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The Intergenerational Consequences of Economic Downturns*

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Abstract

Family income is associated with long-term human capital and labor market outcomes of children. In addition, there is substantial evidence that nutritional and environmental conditions in utero have long-lasting impacts. Both literatures would predict that being born during economic downturns would affect long-run human capital, and labor market outcomes. We test this hypothesis using very long panels of earnings for men from the Internal Revenue Service as well as information on disability application and retirement claiming from the Social Security Administration Master Beneficiary file that have been linked to survey data. We find that a one-standard deviation in GDP growth in the year of birth leads to small increases in employment and earnings at age 36 and to small decreases in the probability of early Social Security claiming. The estimates imply that a $1,000 increase in parental income at the time of birth leads to a 2.35% increase in employment, a 1.92% increase in earnings at age 36, and to a 3.68% decrease in the probability of early retirement. These results provide strong evidence that income changes around the time of birth can have long-run economic consequences for children.

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1. Introduction

Economic downturns, such as the "Great Recession", typically lead to employment, earnings, and income losses for many families. And, a large and growing literature has found that early childhood and in utero exposure to poverty, nutritional deficiencies, and environmental toxins can have long-term impacts on health, human capital development, and labor market outcomes (e.g., Barker 1990, Heckman, 2007, Almond and Currie, 2010). Other research has found that at least some of those detrimental long-term effects can be ameliorated with transfers such as cash welfare or food stamps (e.g., Almond, Hoynes and Schanzenbach, 2011; Aizer et al., 2014). If early childhood and in utero experiences have potentially important long-run consequences, economic downturns might have detrimental long-run effects on health, human capital accumulation, and labor market outcomes.

In this paper, we examine the relationship between economic conditions at birth and employment and earnings as an adult for men born in the United States between 1929 and 1966. In particular, we compare the earnings of men born under differing macroeconomic conditions. We use these estimates along with estimates of the impact of macroeconomic conditions on the incomes of parents to determine the causal effect of parental income on the long-term labor market outcomes of their children.

We find that a one-standard deviation increase in GDP growth in the year of birth leads to small increases in employment and earnings at age 36 and to small decreases in the probability of early Social Security claiming. The estimates imply that a $1,000 increase in parental income at the time of birth leads to a 2.35%

increase in employment, a 1.92% increase in earnings at age 36, and to a 3.68% decrease in the probability of early retirement. These results provide strong evidence that income changes around the time of birth can have long-run economic consequences for children.

2. Literature

People who are in relatively poor health tend to have lower incomes. And there is a large and growing literature that finds that people who were subject to stressors while in utero or early childhood tend to have poorer health as an adult. The fetal origins literature (for example, Barker 1990) suggests that the many negative health outcomes in later life, including cardiovascular disease, Type 2 diabetes, and chronic lung disease, are associated with improper nutrition of the child in utero. Wadsworth and Kuh (1997) find that lower health in utero and the early stages of life are associated with health concerns as an adult, including issues with blood pressure, respiratory function, and schizophrenia. Those negative health outcomes as an adult could translate to negative earnings outcomes.

A number of studies have examined the impact of large negative health and environmental shocks that individuals experience in utero on long-term health outcomes (see reviews in Currie 2009 and in Almond and Currie 2011). Nutritional shocks in utero have also been linked to poor child health (Almond and Mazumder, 2011).

A number of studies have examined the long-run impacts of poverty in early childhood on long-run outcomes. Researchers have examined the association between poverty between a child's prenatal year and 5th birthday on several adult outcomes and found that poverty in early childhood was related to lower adult earnings and work hours (Duncan et al. 2010) and lower schooling (Duncan et al, 1998).

Only a few studies have identified the causal effect of parents' income and wealth on children's long-term outcomes. For example, a recent study by Aizer et al. (2014) examines male children born between 1911 and 1935 in the United States, comparing those born to mothers who were accepted into the Mothers' Pension Program to those born to mothers who applied but were rejected from the program. It finds that the modest increase in income associated with being accepted into this cash welfare program leads to increased years of schooling and greater longevity relative to applicants who were rejected.

Bleakley and Ferrie (2013) examined the consequences of the Georgia Cherokee Land Lottery of 1832 and found that the children of winners had no better adult outcomes than those of losers.

Hoynes Schazenbach and Almond (2012) examine the long-run impacts of food stamp receipt by examining the roll-out of the program. They find that access to the food stamp program in utero leads to an improvement in long-run health outcomes and in an increase in economic self-sufficiency.

3. Data and Measures

The data for this paper come from the U.S. Census Bureau's Survey of Income and Program Participation Synthetic Beta (SSB). The SSB contains person-level micro-data from the SIPP that are linked with administrative tax and benefit data from Social Security Administration (SSA) and Internal Revenue Service (IRS) Form W-2 records and SSA records of retirement and disability benefit receipt.

There are SSB data for nine SIPP panels (1984, 1990, 1991, 1992, 1993, 1996, 2001, 2004, and 2008). Earnings are available annually from 1951 to 2011 from the Summary Earnings Record (SER), which are potentially top-coded at the maximum value at which the Social Security payroll tax is collected in a given year.

We characterize the state of the macro-economy using U.S. annual GDP growth from the U.S. Bureau of Economic Analysis. We restrict our sample to men who were born in the United States. Because earnings are only available from 1951 through 2011, we restrict ourselves to the 1929 through 1966 birth cohorts.

Our primary outcomes are employment at age 36, annual earnings measured around age 36, early retirement (as measured by Social Security claiming at age 62), and Social Security Disability Insurance application. We center our labor market results around age 36 following Haider and Solon (2006), who found that age 36 outcomes were a good proxy for lifetime labor market variables.

Table 1 reports employment rates and annual earnings by age for our 38 cohorts of men (N=150,197). Employment is defined as having any positive earnings in a calendar year. Earnings are from the summary earning records (SER) and are top-coded at the maximum value subject to the Social Security tax in that

year. Earnings are based in 2013 dollars using the Social Security annual wage index. Figure 1 reports annual GDP growth from 1929 through 2014, and Figure 2 reports the cohort sizes for our estimation sample.

4. Methods

We estimate the impact of the macro-economy at year of birth on long-run outcomes by estimating a set of linear regressions such as the following:

(1) $$y_{i,a} = X_i\beta + \gamma GDPg_{i,0} + \varepsilon_i$$

where:

> $y_{i,a}$ is the outcome for individual i at age a,
> X_i is a set of demographic characteristics for individual i including race/ethnicity, ever married, every any children, education, state fixed effects, and panel fixed effects, and
> $GDPg_{i,0}$ is the annual rate of GDP growth in individual i's year of birth.

The primary outcomes we examine include employment at age 36, earnings at age 36, whether the individual claimed his own Social Security retirement benefit at age 62, and whether the individual ever filed a Social Security Disability Insurance application. As secondary outcomes, we examine employment at every age between 25 and 45 and average employment at various age ranges (35-37, 30-42, 30-45, and 25-45).

We estimate the impact of the macro-economy on parent's earnings in the year of birth of their children by estimating the following:

(2) $$\Delta y_{i,t} = X_i\beta + \lambda GDPg_{i,t} + \varepsilon_i$$

where:

$\Delta y_{i,t}$ is the change in annual earnings individual i in year t,
X_i is a set of demographic characteristics for individual i including race/ethnicity, ever married, education, state fixed effects, and panel fixed effects, and
$GDPg_{i,t}$ is the annual rate of GDP growth in year t,
and t is either the year birth of the individual's first or last child.

We examine change in earnings as the change in mother's earnings, the change in the spouse's earnings (which we call father's earnings), and the sum of mother's and father's earnings.[1]

In order to assess the impact of parental earnings at the time of the birth of a child on long-run outcomes, we take the ratio of the coefficient on GDP growth, γ, in model (1) to the coefficient on GDP growth, λ, in model (2).

5. Results

A. Employment

Table 2 reports the estimates of the effect of GDP growth in the year of birth on age 36 employment. We report the results of three specifications. In the first, no additional controls are included. In the second, we include a set of demographic controls (listed above). In the third, we include both demographic controls and the unemployment rate in the year of birth. The coefficients and heteroskedastic-consistent standard errors are reported. However, since GDP growth is measured on a scale that ranges (in the data) from -0.2 to 0.2 the magnitude of the coefficient is not easily interpretable. We also report the mean age 36 employment rate and the mean and standard deviation of GDP growth for the 1929 through 1966 cohorts.

[1] Spouse is identified at the time of the survey not at the time of the birth of the child. As a result, spouse's earnings may not reflect father's earnings.

To ease interpretation, we report the effect of a one standard deviation increase in GDP growth (which is 0.072) on the probability of employment.

Without controls, a one standard deviation increase in GDP growth at the time of birth is estimated to lead to 0.6 percentage point (0.7%) increase in employment at age 36. With controls, the estimated impact is 1.6 percentage points (or 1.9%). The estimates do not change if we also include the unemployment rate in the model.

In Table 3, we report the impact of GDP growth in the year of birth on average employment rates over different age ranges. The impact of GDP growth on future employment is fairly robust across these age ranges.

In Figure 3 and in Table 4, we report the impact of GDP growth in the year of birth on employment at each age from 25 to 45. In the figure, the triangle represents the coefficient on GDP growth and the lines represent the 95% confidence interval based on the standard error of the coefficient. GDP growth at birth has a substantial impact at every age from 25 to 45, though there is some modest variation in the size of the effect by age.

B. Robustness Checks

We next discuss a few robustness checks to determine the extent to which our results are stable across specifications and samples.

In the first set of robustness checks, we add lags of GDP growth and leads of GDP growth to the right-hand side of equation (1). This check helps ensure that it is indeed GDP growth in the year of birth that is relevant for long-term outcomes, not

GDP growth that preceded or followed the in utero period. Of course, there is a degree of correlation across years in GDP growth, so we should expect the coefficient on GDP growth in the year of birth to be affected somewhat.

Table 5 reports the results of ten specifications that add lags (from 1 to 5) or leads (from 1 to 5) of GDP growth to the model that also includes GDP growth in the year of birth. In each specification, the coefficient on GDP growth in the year of birth remains sizable and statistically significant.

In the second set of robustness checks, we add lags or leads of GDP growth in place of GDP growth in the year of birth in equation (1). Table 6 reports the results of 10 specifications that include lags (from 1 to 5) or leads (from 1 to 5) of GDP growth. These results are also reported in Figure 4. The results show that the effect of GDP growth on age 36 employment diminishes as it occurs in a more distant year prior to birth or in a year following birth, with the exception of GDP growth in the year following birth. In fact, GDP growth in the year following birth has an even larger effect on employment at age 36 than does GDP growth in the year of birth. This suggests, perhaps, that our model is mis-specified and it is early childhood income that matters even more than in utero income.

In our final robustness check, we use different samples of cohorts than in our main specification. Our main specification uses the 1929 to 1966 cohorts. We can vary this set of cohorts, but still need to use a large number of cohorts in the model in order to identify the impact of GDP growth in the year of birth. To assess whether there is any evidence of variation across cohorts in the impact of GDP growth on long-term outcomes, we estimate 19 different specifications, each with 21 cohorts of

men. Each cohort spans a different, but partially overlapping, set of cohorts. For example, our first specification includes the 21 cohorts from 1929 to 1949. The second the cohorts from 1930 to 1950 and so on.

We find that the estimates are highly stable across cohorts for our first 14 specifications (ranging from 1929-1949 through 1941-1962). However, the estimates first become smaller and then negative for the remaining 5 specifications (1942-1963 through 1945-1966). These cohorts happen to include the baby-boom generation, which are notably large cohorts.

C. Earnings

Table 7 reports the estimates of the effect of GDP growth in the year of birth on age 36 earnings and on average earnings over different age ranges. We find that a one standard deviation increase in GDP growth at the time of birth to lead to a $713 increase (1.5% increase) in earnings at age 36. When looking at earnings over other age ranges, we see similarly sized effects.

D. Social Security

We report the results on our final two outcomes, whether the individual claimed his own Social Security retirement benefit at age 62, and whether the individual ever filed a Social Security Disability Insurance application. Table 8 reports the mean levels of these outcomes for men born between 1929 and 1950. We restrict our cohorts to this range so that all were at least age 62 by 2012, the last year available in the MBR records. 35% of men who claimed their own Social

Security benefit did so at age 62. 22% of men in these cohorts applied for SSDI at some point before turning age 62.

Table 9 reports the estimates of GDP growth in the year of birth on these two outcomes: early retirement and SSDI application. For each outcome we report two specifications, one with no controls and one with the set of demographic controls listed above. Without controls, GDP growth is not associated with early retirement. However, once demographic characteristics are controlled for, a 1 standard deviation increase in GDP growth is estimated to lead to a 0.3 percentage point (1%) decrease in the probability of early retirement. By contrast, GDP growth is estimated to lead to an increase in the probability of SSDI application, though the effect is very small and goes away when demographic characteristics are controlled for.

E. Parental Earnings

In Table 10 we report the results of equation (2). For this analysis we restrict our sample to mothers and their spouses who had children in any year between 1952 and 2011. The SSB contains the birth year of the first and last child born to each mother. We determine the impact of GDP growth on the growth in family earnings in the years these children were born.

We find that a one standard deviation increase in GDP growth leads to a $775 dollar increase in family earnings in the year a mother's first child was born. The estimate for mothers earnings is $105 while that for spouses (fathers) is $682. The

increase in family earnings represents 24% of the mean family earnings growth, and 1.4% of mean family earnings.

F. Impact of Family Earnings on Long–term Outcomes of Children

We are able to combine the estimates of the impact of GDP growth on parental earnings and the impact of GDP growth on children's outcomes to obtain an estimate of the causal impact of parental earnings in the year of a child's birth on long-term outcomes. This estimate requires two major assumptions. The first is that all of the effect of GDP growth on child outcomes is due to its effect on parental earnings. The second is that the relationship between GDP growth and parental earnings is stable across cohorts as the estimates on parental earnings are for different cohorts than are the estimates on long-term outcomes.

Table 11 reports these estimates of the impact of parental earnings on the long-term outcomes of their children. We find that the effect of a $1,000 increase in parental earnings in the year of birth leads to a 2.35% increase in employment at age 36, a 1.92% increase in earnings at age 36, and a 3.68% decrease in the probability of early retirement.

6. Conclusions

The state of the economy in the year of a person' s birth has long-run consequences for labor market outcomes, including employment, earnings, and retirement. Moreover, the results imply that parental earnings have small but important long-run consequences for their children. Our results provide support for

theories, such as those in the fetal origins literature, that posit that events experienced in utero or in early childhood can have long-run impacts on human capital development and earnings.

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Table 1
Summary Statistics

Age	Employment	Annual Earnings (2013 $)	
	Mean	Mean	St. Dev
25	0.8802	32915	23615
26	0.8832	35545	24784
27	0.8862	37735	25778
28	0.8884	39560	26583
29	0.8904	41143	27267
30	0.8928	42672	27930
31	0.8924	43890	28572
32	0.8928	45047	29222
33	0.8912	45884	29087
34	0.8897	46678	30371
35	0.884	47261	31447
36	0.88	47909	32258
37	0.8767	48525	33004
38	0.8726	49003	33581
39	0.8693	49364	34119
40	0.865	49711	34119
41	0.8602	49726	35084
42	0.8567	49789	35562
43	0.8503	49599	36031
44	0.8433	49319	36389
45	0.8355	48803	36995
35-37	0.8802	47898	30524
30-42	0.8787	47342	26457
30-45	0.872	47343	26457
25-45	0.8753	47699	26636
Observations		150197	

Notes: Robust standard errors reported in parentheses. * p<0.05
Sources: SIPP SSB, BEA, and BLS.

Table 2
GDP Growth in Year of Birth on Age 36 Employment

	(1)	(2)	(3)
GDP Growth	0.083 *	0.228 *	0.218 *
	(0.014)	(0.030)	(0.030)
Demographic Controls	No	Yes	Yes
UR Rate	No	No	Yes
Mean of Dependent Variable	0.88	0.88	0.88
Mean GDP Growth	0.041	0.041	0.041
St Dev GDP Growth	0.072	0.072	0.072
Effect of a 1 SD Increase in GDP Growth	0.006	0.016	0.016
As a percentage of employment rate	0.7%	1.9%	1.8%

Notes: Robust standard errors reported in parentheses. * p<0.05
Sources: SIPP SSB, BEA, and BLS.

Table 3
GDP Growth in Year of Birth on Average Employment Rates

	(1)	(2)	(3)	(4)	(5)
Age Range	36	35 to 37	30 to 42	30 to 45	25 to 45
GDP Growth	0.228 *	0.209 *	0.133 *	0.139 *	0.136 *
	(0.030)	(0.026)	(0.020)	(0.020)	(0.018)
Demographic Controls	Yes	Yes	Yes	Yes	Yes
Mean of Dependent Variable	0.88	0.88	0.87	0.87	0.88
Mean GDP Growth	0.041	0.041	0.041	0.041	0.041
St Dev GDP Growth	0.072	0.072	0.072	0.072	0.072
Effect of a 1 SD Increase in GDP Growth	0.016	0.015	0.010	0.010	0.010
As a percentage of employment rate	1.9%	1.7%	1.1%	1.2%	1.1%

Notes: Robust standard errors reported in parentheses. * p<0.05
Sources: SIPP SSB, BEA, and BLS.

Table 4
GDP Growth in Year of Birth on Employment Rates at Different Ages

Age	25	26	27	28	29	30	31	32	33	34	
GDP Growth	0.123	0.159	0.114	0.118	0.12	0.11	0.113	0.085	0.101	0.157	
	(0.025)	(0.026)	(0.025)	(0.025)	(0.025)	(0.026)	(0.027)	(0.027)	(0.027)	(0.028)	
Age	35	36	37	38	39	40	41	42	43	44	45
GDP Growth	0.186	0.228	0.213	0.193	0.111	0.061	0.09	0.082	0.136	0.151	0.199
	(0.029)	(0.030)	(0.030)	(0.031)	(0.031)	(0.032)	(0.032)	(0.032)	(0.032)	(0.033)	(0.034)

Notes: Robust standard errors reported in parentheses. * $p<0.05$
Sources: SIPP SSB, BEA, and BLS.

Table 5

Robustness Check: GDP Growth in Year of Birth on Age 36 Employment Rates with Leads and Lags Included

Lags included	-5	-4	-3	-2	-1
GDP Growth	0.282 *	0.321 *	0.277 *	0.201 *	0.149 *
	(0.031)	(0.033)	(0.031)	(0.030)	(0.036)
Leads included	1	2	3	4	5
GDP Growth	0.095 *	0.209 *	0.277 *	0.311 *	0.183 *
	(0.036)	(0.030)	(0.031)	(0.035)	(0.035)

Notes: Demographic controls included. Robust standard errors reported in parentheses. * $p<0.05$

Sources: SIPP SSB, BEA, and BLS.

Table 6
GDP Growth in Years Relative to Year of Birth on Age 36 Employment Rate

Year relative to year of birth	-5	-4	-3	-2	-1	0
GDP Growth	0.081	0.071	0.134	0.203	0.222	0.228
	(0.030)	(0.031)	(0.030)	(0.030)	(0.030)	(0.030)
Year relative to year of birth	1	2	3	4	5	
GDP Growth	0.321	0.184	0.129	0.012	-0.023	
	(0.032)	(0.029)	(0.029)	(0.031)	(0.034)	

Notes: Robust standard errors reported in parentheses. * p<0.05
Sources: SIPP SSB, BEA, and BLS.

Table 8
Summary Statistics from SSA Master Beneficiary Records

	Mean
Claim Own Retirement Benefit at Age 62	0.351
Applied for SSDI Benefit	0.217

Notes: 1929 through 1956 Birth Cohorts
Source: SIPP SSB v6.0

Table 9
GDP Growth in Year of Birth on Early Retirement and SSDI Application

	(1)	(2)	(3)	(4)
	Early Retirement		SSDI Application	
GDP Growth	-0.037	-0.103 *	0.056 *	0.023
	(0.019)	(0.039)	(0.021)	(0.034)
Demographic Controls	No	Yes	No	Yes
Mean of Dependent Variable	0.351	0.351	0.217	0.217
Mean GDP Growth	0.039	0.039	0.039	0.039
St Dev GDP Growth	0.094	0.094	0.094	0.094
Effect of a 1 SD Increase in GDP Growth	-0.003	-0.010	0.005	0.002
As a percent of mean	-1.0%	-2.8%	2.4%	1.0%

Notes: Robust standard errors reported in parentheses. * p<0.05
Sources: SIPP SSB v 6.0, BEA, and BLS.

Table 10
GDP Growth in Year of Birth of Child on Parental Earnings

	(1)	(2)	(3)	(4)	(5)	(6)
			Change in Earnings			
	Mother		Father		Parents	
	First Child	Last Child	First Child	Last Child	First Child	Last Child
GDP Growth in Child's Year of Birth	4,570	5,612	29,647	32,632	33,698	34,074
	(1385)	(1485)	(2731)	(2970)	(3450)	(3720)
Mean Earnings Change	$912	$617	$2,571	$1,635	$3,261	$2,007
Mean Earnings	$13,462	$15,533	$38,264	$46,723	$54,151	$64,131
Mean GDP Growth	0.036	0.036	0.036	0.036	0.036	0.036
St Dev GDP Growth	0.023	0.023	0.023	0.023	0.023	0.023
Effect of a 1 SD Increase in GDP Growth	$105	$129	$682	$751	$775	$784
As a percent of Earnings Change	12%	21%	27%	46%	24%	39%
As a percent of Earnings	0.8%	0.8%	1.8%	1.6%	1.4%	1.2%

Note: Earnings are measured in 2013 $.

Table 11
Impact of $1000 of Parental Earnings in Year of Child's Birth on Outcomes

Outcome	Effect of a 1 SD Increase in GDP Growth on Outcome	Effect of a 1 SD Increase in GDP Growth on Parental Earnings	Implied effect of a $1,000 increase in parental earnings in year of birth on outcome	Mean value of the outcome	Percent effect of a $1,000 increase in parental earnings on outcome
Age 36 Employment	0.016	$775	0.021	0.88	2.35%
Age 36 Earnings	$713	$775	$920	$47,909	1.92%
Early Retirement	-0.01	$775	-0.013	0.351	-3.68%
Disability Application	0.002	$775	0.003	0.2167	1.19%

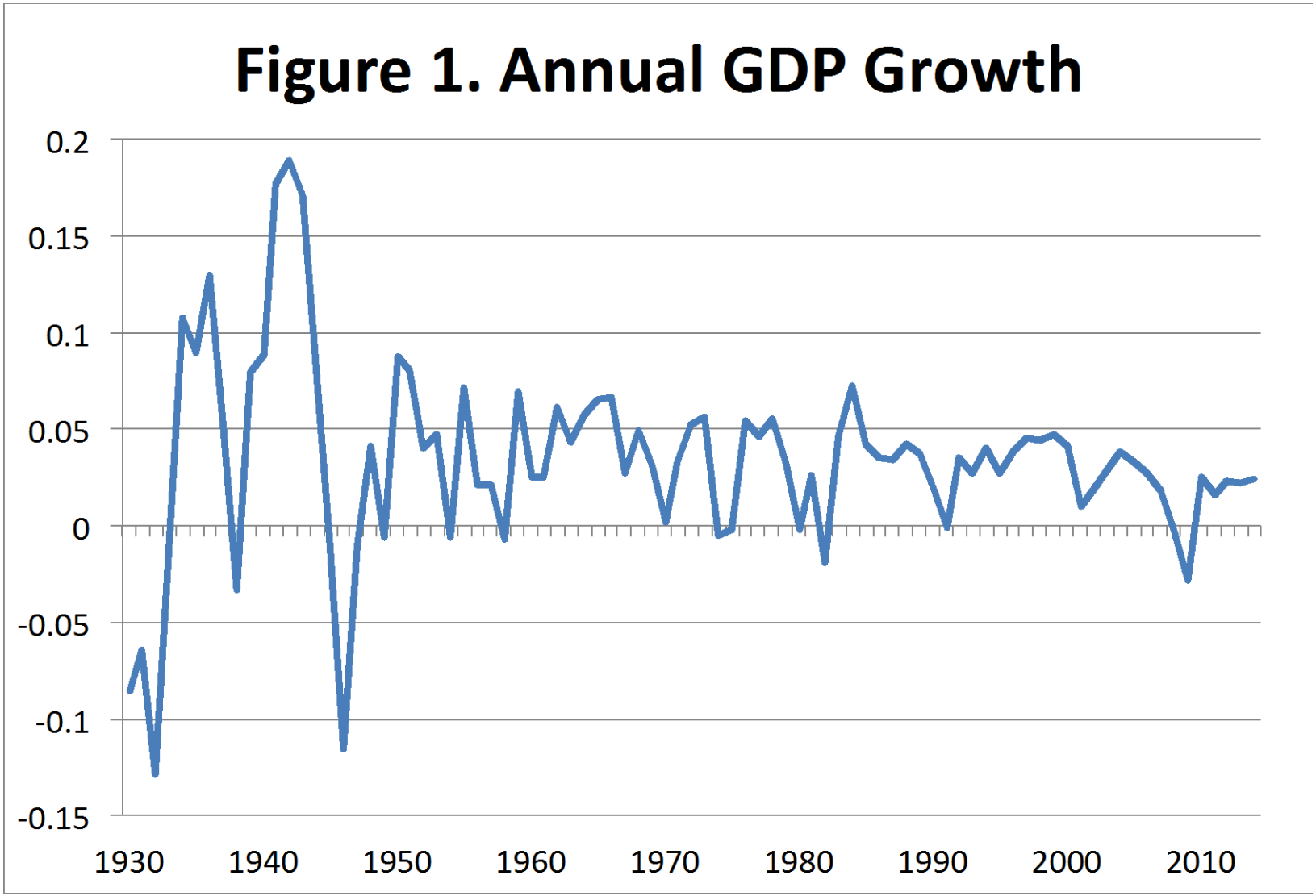
Figure 1. Annual GDP Growth
0.2
0.15
0.1
0.05
0
-0.05
-0.1
-0.15
1930
1940
1950
1960
1970
1980
1990
2000
2010

Figure 2. Number of Observations by Cohort

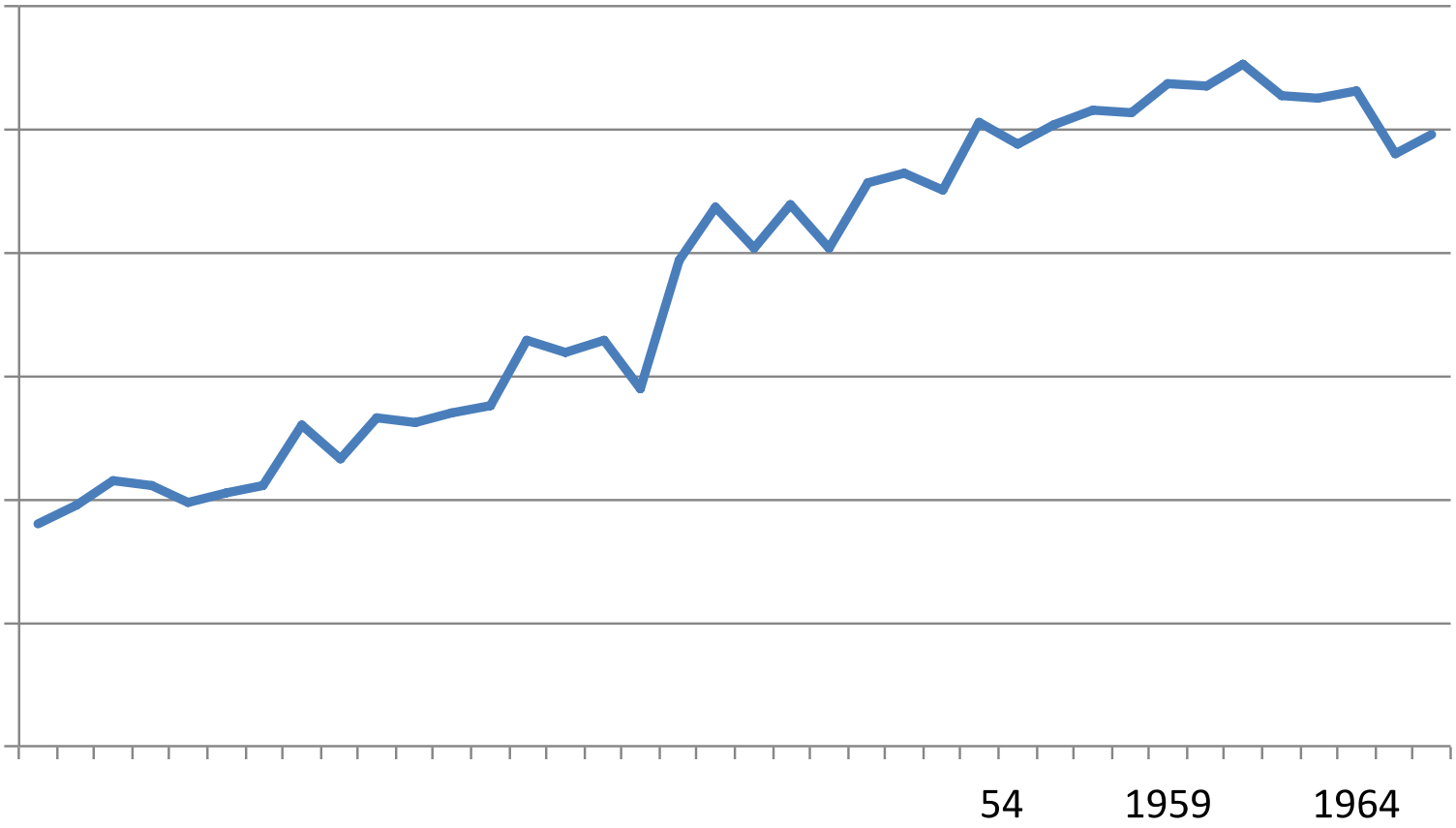

Figure 3. Effect of GDP Growth in Year of Birth on Employment Rates by Age

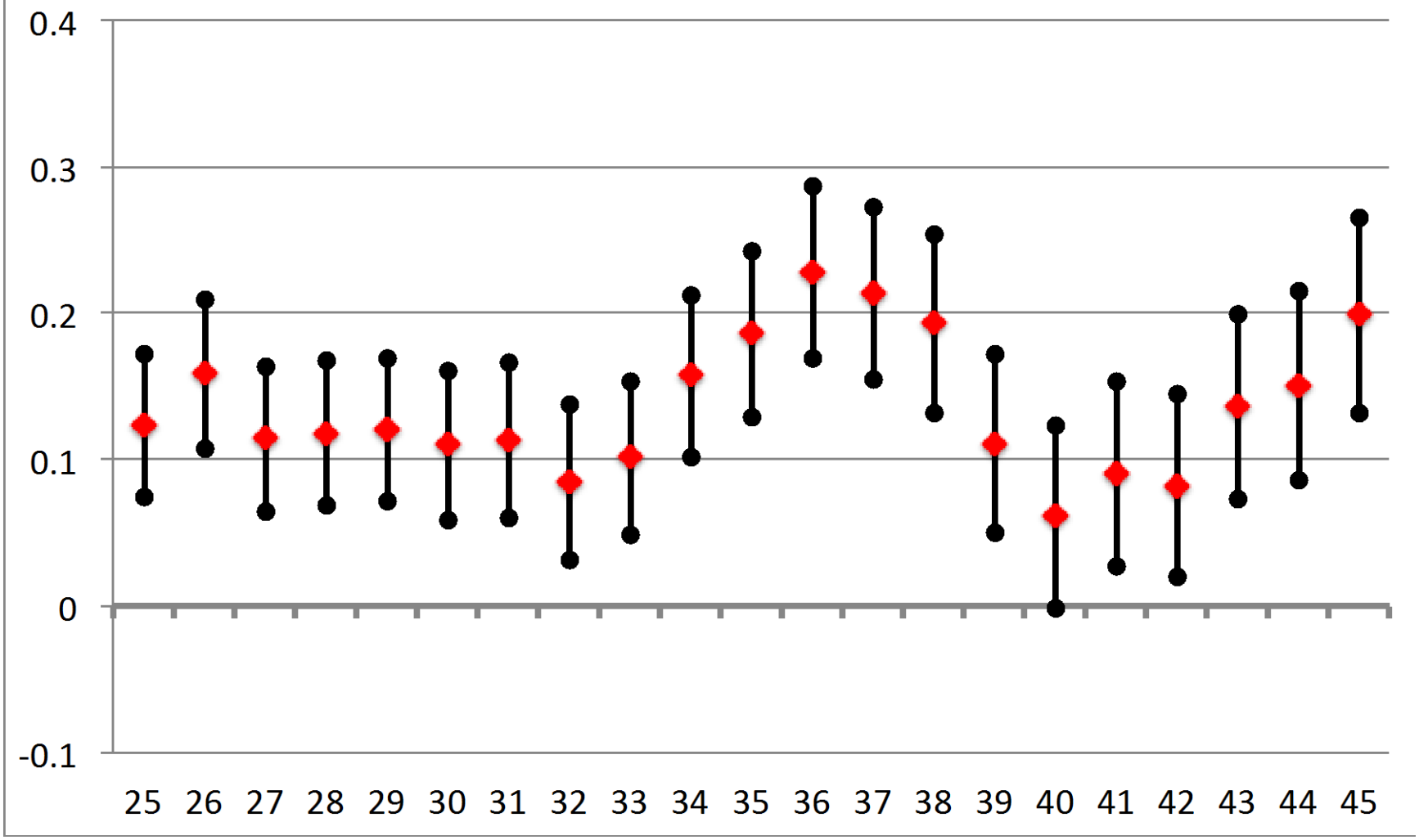

Figure 4. Effect of GDP Growth in Years Relative to Year of Birth on Age 36 Employment

