 1973.” The omitted period is 1969-1974.

A.4 Cumulative Effects on Total Income Under Alternative Scenarios

Table A.10: Regression Estimates of Effects on Total Income: Limits Sample to Young Cohort of Household Heads 35 Years or Younger in 1970

	OLS (1)	IV (2)
Boom HH * 1975-1979	6,965*** (2,287)	5,893** (2,689)
Boom HH * 1980-1984	7,552** (3,096)	6,258* (3,633)
Boom HH * 1985-1988	-9,012*** (3,252)	-10,571** (4,173)
Boom HH * 1989-1992	-6,685* (3,693)	-9,128** (4,437)
Observations	34,957	34,957
R-Squared	0.736	0.736

Notes: The standard errors (in parentheses) are clustered at the household head level. * p<0.1 ** p<0.05 *** p<0.01. All models include household head, state, and year fixed effects and controls for family size and marriage. The second column shows IV results where the instrument for “Boom HH” is “Boom HH in 1973.” The omitted period is 1969-1974.

Table A.11: Cumulative Effects on Total Income - Young Cohort

Discount Rate	OLS	IV
0	9,798	-18,042
1	14,294	-10,935
2	17,981	-4,967
3	20,990	42

Notes: Cumulative effects are based on annual income effects reported in Table A.10. Discounting is annual, beginning in 1975 which represents t = 0.

Table A.12: Cumulative Effects on Total Income - Inflation Adjusted Using Regional CPIs

Discount Rate	Under 55		All Ages		Non-Retired	
	OLS	IV	OLS	IV	OLS	IV
0	789	-21,527	57,329	47,358	-2,806	-23,813
1	5,360	-15,014	54,614	45,064	1,720	-17,303
2	9,142	-9,540	52,094	42,936	5,470	-11,825
3	12,260	-4,941	49,752	40,959	8,570	-7,215

Notes: Cumulative effects are based on annual income effects reported in Table A.9. Discounting is annual, beginning in 1975 which represents $t = 0$.

A.5 Functional Form

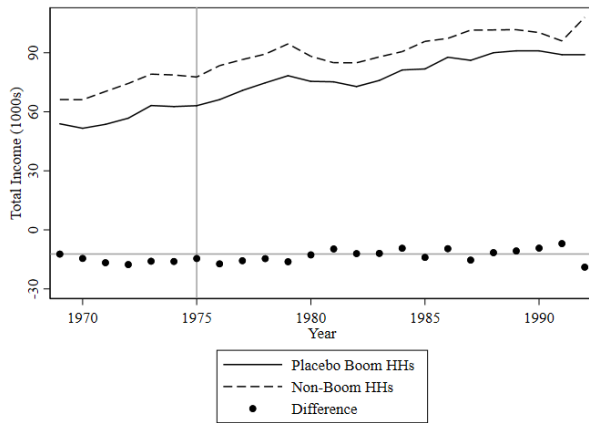
The analysis requires choosing whether to model boom-and-bust effects using a level scale (i.e. measuring income in dollar amounts) or logarithmic scale (i.e. measure the natural log on income). A key benefit of modeling income in levels, rather than log points, is that it is compatible with using a dependent variable that includes zero values, which is the case for income due to unemployment, retirement, and unprofitable household businesses. It is possible, however, that measuring income effects in levels may not be the appropriate functional form. The choice to model income changes in level versus percentage terms could be consequential in our setting because the average boom household had lower income at the beginning of the sample relative to non-boom households. If temporal shocks to within-household income variation operate on a percentage scale, and we model them using a level scale (or vice versa), then our regression models would be specified incorrectly.

To determine appropriate functional form given the average income differences, we conduct a placebo analysis that splits *non-boom* households into two groups: those with above-average incomes and those with below-average incomes. Next, we identify a subsample of the households for whom the pre-boom difference in means for the above-average and below-average groups are equivalent to the pre-boom difference in means between boom and

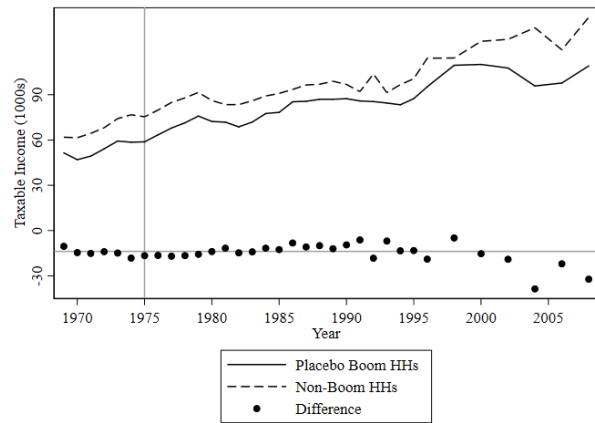
non-boom households.¹ We then code the below-average households as “boom households” and above-average households as “non-boom households.” Using this sample, we produce placebo graphs of means and estimates of changes in income across years. As shown in Figure A.1, the placebo treatment and control groups experience very similar changes in means, when measured as levels, over time. Similarly, as shown in Table A.13, these two groups experience similar changes over the course of the sample when income is measured in level terms, as can be inferred by the insignificant coefficients on all of the interaction terms. These placebo results indicate that within-household changes in income across time primarily operate in level terms in our sample. For this reason, combined with the fact that many income observations have a zero value, we conduct the analysis modeling income in levels.

While we believe modeling income in levels is appropriate in our setting, we also investigate the sensitivity of our model to the inverse hyperbolic sine (IHS). Unlike using the log of income, the IHS transformation is defined at zero values and thus allows us to include all observations. Table A.14 reports the estimation results. While these IHS results are a bit noisier, they are qualitatively similar to our primary income estimates reported in Table 3. In the All Ages sample, we document positive effects during the boom period and small insignificant effects during the bust and post-bust periods. In the Under 55 and Non-Retired samples, we estimate sharp positive boom effects yet negative bust and post-bust effects that are larger in absolute value than the positive boom-era estimates. While the negative effects in the bust and post-bust effects are only on the cusp of statistical significance in the Under 55 sample, they are significant in the Non-Retired sample.

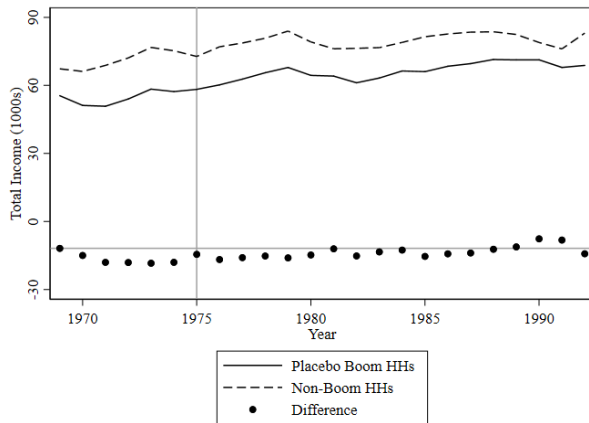
¹To select the subsample, we first require non-boom households to have a mean pre-boom income that is within an arbitrarily small, symmetric bandwidth of the overall pre-boom sample mean (the pre-boom sample mean is about \$60,000) in order to be included in the subsample. We then expand the bandwidth symmetrically by \$100 until the difference within the subsample between mean incomes for above-average households and mean incomes for below-average households reaches the pre-boom difference in mean incomes for boom and non-boom households. This occurs at a bandwidth of about plus-or-minus \$15,000 and leaves between 400 and 600 households on either side of the sample mean, depending on the outcome (total vs. taxable income) and age restriction (Under 55 vs. All Ages).



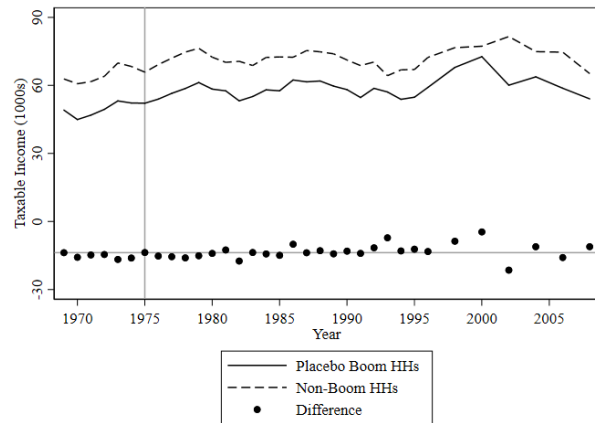
(a) Total Income, Under 55



(b) Taxable Income, Under 55



(c) Total Income, All Ages



(d) Taxable Income, All Ages

Figure A.1: Investigating Functional Form: Placebo Trends in Mean Income. Sample limited to a subsample of control households (see text earlier in this subsection for details on sample selection); no treatment households are included. Households with below-average pre-boom incomes are falsely coded as boom households. The vertical line corresponds to the beginning of the energy boom and the dots corresponds to differences in mean incomes relative to the first year of the sample, which is 1969. The second phrase in each label describes the sample.

Table A.13: Investigating Functional Form: Placebo Estimates of Effects on Total Income

	Total Income		Taxable Income	
	Under 55 (1)	All (2)	Under 55 (3)	All (4)
Placebo Boom HH * 1975-1979	-341 (1,583)	-1,054 (1,338)	-1,387 (1,675)	878 (1,665)
Placebo Boom HH * 1980-1984	1,273 (2,372)	1,359 (1,849)	1,514 (2,505)	2,043 (2,327)
Placebo Boom HH * 1985-1988	-684 (3,387)	-30 (2,501)	2,514 (3,505)	3,226 (3,044)
Placebo Boom HH * 1989-1992	548 (3,527)	3,732 (2,689)	1,696 (3,759)	4,295 (3,249)
Placebo Boom HH * 1993-1999			1,544 (4,953)	5,171 (3,813)
Placebo Boom HH * 2000-2012			-8,388 (9,190)	7,926 (5,238)
Observations	15,037	21,831	15,829	23,479
R-Squared	0.534	0.518	0.526	0.526

Notes: Sample limited to a subsample of control households (see text earlier in this subsection for details on sample selection); no treatment households are included. Households with below-average pre-boom incomes are falsely coded as boom households. The standard errors (in parentheses) are clustered at the household head level. * p<0.1 ** p<0.05 *** p<0.01. All models include household head, state, and year fixed effects and controls for family size and marriage. The omitted period is 1969-1974.

Table A.14: Investigating Functional Form: Inverse Hyperbolic Sine

	Under 55		All Ages		Non-Retired	
	OLS (1)	IV (2)	OLS (3)	IV (4)	OLS (5)	IV (6)
Boom HH * 1975-1979	0.128*** (0.037)	0.140*** (0.040)	0.078** (0.035)	0.103*** (0.034)	0.081** (0.036)	0.109*** (0.034)
Boom HH * 1980-1984	0.165*** (0.056)	0.198*** (0.059)	0.110** (0.045)	0.119** (0.047)	0.121*** (0.045)	0.130*** (0.050)
Boom HH * 1985-1988	-0.127 (0.093)	-0.143 (0.110)	-0.059 (0.061)	-0.079 (0.069)	-0.122* (0.071)	-0.150* (0.083)
Boom HH * 1989-1992	-0.208 (0.138)	-0.224 (0.162)	-0.117 (0.085)	-0.143 (0.096)	-0.197* (0.106)	-0.230* (0.122)
Observations	49,501	49,501	72,664	72,664	59,487	59,487
R-Squared	0.641	0.028	0.657	0.024	0.668	0.024

Notes: The models are analogous to our primary models reported in Table 3 except the dependent variable is transformed using the inverse hyperbolic sine. The standard errors (in parentheses) are clustered at the household head level. * p<0.1 ** p<0.05 *** p<0.01. All models include household head, state, and year fixed effects and controls for family size and marriage. The omitted period is 1969-1974.

A.6 Channels and Auxiliary Evidence

Through which channels did the boom and bust affect income? In Table A.15, we evaluate boom and bust effects in separate categories dominated by labor income, business income, and retirement income. We also examine unemployment and wage rates to investigate the effects on labor income in detail. To summarize, we find that strong gains in labor income during the boom period (via higher wage rates) easily offset smaller boom-period losses in household business and investment income.² During the early bust, gains in labor income turned negative (due to higher unemployment) and were compounded by losses in business and investment income for the average household that persisted during the late bust. We also find evidence that retirement and transfer income significantly decreased for

²The negative boom period effect on business and investment income is potentially explained by 1) rising input costs for small business owners (which is evidenced by the rise in wage rates), 2) household heads being drawn out of proprietorship into employment based on attractive boom period wage rates, and 3) an over-exuberant increase in business investment during the boom period that outpaced revenue gains.

boom households during the late bust (1989-1992), relative to non-boom households, in the All Ages sample. By contrast, there was no effect in the Under 55 sample. In combination with our earlier findings related to delayed retirement, this pattern likely reflects older individuals extending their working years, thereby delaying receipt of retirement income.

Table A.15: Regression Estimates of Effects on Different Channels

	Labor Income		Wage Rate		Unemployment		Trans. & Retrmt Inc.		Non-Labor Income	
	Under 55 (1)	All Ages (2)	Under 55 (3)	All Ages (4)	Under 55 (5)	All Ages (6)	Under 55 (7)	All Ages (8)	Under 55 (9)	All Ages (10)
Boom HH * 1975-1979	5,680*** (2,078)	5,603*** (1,860)	1.84*** (0.68)	1.95*** (0.67)	-0.011 (0.009)	-0.007 (0.006)	264 (378)	124 (470)	-1,147 (846)	-1,019 (697)
Boom HH * 1980-1984	9,479*** (2,781)	8,874*** (2,494)	4.03*** (1.08)	3.58*** (0.92)	0.004 (0.015)	0.001 (0.009)	327 (480)	-103 (707)	-2,940*** (918)	-1,735** (861)
Boom HH * 1985-1988	-6,618* (3,524)	655 (2,959)	0.00 (1.30)	-0.26 (1.10)	0.039* (0.020)	0.026** (0.012)	493 (618)	-966 (868)	-829 (1,888)	-1,826 (1,417)
Boom HH * 1989-1992	-4,991 (4,070)	4,508 (3,487)	0.41 (1.52)	0.26 (1.45)	-0.000 (0.018)	-0.001 (0.011)	-377 (721)	-3,187*** (1,039)	-1,985* (1,196)	-2,249** (991)
Boom HH * 1993-1999	-2,577 (5,346)	6,069 (3,965)	0.67 (1.78)	0.06 (1.53)	0.009 (0.019)	-0.000 (0.009)			-3,309 (2,154)	-2,361* (1,343)
Boom HH * 2000-2012	-7,553 (8,792)	16,209** (8,136)	3.47 (3.90)	4.06 (3.97)	0.018 (0.029)	0.007 (0.014)			-2,049 (5,014)	-4,146 (2,716)
Observations	55,265	88,833	49,173	65,303	52,565	85,448	49,758	72,989	55,198	88,694
R-Squared	0.750	0.645	0.650	0.587	0.220	0.200	0.473	0.536	0.423	0.466

Notes: The standard errors (in parentheses) are clustered at the household head level. * p<0.1 ** p<0.05 *** p<0.01. All models include household head, state, and year fixed effects and controls for family size and marriage. All columns show IV results where the instrument for "Boom HH" is "Boom HH in 1973." The omitted period is 1969-1974.