At Least I Have My Health: Health and Income Inequality During the Depression

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Abstract

There is little consensus across disciplines on the degree to which income inequality influences health outcomes. Using a newly developed panel data set for cities in 1929, 1933, and 1939, I examine the relationship between infant mortality and various measures of the income and wealth distribution during the Great Depression. Unconditional correlations suggest that increased income inequality was associated with higher infant mortality. When additional explanatory variables are added the relationship weakens. Estimates using fixed effects are statistically insignificant and relatively small in size. A one percentage point increase in a city-specific gini coefficient was associated with a increase of 0.00361 infant deaths per 1000 live births. When using income shares as an inequality indicator, a one percentage point increase in the share of the highest income earners was associated with an 0.224 increase in infant mortality. Stillbirths were used as a separate welfare measure. Results were significantly different. A one percentage point increase in the gini was associated with a decrease of 3.808 stillbirths per 10000. An analysis with more observations using household's rental and housing values as proxies for income and wealth finds no statistically significant relationship between income inequality and infant mortality or stillbirths.

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1 Introduction

Studies of income inequality and infant mortality that have used modern data have found that the relationship was generally statistically insignificant. However, due to progressive taxation, measuring inequality was extremely problematic (Meyer and Sullivan, 2010). To correct for this, I use historical data. Analyzing pre-WWII data has two advantages: less than 10% of all households paid taxes and prior to 1934 there were fewer governmental monetary transfers. The present study used a novel dataset from the Depression era to investigate the relationship between inequality and infant mortality.

Income inequality is a contentious issue. The literature has offered two major hypotheses on the relationship between income inequality and health: the absolute hypothesis and stress hypothesis. The absolute income hypothesis suggests that income inequality should have no direct effect on individual health. Under this theory any relationship between income inequality and health reflects a spurious effect due to the direct relationship between income and health (Preston, 1975; Gravelle, 1998; Deaton, 2003). The stress hypothesis is not one but a collection of theories in which stress is the primary mechanism by which income inequality effects health.[1] Proponents suggest that income acts a social metric by which individuals value themselves. A lower value as opposed to a low value is seen as a social failure. The psycho-social stressor then leads to a myriad of physiological problems, which in turn, leads to poorer health outcomes. There has been evidence presented for either side (see Wilkinson and Pickett, 2006 for a review).

The results from empirical studies have also been varied. Generally studies on income inequality and infant mortality[2] are conducted at the country level. The results of inter-country studies are an average effect over diverse regions and people. The estimates from these studies may not be representative of a particular country. There has been a handful of papers that have focused solely on income inequality and infant mortality in the US. Meara (1999), Mellor and Milyo (2001), and Mayer and Sarin (2005), have all found that infant mortality has a negative but statistically insignificant association with income inequality as measured by the gini coefficient. This paper differs from much of the existing literature on income inequality in that, it focuses on a single country, the US, during a time in which the confounding factors of taxes and public transfers were at a minimum.

The Great Recession has sparked a fervent debate on the social implications of income inequality. Infant mortality and stillbirths are considered direct and informative

[1] Contributing hypotheses include the relative-income hypothesis, the deprivation hypothesis, the relative position hypothesis, and the income inequality hypothesis. See Lynch and Kaplan (1997) for an overview.

[2] Infant mortality is defined as the number of child deaths within the first year of life per 1000 live births.

welfare indicators (Steckel, 2008). A study of infant mortality and income inequality during the Great Depression offers a historical reference point from which to direct present policy. In the US Joint Economic Committee Report, "Income Inequality and the Great Recession" parallels were made between the Great Recession and the Great Depression. Both were preceded by a widening income gap. Due to a lack of income data, further investigation into the effects of income inequality were not viable.

A related study by Fishback, Haines, and Kantor (2007) measured the effect of public and private relief spending on birth and death rates. They found that New Deal relief spending decreased infant mortality by 0.163 lives per 1000 live births per capita dollar. However, they noted that an important omission was a precise control for income inequality The authors had data for only the top income earners.[3] This paper was able to examine more accurately the impact of income inequality.

Income data prior to 1940 was sparse. One main contribution of this paper is the unique dataset on income and income inequality. However, the analysis could be enriched by more observations. In response, I created an alternative dataset using housing and rental values from the 1930 and 1940 censuses and for years between 1933 and 1936 from the Financial Survey of Urban Housing. Housing and rental values were very strongly correlated with income, and results from using housing inequality were similar to the results using income inequality measures.

The results suggest that changes in income inequality as measured by gini, income shares, and housing inequality were not associated with a statistically significant change in infant mortality. In cross-sectional analysis infant mortality was highly correlated with income inequality, as can be seen in the OLS results. However, once correlates are added including city and year effects, the relationship becomes much weaker and statistically insignificant. Even though during the Depression there was a very different tax environment, the results for the period are similar to modern findings that income inequality was not strongly associated with higher infant mortality. Stillbirths were more sensitive to changes in the gini coefficient. A one percentage point increase in the gini coefficient was associated with a decrease in 3.808 stillbirths per 10000.

[3] Most income estimates for the time period came from tax data. Only the top 10% of income earners paid taxes.

2 Infant Mortality

Prior to 1850, the death of infants was accepted as a fact, a natural process of selection.

> " The assertion has been made in some quarters that effort directed toward the prevention of infant mortality interferes with the operation of the law of natural selection, that the results of such effort would be to prolong the lives of the weak, to increase the miseries of the poor and to reduce the average vitality of the next generation. A careful study of the situation shows that the argument is fallacious..."

– economist Irving Fisher speaking at the inaugural meeting of the Association for the Study and Prevention of Infant Mortality in response to objections against infant mortality reform (Journal of the American Medical Association: Society proceedings, 1910)

Concomitantly with industrialization, there was a change in the family-concept generally, and in the child concept, specifically. Children came to be seen as a "sacred" consumption good as opposed to an investment good (Zelizer, 1981).

The Association for the Study and Prevention of Infant Mortality (ASPIM) founded at Yale in 1909 was one of several Progressive organizations that underscored the new position of the child by dedicating itself to investigating the causes of infant mortality. The members of (ASPIM) had a variety of specializations from medicine to economics. The association found that most infant deaths were attributed to gastrointestinal disease, namely diarrhea. However, there was no consensus as to the cause of the disease. Some speculated that it was due to poor milk quality which led to series of pasteurization reforms and proper feeding campaigns. A smaller group of scholars focused on the lack of education associated with poverty (Brosco, 1999).

The movement garnered increasing support and the cause was adopted by the federal government. The Children's Bureau was founded in 1912 under President Taft.[4] The Bureau was created to investigate and report on infant mortality, birth rates, orphanages, juvenile courts and other social issues related to care and maintenance of children.[5] Data gathered by the Bureau led to efforts to increase public education in proper infant care and home hygiene. One of the key reforms was the Sheppard-Towner Act (1921). The act provided public funds to instruct women on proper infant and maternal care.[6]

[4] Most notable government policies: Compulsory schooling laws (1880s); Child labor laws (1890s); Mother's pension(1910-1930); Shepherd-Towner Maternity and Infancy Act (1920).

[5] See (www.acf.hhs.gov

[6] Fox (2009) found that over the period 1923-1932 spending on health education and poverty relief was successful in reducing mortality rates for infants and school age children. Adjusted to 2007 dollars, for every $29,000 investment in public health education an infant death was avoided.

By 1929, the number of infant deaths had decreased dramatically. In 1915, the average infant mortality rate was 99.9 deaths per 1000.[7] By 1929, infant mortality had fallen to 67.6 deaths per 1000. In 1933, at the height of the Depression, infant mortality rate was 58.1 deaths per 1000.[8] The causes of infant death had also changed. By 1929, the four leading causes of death were: prematurity (due to congenital weakness), congenital malformations, birth injury, and congenital syphilis (Cone, 1979).[9]

A stillbirth was defined as a fetus which dies in utero after the 20th week of gestation.[10] Stillbirth data was more sparse and was less studied than infant mortality. This was due to the variation of reporting across the states. Presently, states were required to report fetal death as opposed to stillbirths. Fetal deaths were spontaneous intrauterine deaths happening at any time during pregnancy. Most states reported fetal deaths if the gestation period succeeded 20 weeks, but it varied.[11]

During the Depression, half of all births were in the presence of a midwife. Midwives were less likely to report stillbirths, often at the families behest. Thus, stillbirth data was a noiser measure of welfare.

3 Modern Studies

Literature concerning the relationship between infant mortality and income inequality was not vast. Table 1 outlined the authors, time of analysis, and results of economic inquiry into the connection between income inequality and infant mortality.

Each paper focused on infant mortality and income inequality within the US. However, all of the papers listed were using more recent data. Each paper found that the relationships between infant mortality and income inequality were not significantly different than zero. This was directly comparable to the results of the present paper.

Mayer and Sarin (2005) assessed the three main mechanisms attributed to the link between income inequality and health: non-linearity or the spuriousness of the inequality and health relationship due to the relationship between income and health; economic segregation, and state health spending. The authors find that income inequality and infant mortality do

[7] Infant mortality rose in 1916 and 1918 due to an influenza epidemic.

[8] Despite the national trend, black infant mortality rates were approximately twice that of whites. In 1915, black infant mortality rate was 181 deaths per 1000 live births; in 1929, it was 102.2 ; in 1933, it was 85.4.

[9] Of the deaths due to prematurity, maternal syphilis was estimated to be responsible for 50-80% of the cases (Luke, et al, 1993).

[10] If a fetus dies in the uterus prior to the 20th week, the ocurrence is called a miscarriage or a spontaneous abortion.

[11] http://www.cdc.gov/nchs/fetal_death.htm

not have a direct relationship. However, their analysis suggests that economic segregation is a function of income inequality and in return infant mortality is a function of economic segregation. Thus indirectly, income inequality influenced infant mortality.

Mayer and Sarin (2005) used a fixed effects framework and were therefore able to control for unobserved heterogeneity. The authors used economic segregation as a proxy for income inequality. With historical data, I am able to explore a direct relationship between income inequality and infant death.

4 Biological Mechanism

The link between income inequality and infant mortality or stillbirths was not obvious. There were two main avenues through which income inequality affects individuals: availability of health resources and through the psychosocial stressor of failure and uncertainty. During the 1920s and 1930s, hospitals began to use new birthing techniques and surgeries. Sanitation methods were untested and proved in many cases to be inadequate, thus causing many maternal deaths (Thomasson and Treber, 2006). American hospitals during the 1920s and 1930s did not boast higher success rates over domicile births (Devitt, 1977). If we assumed that both wealthy and non-wealthy families had access to mid-wives, then the quality of healthcare across the economic spectrum was quite even.

An alternative mechanism through which income inequality effects infant mortality was stress. The effects of stress on the body have long been an active area of study for neurobiologists, immunologists, and epidemiologists. Income inequality may have induced the psycho-social stressors, failure and uncertainty, which could have caused the "stress response" in the parturient leading to negative birth outcomes.

The short run stress response in the average human included a release of hormones and neuro-homones that send messages to: increase cardiovascular tone, immune activation, energy mobilization, increased blood flow and cerebral glucose utilization, loss of appetite, enhanced memory consolidation, loss of proceptive and receptive sexual behaviors ,and water retention and vasoconstriction (Sapolsky, 2000). The benefit of this natural “fight or flight” defense mechanism waned dramatically with the duration of the stressor. Prolonged exposure to stress led to extended secretion of glucocorticoids (GC), which raised the risk of hypertension, insulin-resistant diabete mellitus, amenorrhea, impotency, ulcers, and immune suppression (Sapolsky,2000). The GC secretions during major long term stress events could kill neurons and cause explicit memory deficits and impaired brain function (Sapolsky, 2000).The normal stress response could be particularly harmful to the parturient and the fetus/embryo.

Table 1: **The Literature**

Previous research on the effect of inequality on infant mortality in the United States

Author	**Data and time period**	**Results**
Mellor and Milyo (2001)	48 continental states, 1950 - 1990	Gini (-, insig)
Meara (1999) (individual level)	1990 birth/death records, 1980 NNFMS, 1988 NMIHS	Gini (-, insig)
Mayer and Sarin (2005)	1985, 1987, and 1991 Vital Statistics	Economic segregation (+, sig)

sig = significant, insig=insignificant,

NNFMS = National Natality and Fetal Mortality Survey; NMIHS= National Maternal and Infant Health Survey

Note.Mayer and Sarin used economic segregation as a proxy for income inequality.

Pregnancy is that curious situation in which two organisms occupy the same space at the same time and thus must share all resources. During the physical mobilization associated with the stress response, the mother's body may act to secure its own survival keeping needed resources that would have gone to the fetus (Pike, 2005). In response to a resource-poor environment the fetus/embryo economized. The fetus may restrict growth, allocating resources to the most immediate organs and systems, generally the brain. Under extreme cases, the fetus may choose to initiate the endocrine cascade that leads to birth (Haig, 1993; Wells,2003). Early births lead to a host of growth and developmental problems for the fetus. Low birth weights (births of less than 5 lbs), an outcome associated with early births and growth restriction, are currently the leading cause of death and morbidity of infants in the industrialized world.

The effects of stress transferrd from mother to fetus carried beyond early births. Brouwers et al (2001) found that when mothers are under significant psychosocial stresses babies have altered neuroendocrine responses and behavior. Young (2002) found that negative postnatal environmental influences the infants sympathetic nervous system, which manages the child's "fight or flight" response.

One of the most compelling "quasi-natural" experiments was conducted by Glynn, et. al. (2001). They investigated the effect of a magnitude 6.8 earthquake in California on maternal and fetal health. The women in the study were on average 50 miles from the epicenter of the quake and suffered no physical damage. The study included a random cross-section of 281 pregnant women. Glynn et al (2001) found that women in the early stages of pregnancy were more likely to have shorter gestation (pregnancy) periods. Thus extrapolating, the stress and fear of future problems brought on by income inequality can lead to more problems with still births and infant deaths even if nutrition is not a factor.

5 Data

Income data is drawn from the Financial Survey of Urban Housing (FSUH) performed by the Civil Works Administration (CWA) early in 1934 and wage and salary income from the 1940 Census. The main focus of the CWA survey was to analyze the relationship between housing quality and incomes. The survey was conducted by interview and by mail for 61 large and mid size cities beginning in February 1934. The unit of analysis was the household. Every tenth block was canvassed by interview. If there were less than 50000 inhabitants in the city, every seventh block was canvassed. In four out of the ten blocks, inhabitants were supplied with questionnaires to be returned by mail. Interviewers were allowed discretion in canvassing more blocks if they considered neighborhoods to be too homogeneous. Of these

61 cities, the Department of Commerce released information for 33 cities to the National Bureau of Economic Research.

The 33 cities released were diverse. Butte, Montana was a mining center, whereas Lincoln, Nebraska and St. Joseph, Missouri were commercial centers. San Diego was an expanding city, tripling population from 1920 to 1940. In contrast, Portland, Maine had a stationary population. Birmingham, Ala had a population of nearly 40% African-Americans, while the black population share in Portland Maine was 0.5%. Horst Menderhausen (1946), used this information to investigate the distribution of incomes and the effect incomes had on homeownership and rental rates.

Since the National Bureau of Economic Analysis was only privy to data from only 33 cities, Menderhausen based his analyis on those 33 cities. For 1929, I used Menderhausen's data, solely. For 1933, I included Menderhausen's data along with 26 other of the original cities not released. Of the 33 cities that overlap, there are some differences. Menderhausen's metric for cleaning the data was not precisely known. I have included both a balanced panel using Menderhausen's dataset and an unbalanced panel combining both datasets. As will be seen below, the coefficient estimates for the same specifications are similar in the two panels.

The 1939 income estimates were constructed from the 1940 census. The income variable comes from household heads who reported working for a salary for a private firm or the government (including work relief earnings). This does not include anyone who was self-employed or any unpaid family labor. The FSUH questionaire did not distinguish between types of household income. For instance, there was no distinction made between wages from private or public employment, interest income, rental income, or income from relief. Therefore over the three years of my dataset there were differences in the definition of income. To address the differences in collection, I included a year fixed effect.

Three income measures were derived: the gini coefficient, income shares, and housing values. The gini coefficient was a inequality index that ranged from 0 to 1. A gini coefficient of 0 implied that all households had equal income or zero income inequality. A coefficient of 1 implied that there was one household holding all the wealth. The gini coefficient was calculated according to a basic trapezoid algorithm as explained in Appendix A.

The income share variable indicated the percentage of the city population falling in one of following income categories: $0 income, $1 -249, $250-499, $500-749, $750-999, $1000-1499, $1500-1999, $2000-2999, $3000-4499, $4500-7499, and above $7500. The $750-999 group was removed to serve as the reference group.

A series of correlates were added to control for other factors that were reported to influence infant mortality. The demographic variables, percent illiterate and percent black were interpolated from 1930 and 1940 census data. Table 2 shows that the percent black varied from 0.256% to 53.795% across cities. However, within the same city neither the percent illiterate nor the percent black changed much between 1930 and 1940. During the first half of the century the share of births in hospitals rose substantially. The mean percentage of hospital births for the sample was about 55.4%, with a range from nearly 7% to nearly 94% in the unbalanced panel. The within city standard deviation across time was approximately10 percentage points.

I also control for public and private relief spending where available. The relief data from Baird (1942) used by Fishback, Haines, and Kantor (2007) is available for 114 cities, but their sample differs from the CWA sample. With respect to the cities for which relief data was available, the average dollar amount was $25.741 (in 1967 dollars) with a range from $.292 before the New Deal to $98.173 after the New Deal policies were established. Note that there was a substantial national deflation of approximately 25 percent between 1929 and 1933. The drop in nominal income overstated the true drop in real income. The price level in 1933 was only 77.6 percent of the level in 1929.[12] Because the 1929 and 1933 income data were reported by specific income bins and individual level data were unavailable, I was not able to accurately adjust the categories for deflation. Therefore, I used year fixed effects to control for changes in the national price level. Cross-city long run price differentials and other time-invariant features of the cities, like basic sanitation, were controlled for with city fixed effects.

Over the sample years, the mean number of infant deaths per 1000 live births was 58.29. Infant mortality rates ranged from 32.098 infant deaths per 1000 live births in Evanston, Illinois to 141.16 infant deaths in Albuquerque, New Mexico. Between cities, the standard deviation was approximately 18.24 deaths per 1000 live births. On average, the standard deviation within a city was 7 infant deaths.

The box plots in Figure 1 showed the decline in infant mortality rate from 1929 to 1939. In 1929, the median infant mortality rate was 61.87 deaths, which was well above the sample median at 51.06. The lower quartile was at 53.7 deaths and the lowest infant death rate was found in Portland, Oregon at 42.53. The upper quartile was 71.18 and the highest infant death rate was 93.51 held in Atlanta, Georgia.

The 1939 median infant mortality rate was below the sample median infant mortality rate at 44.58. The upper quartile in 1939 at 58.25 was lower than the median in 1929. The box plots show increasing variation between city infant mortality rates over the years. This variation across cities and years along with the variation shown in income inequality in

[12] The income categories in 1967 dollars are: $0; $1.29 – 320.88; $322.16-643.04; $644.33-965.21; $966.49-1287.37; $1288.66-1931.70; $1932.99-2576.03; $2577.32-3864.69; $3865.98-5797.68; $5798.97-9663.66; $9664.95 and up

Figure 2 is used to identify the effects of income inequality on infant mortality.

Figure 4 is a whisker plot showing the central tendency of income inequality by year. In 1929, the sample average gini was over 60.[13] This was well above the sample median at 40.48. By 1939, the mean gini had fallen to 35.71 with a significant increase in variance. There were some cities across the US which had a gini close to 25[14]. To put the change in inequality over the decade into modern terms, a city in the US went from having an income inequality level akin to modern Columbia to having an income inequality level akin to modern Canada.

Scholars have written about the Great Compression that lasted well into 50s, but the beginnings, during the Depression, were not fully captured with data available.

> "The income leveling of 1929-1953 was not a statistical lie, even though the main data set comes from income tax returns. . . . confirmation of the change can be seen in shifts in America's occupations and living arrangements" Lindert (2000).

One of the benefits of using the FSUH dataset was that the entire distribution of incomes were represented. The sample mean of gini coefficients in my sample were slightly higher than the numbers proposed by Atkinson and Brandolini (2001), who used tax data from the Bureau Economic Analysis. Atkinson and Brandolini (2001) estimated a gini coefficient of 51 for 1929 and approximately 48 in 1933 (Atkinson, 1999). Those estimates were based on information from the very top of the income distribution. Fewer than 10 percent of households paid income taxes.

Figure 5 showed that cross sectional correlation between income inequality and infant mortality was not consistent across the three years. In 1929, an increase in income inequality was associated with lower infant mortality. In 1933, there was no clear relationship, and in 1939, income inequality was higher in areas with higher infant mortality. It was not clear, from Figure 3, the average effect of income inequality on infant mortality throughout the Depression.

Within the sample, the gini coefficient for all cities decreased from 1929 to 1933, as shown in Figure 6. For all but two cities, Boise and San Diego, infant mortality decreased from 1929 to 1933. For most cities, infant mortality rates decreased by twenty infant deaths per 1000 from 1929 to 1933. Butte, Montana had the largest decrease by nearly 45 infant deaths. Boise, Idaho had an increase in infant deaths by nearly 15 infant deaths.

[13] According to the CIA factbook, in 2009, Columbia had a gini coefficient of 58.5.

[14] This is a number lower than Finland (in 2008), Denmark (in 2007), and Iceland (in 2006). These numbers are slightly higher than those proposed by Atkinson and Bandolino(2001). However, Atkinson and Brandolino (2001) used only tax data.

From 1933 to 1939, Trenton, New Jersey was the only city for which both the gini and infant mortality increased, as shown in Figure 7. Five other cities–Atlanta, Worcester, Indianapolis, Cleveland , and Birmingham—experienced an increase in the gini coefficient but not infant mortality. Atlanta and Birmingham had the lowest gini coefficients in 1929. Figure 8, showed the relationship between change in gini on the change in infant mortality from 1929 and 1939. Some care must be exercised with the comparisons of 1933 and 1939 because the 1939 information used only information on wage and salary income (including work relief) while the 1933 information used all income.

An alternative set of measures was the shares of households in different parts of the income distribution. The shares were divided using the original Menderhausen categories: $0 income, households earning between $0 -249, $250-499, $500-749, $750-999, $1000-1499, $1500-1999, $2000-2999, $3000-4499, $4500-7499, and above $7500 . Figures 9 and 10 show the significant change in tendency in the below $500 and above $2000 groups. In 1929, only about 12% of American households in any of the sample cities earned less than $500. By 1939, approximately 30% of households were earning less than $500. Close to 35% of households earned above $2000 in 1929, 16% in 1933, and 26.74% in 1939.

6 Empirical Specification

Several econometric specifications were used. I estimate the following reduced-form infant mortality equation:

$$IMR_{it} = f(Inequality_{it}, Y_{it}, X_{it}, city, year, e_{it})$$

where IMR_{it} , the number of infant deaths per 1000 live births in city i in year t , is modeled as a function of inequality ($Inequality_{it}$), economic activity (Y_{it}) , a vector of demographic and facility characteristics (X_{it}),city fixed effects ($city$), year fixed effects ($year$), and a random error term (e_{it}). The demographic vector, $X_,$ includes: percent black, percent illiterate, the percentage of babies born in hospitals, and per capita relief spending.

I used both gini coefficient, income shares, and housing values to determine the effect of income inequality on mortality. The gini coefficient, which was often used in income distribution studies, summarizes inequality with one number. When the gini coefficient was used as the measure of inequality, state per capita income was included as a control for average income levels. By including state per capita income, I was able to control for income and address the absolute income hypothesis. State income per capita was representative of average city income without being multicollinear with the gini coefficient. The state per capita income measure was not included when the shares of households by income were used.

7 Infant Mortality Results

The results suggested that in the absence of year and city fixed effects, income inequality was associated with higher infant mortality rates. However, once the specification included city and year fixed effects, the effects of income inequality were small and statistically insignificant. The OLS estimates, without covariates, in specification 1 of Table 4, showed that a one percentage point increase in the gini coefficient was associated with an increase in infant mortality by 0.483 deaths per 1000 live births. When correlates were added to the equation in specifications 2, 3, and 4, the coefficient decreased in magnitude. When relief spending per capita were added to the analysis, the gini fell to 0.293.

Since data on public and private per capita relief spending was not available for each city in the sample, the change in the coefficient of the gini might have come from a reduction in the sample size from 97 to 67 observations or from the addition of the relief spending to the specification. The shift from specification 2 to 3 shows that the impact of cutting the sample size to 67 had little effect on the coefficient of the gini. The coefficients were similar; all were within a standard deviation. The shift from specification 3 to 4 with the same sample sizes, showed that fall in the coefficient from 0.576 in column (2) to 0.293 in column (4) is largely due to the inclusion of relief spending and not the restrictions on the sample.

The fixed effects specification controls for time invariant unmeasured aspects of cities while the year fixed effects control for differences in the national measures of the cost of living and differences in the type of evidence used to develop the gini coefficient. The inclusion of the city and year fixed effects in specifications 5 through 8 caused the coefficient to decrease considerably and become statistically insignificant. Thus, once the fixed effects analysis focused the variation on differences within cities over time after controlling for differences associated with years, the gini had little effect on infant mortality.

The analysis in Table 4 was performed on an unbalanced panel because information on some cities were not available in all years. The results for a balanced panel in Table 4 serve as a check to insure that the results in Table 4 were not being driven by an unusual pattern of missing data for specific cities. The results in Tables 4 and 5 for each of the 8 specifications were very similar. In the specifications with the gini and real state per capita income in Tables 4 and 5, there was no statistically significant relationship between the average state income and infant mortality rates. The absence of a relationship between infant mortality and measures of income distribution and average income suggested that other factors were dominating the changes in infant mortality during the Depression.

The correlate coefficients showed consistent patterns across the tables. One of the most important was the negative impact of hospital births on infant mortality rates. In all of the tables when controlling for city and year effects, the infant mortality rate is lower in areas where a higher share of infants were born in hospitals. The coefficients ranged from -13.44 in the unbalanced panel to -10.77 in the balanced panel. The latter was statistically significant at the 5% level. These were sizeable effects on the infant death rate, as an area with 10 percent more hospital births tended to have nearly two fewer infant deaths per thousand.

The results contrast somewhat with the results for maternal mortality found by Thomasson and Treber (2008) who found that access to hospitals had little effect on maternal deaths until the introduction of sulfa drugs in 1937. If there was any endogeneity bias in this coefficient, it was likely to be positive to the extent that communities sought to build more hospitals in areas with more infant mortality. Thus, the estimate of the impact of hospital beds was likely to be biased against finding a negative effect.

An alternative measure of inequality is to control explicitly for the shares of households in each income class, as used in Waldmann (1992, 2009). The reference group was households earning between $750-999, and the sample median income is $1500. Tables 6 and 7 show the results for the unbalanced and balanced panels using household income shares. In specification 1 with no other correlates in Tables 5 and 6, there was no discernible pattern. That is to say, infant mortality did not fall continuously with higher or lower shares of households in higher income categories.

However, once the time-varying controls and then the city and year fixed effects were added, the relationship starts to take form. In cities with more households earning below $750, infant mortality was lower. The change in the results with the addition of correlates and fixed effects suggested that the positive raw correlations between income shares and the infant mortality rate in specification 1 in Table 6 and 7 were largely due to the omission of information on access to relief and hospitals, the demographic structure of cities, and factors about sanitation facilities and other activities captured by the city and year fixed effects. Yet, the coefficients for these factors were not statistically significant.

8 Stillbirth Results

Stillbirth rates were much more responsive to measures of income inequality. The results suggest that in the absence of year and city fixed effects, higher income inequality is associated with lower stillbirth rates but the association was small in magnitude and statistically insignificant. However, once the specification includes city and year fixed effects, the effects of income inequality were economically substantial and statistically significant.

In the OLS estimates without controlling for any other covariates in specification 1 of Table 8 a one percentage point increase in the gini coefficient was associated with a decrease in stillbirths by -0.205 deaths per 1000 live births. When correlates were added to the equation in specifications 2 and 3 the coefficient decreased. When relief spending per capita was added to the analysis, stillbirths rose by 0.550 per one percentage point increase in the gini. The shift from specification 2 to 3 shows that the impact of cutting the sample size to 67 had little effect on the coefficient of the gini. The coefficients were similar. The shift from specification 3 to 4 with the same sample sizes, showed that rise in the coefficient from -0.474 in column (2) to 0.550 in column (4) was largely due to the inclusion of relief spending and not the restrictions on the sample.

The inclusion of the city and year fixed effects in specifications 5 through 8 causes the coefficient to increase in magnitude considerably. Thus, once the fixed effects analysis focused the variation on differences within cities over time after controlling for differences associated with years, the gini had more significant effect on stillbirths. The results suggested that a one percentage point increase in the gini decreases stillbirths by 3.808 deaths per 1000 births. When using a balanced panel, the effect became more negative. A one percentage point increase in the gini was associated with a decrease of 3.907 infant deaths.

Controlling explicitly for household income shares and again using the $750-999 as a reference, Table 10 and 11 showed the results for the unbalanced and balanced panels. In specification 1 with no other correlates in Tables 10 and 11, there was no discernible pattern. That is to say, stillbirths did not fall continuously with higher or lower shares of households in higher income categories.

Unlike the case of infant mortality, once the time-varying controls and city and year fixed effects were added, a pattern began to take shape. What was notable were the effects of the two highest income groups. The results suggested that a one percentage point increase in the number of households earning between $4500 -$7499 was associated with an increase in stillbirths by 18.91 deaths per 1000 births. While an increase in the number of households earning over $7500 was associated with a decrease in stillbirths by 8.376 deaths. Using the balanced panel in Table 11, a one percentage point increase in the number of households earning between $4500-$7500 was associated with a increase in stillbirths by 24.46 deaths. And one percentage point increase in households earning over $7500 is associated with a decrease in stillbirths by 11.98 deaths per 1000.

9 Using Housing Rent and Value Distributions

The main problem with the above analysis was the small number of cities for which the income distribution and other correlates were available in 1929, 1933, and 1939. There also may have been issues with measurement error when comparing the wage and salary income distribution from 1939 to income distributions of 1929 and 1933. The differences between 1929 and the other two years was largely controlled by the inclusion of year dummies, but the control could have been incomplete if there was variation within cities due to data collection methods in 1939 and the first two years.

Therefore, I developed an alternative way to address the impact of wealth and income distribution on infant mortality using information on housing values and rents as proxies for the income and wealth distribution. Using this information allowed the panel to expand to 413 cities with an average of 2 years for each city in the unbalanced panel. The census provides housing information for 1930 and 1940. Also, there is data for a middle decade year, 1934, 1935, 1936, or 1937. After the Civil Works Administration conducted housing inventories for 64 cities in 1934, inventories were collected using nearly the same methods for over 100 more cities over the next two years.

For housing values for owned housing, the value was the sale price at which the household head believed the property could be sold. The rents were the monthly contracted rents reported by the household heads. In the 1930 sample, renters constituted 53.5% of the population. Given that the household rented, 15% paid between $0-14.99; 39% paid between $15-29.99; 31.99% paid between $30 and $49.99; 14% paid between $50-99.99; and.01% paid over $100. In 1930, the homeowner distribution were as follows: 6% with home values below $1499; 13% with values between $1500 and 2999; 25% with values between $3000-4999; 38% with values between $5000 and 9999; and 18% with home values above $10,000.

By 1940, the renter to owner ratio as well as the respective distributions had changed dramatically. Renters constituted 62.54% of the sample population. Given that the household rented, 24% paid between $0-14.99, 45% paid between $15-29.99, 25% paid between $30-$49.99; 6% paid between $50-99.99 ; and.004% paid over $100. In 1940, the homeowner distribution was: 13% with home values below $1499; 27% with values between $1500 and 2999; 31% with values between $3000-4999; 23% with values between $5000 and 9999; and 6% with home values above $10000.

The data for the middle decade years were limited. Nonetheless, the sample housing values reached a low in 1935 and 1936.[15] Renters were 62.3% of the population and 83% of all renters paid less than $30. Nearly 50% of owners owned homes that were valued below

[15] The years are not significantly different.

$3000.

10 Housing Values and Rents as a Proxy for Income Distribution

Housing prices, including both rental rates and house values, were a function of housing supply and housing demand. Housing demand was a function of income and interest rates. New housing construction fell sharply between 1929 and 1933 and then grew relatively slowly. Prices also fell sharply between 1930 and 1934 and then rose relatively little.

The 1940 census had both income and housing values. To establish the relationship between income and housing values, I ran a simple OLS regression of income of the head of household on the housing value. The sample housing value mean and standard deviation were $3046.63 and $3244.08, respectively.[16] The sample housing value mean and standard deviation were $23.44 and $27.59, respectively.[17] I found that housing values were highly correlated with head of household income. Table 12 and Table 13 showed cross-sectional correlations between household income and housing values and rents, for cities in the 1940 census. All correlations between income and housing values were positive and significant at the 5% level. In the case of rents however, there were three cities for which the correlation were not positive and statistically significant at the 5% level: Boston, MA; Grand Rapids, MI; and Worcester, MA.

11 Housing Results

The housing specification included the demographic variables: percent black, percent illiterate, percent hospital births. The relief variable for the larger sample was constructed slightly differently due to data limitations. The per capita public and private relief variable were taken directly from Baird (1942).[18] Per capita relief spending was the sum of federal spending on old age pensions, aid to families with dependent children, aid to the blind, and general federal relief spending collected from the Fishback, Horrace, Kantor(2007) information at the county level.

The reference group were homeowners with housing values over $10,000. The OLS results in Table 14 column 8 showed that larger shares of renters and homeowners, in nearly

[16] There are over 15 million observations.
[17] There are nearly 20 million observations.
[18] Data taken from the Federal Security Agency, the Social Security Board, Public Assistance Report.

all categories, are associated with an increase in infant mortality. Positive associations between housing values and infant mortality along with choosing the highest home values as a reference group showed that the households who were able to afford higher home values seemed to insulate themselves from the effects of the Depression in terms of infant mortality. A positive association between every other home value category implied that all other homeowners had higher infant mortality rates. This gave some insight as to who were the biggest losers during the Depression. The wealthiest Americans during a financial crisis were noted to be particularly susceptible because presumably a larger proportion of their wealth came from interest income (Grayson, 2010). However in terms of infant mortality, this finding, although statistically insignificant, gave some cause to question this.

From column 8, the correlation between housing values and city infant mortality rate were not significantly different. A one percentage point increase in the number of homeowners owning a home valued between \$0 and \$1499 was associated with an increase in infant mortality by 0.148 infant deaths per 1000. The associations between the other home value categories are similar. The category with housing values from \$1500 -2999 was notable. With respect to the reference group, infant mortality increased by 0.822 per 1000 infant deaths given an increase in the percentage of households with home values between \$1500 – 2999. It is may have been the case that homeowners within this group relied more on wage income as opposed to relief or a diversified wealth portfolio more than any other category and were therefore more vulnerable to the downturn.

In terms of renters the relationship was not quite so linear. Renters paying the least and the most in rent had lower levels of infant mortality with respect to the households having the highest home values. In fact, for a one percentage point increase in the number of households in the highest rental category there was a decrease in infant deaths by 1.172 per 1000 live births. Homeownership was seen as a societal value for which individuals used to measure their success. However, in uncertain economic times it may have proven to be a bigger real and psychic liability than renting.

The renter paying the least in rent also had lower infant deaths. Biology may shed light on this finding. There was debate about the determinants of the poverty trap but there was little debate on its existence. A majority of households in the lowest category of renters had been in the lowest category prior to the Depression (Grayson, 2010). Their situation was relatively less uncertain and therefore less stressful. In fact, it could be argued that after 1934 the significant increase in relief greatly improved their economic prospects from even pre-1929 levels. This would have contributed to better birth outcomes.

Comparisons of housing value share coefficients in specifications 2 and 4 suggest that the omission of city and year effects led to positive omitted variable bias for all but one income category. When the city and year effects were added, all but the coefficient on the rental shares of $100 and up per month were more negative in specification 4 than in specification 2. None of the coefficients were statistically significant, which suggested that we could not reject the hypothesis of no effect housing value shares.

Table 15 reran the housing value regressions using stillbirths as a welfare measure. The variability across cities was such that we were not able to obtain easily interpretable results. There were no statistically significant correlations and no obvious patterns. Generally with respect to the percentage of households with the greatest home values most other homeowners had lower stillbirth rates. Focusing on column 8, coefficients were lower by 5.171 to 13.73 stillbirths per 1000 births. For renters, nearly all had lower stillbirth rates than the households living in the most valued homes.

12 Conclusion

The United States experienced its largest income compression from 1929-1953 (Lindert, 2000). There was not much known about income inequality or its welfare effects during the Great Depression. Generally, unemployment and GNP indicated a country's well being, but an alternative picture of total welfare could be elicited through non-pecuniary indicators such as infant mortality. I examined the relationship between infant mortality and income inequality using one of the earliest comprehensive income surveys, the Financial Survey of Urban Housing (FSUH).

Multiple measures of inequality were used, including the gini coefficient, income shares, and housing value shares. Cross-sectional comparisons across cities suggested that infant mortality was higher in areas with more inequality. Using a fixed effects estimator, however, the estimated relationship between income inequality and infant mortality was statistically insignificant for all specifications. I also found that the relationship between stillbirth rates and income inequality are negative and statistically significant suggesting that greater income inequality led to lower stillbirths.

The natural sciences have recorded the deleterious effects of stress on the body. Stress biologists would argue that if the average parturient interpreted income inequality as a stressful environment, then birth outcomes would be negatively effected. Thus, the results would suggest that income inequality does not produce a stressful environment as interpreted by expectant mothers. Yet, hierarchy was arguably primal (Sapolsky, 2005). Failure, an accepted stressor, was associated with being a member of the lower class (Rank and Hirschl, 2001).

A possible explanation of this seeming inconsistency was social support. Social scientists have found that social support could buffer the effects of stress (Antonovsky, 1979). Social support was defined as the love, reassurance, understanding, help provided by others (Weiner, 1992).[19] The Great Depression was marked by its pervasiveness. The effects were widespread as opposed to isolated cases of job loss. Because a significant percent of the population were effected directly, this may have acted as a mitigating force in the perception of the stressful environment. Future investigation into income inequality and infant mortality during the Great Depression would be furthered with the inclusion of a measure of social support or cohesion.

Most studies of income or income inequality on birth outcomes use infant mortality. I also included stillbirth rates as a welfare measure. Eventhough stillbirths were a noisier measure due to variation in definition, it was still a valuable indicator of fetal death. In the unbalanced sample a one percentage point increase in the gini led to a decrease of 3.808 stillbirths per 10000 births and a decrease of 3.907 stillbirths in the balanced panel. Stillbirths were much more sensitive to the gini measure. If income inequality induced a stressful environment, this would not be surprising given the biology literature. The inverse relationship between stillbirths and income inequality was consistent with social support as an omitted variable. Stillbirth data can be informative, and future studies should weigh closely the benefits of the measure.

[19] The availibility of social supports has been shown to lower the correlation between stressful life events surveys and complications with pregnancy (Nuckolls, Cassel, and Kaplan, 1972).

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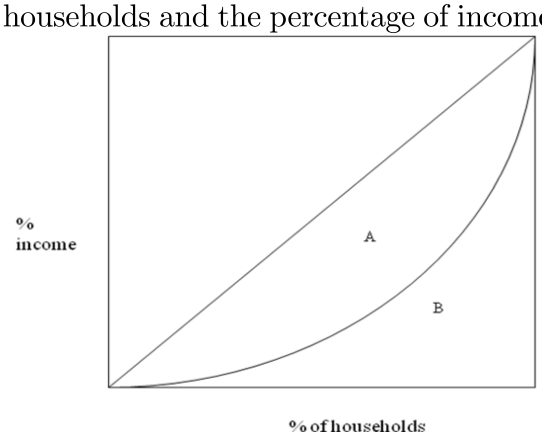
13 Appendix A: Calculating the Gini Coefficient

Empirical studies of inequality which use the gini measure differ from theoretical studies in very salient way. Data is not generally continuous. In this particular case, the income variable is in terms of income categories as defined by the Civil Works Administration. The formula below is the theoretical definition of the gini coefficient, where $L(X)$ is the functional representation of the Lorenz curve.

Thus calculating the gini coefficient for this project is not at all obvious. In order to construct the gini coefficients for the cities studied, I used a very simple and very intuitive graphical method. The gini coefficient measures inequality by measuring the distance between perfect equality which is characterized by x % of households owning x% of total income and the actual percentage of households earning x% of total income.

I constructed the variables *cumperpop* (cumulative percentage of households) and *cumyperpop* (cumulative percentage of income). *Cumperpop* can be written $x_0, x_1, x_2, \ldots x_k$, where x_0 is 0% of total population in the city and x_k is 100% of total population in each city. *Cumyperpop* can be denoted $y_0, y_0, y_2, ..y_k$, where y_0 is 0% of total income in the city and y_k is a 100% of total income in the city. Consider figure 11, where the x axis represents the percentage of households and the y axis represent the percentage of household incomes and the diagonal represents perfect equality. Let the curve represent the actual relationship between the percentage of households and the percentage of income, then the gini coefficient,



G, is equal to $A/(A+B)$.

We can see that the gini coefficient will always be a number between 0 and 1. A gini coefficient of 0, which exists when the actual relationship between the percentage of total households in the city and the percentage of total income in the city equal, represents perfect income equality. A gini coefficient of 1, which exists when total income is owned by one household, characterizes a perfectly unequal income distribution.

Since the figure is a square with each axis having a length of 1and the area of $A+B = .5$, it is sufficient to calculate the area of either the A region or the B region. Here, I preferred to calculate the area of region B.

The area of the B region is roughly composed of a triangle and a series of trapezoids.

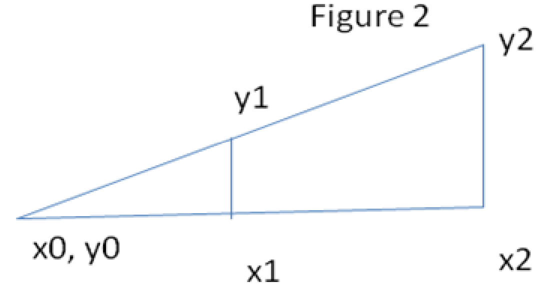
Let us focus on the first triangle in region B as represented in Figure 2.1calculated the area of triangle $y_1x_0x_1$. Next the area of the trapezoid $y_1y_2x_1x_2$ is calculated using the formula, $[(1/2) * (x_2 - x_1) * (y_2 + y_1)]$. We see that each subsequent region of region B is has roughly the same shape as trapezoid 1. So each subsequent section is treated like a trapezoid with endpoints at the correct population and income percentages. Continuing with this method, I calculated the total area of region

$B = (1/2)\{(x_1 - x_0) * (y_1 + y_2) + (x_2 - x_1) * (y_2 + y_1) + ... + (x_k - x_k - 1) * (y_k + y_k - 1)\}$ where xi and yi are the two cumulative percentages on the X and Y axis.

With some algebra, the gini coefficient is thus,

$G = A/(A + B)$, equivalently, $1 - (2B/1000)$.

Figure 2



All gini coefficients were calculated using this method.

14 Appendix B: More on the Biological Mechansim

The natural stress response includes the release of glucocorticoids. When the mother releases glucocorticoids, the placenta stimulates placental corticotropin releasing hormone (CRH). The feto-placental unit controls the timing of parturition. Placental CRH has been identified as a potent vasodilator and a hormone-hormone trigger for fetal adrenal cortisol, which in turn is a major stimulator of organs necessary for survival during the birth process. For instance, an increase in the level of CRH accelerates fetal lung development an organ necessary for birth success. This is necessary when the fetus becomes "anxious" about the viability of the maternal environment. Preterm delivery may represent the final fetal response when other measures have not improved access to vital resources (McLean et al, 1995).

CRH and its regulation represent an integrated system with multiple critical roles: CRH provides information about the environment to the fetus, regulated responses that help it adjust to the postnatal environment, and in the event that these responses are insufficient, the influences the timing of delivery (Pike, 2005). Low birthweight which generally accompanies preterm delivery and length of gestation are primary factors in determining probability of stillbirth and infant death.

Initiating parturition early leads to a host of growth and developmental problems for the fetus. Birth between 37-40 weeks can be both advantageous for the mother and child when the maternal environment is compromised. However, preterm birth is never ideal. There are consequences.

Each human has genetic predisposition to a particular psycho-social stress response strategy. The perception of stress or the definition of a stressor was a function of a person's life history including her education and family environment. According to recent research, a person's environmental response strategy was defined over generations and was passed on through genetic and epigenetic inheritance. For this reason, including controls for ethnic differences were imperative. Along this line, Jasienska (2007) hypothesized that a reason for systemic lower birthweight for African American newborns as compared to their African counterparts, controlling for socioeconomic variables, was lower due to the historic institution of slavery. A smaller baby or one that initiates parturition (birth) earlier was more beneficial for the mother and child because the maternal environment was generally insufficient. Throughout the nearly 300 years of enslavement there was a lasting evolutionary change in birthweight of African children born in the US. Similarly, economists Green and Darity (2010) have made use of allostatic load theory to discuss present black-white health disparities in the context of economic legacy of slavery..[20]

[20] For other discussions see Weiner (1992) and Kuzawa and Sweet (2009).

15 Appendix C: Syphillis

Syphillis, caused by the bacterium treponema pallium, is a disease that can be transmitted through sex or from mother to fetus. Congenital syphillis, syphillis contracted in utero, was a leading factor in both infant deaths and stillbirths. According to the Center for Disease control, 60-80% of pregnant women infected with syphillis will transmit the disease to the fetus. This rate is increased if the mother contracts the disease during the second half of pregnancy. Untreated maternal syphillis leads to stillbirths in 40% of the cases.

The reported rate of syphillis infections varied widely. However, military records were amongst the most comprehensive and consistent of the time. Veneral disease was the second leading cause of solidier debility after influenza, and it was the number one cause of rejection to admittance in the armed forces during WWI (Brandt, 1987). In response, the government passed the Chamberlain-Kain Act (1918). The Act created the Veneral Disease Divison, the first department solely devoted to the containment and eradication of veneral diseases.

Veneral disease contraction transcended income categories. Infection rates by income may have been misleading. Significantly more incidence of syphillis were contributed to poorer families. There is evidence to suggest that due to the stigma of contracting a veneral disease, wealthier families had both the incentive and the resources to conceal their condition (Sacco, 2002). The Depression predates the widespread use of pencillin. The primary treatment for syphillis was Salvarsan a highly volatile but effective treatment. Evidence suggested that the drug was widely available irregardless of income (Wade, 1981).

Table 2: Summary Statistics-unbalanced

Variable	Mean	(Std. Dev.)	Min.	Max.	N
Dependent Variable					
Stillbirths	106.016	(102.2)	5	709	126
Infant Mortality	58.29	(18.241)	32.098	141.159	126
Inequality Variables					
gini	50.657	(10.948)	30.133	67.094	99
% below $500	25.198	(10.977)	5.228	54.775	127
% $500-999	19.767	(6.104)	6.877	33.912	127
% over $2000	22.46	(10.494)	4.387	76.059	127
Demographic Variables					
% Black	10.073	(14.132)	0.256	53.795	127
% illiterate	3.603	(2.674)	0.713	14.952	127
% foreign born	8.497	(7.315)	0.401	26.626	127
% Black*% illiterate	64.461	(131.313)	0.227	788.362	127
Institutional Variables					
% hospital births	55.4	(21.1)	7	94	126
% voted	31.455	(11.647)	2.7	68.75	127
Income Variables					
Real pc state Y	1082.356	(439.992)	327.443	2244.478	127
Pc public and private relief	25.741	(23.379)	0.292	98.173	81

Stillbirths are per 10,000 births. Infant mortality per 1000 live births.

Table 3: Summary Statistics-unbalanced

Variable	Mean	(Std. Dev.)	Min.	Max.	N
Dependent Variable					
Stillbirths	127.058	(113.674)	25	709	86
Infant Mortality	53.375	(14.331)	32.098	93.511	86
Inequality Variables					
gini	50.702	(11.08)	30.133	67.094	81
% below $500	22.92	(9.874)	5.228	51.387	87
% $500-999	19.125	(6.089)	6.877	32.753	87
% over $2000	24.318	(11.031)	7.286	76.059	87
Demographic Variables					
% Black	7.134	(10.453)	0.282	39.234	87
% illiterate	2.824	(1.753)	0.713	7.846	87
% foreign born	10.275	(7.301)	1.045	26.626	87
% Black*% illiterate	30.643	(62.793)	0.402	307.822	87
Institutional Variables					
% hospital births	59	(20)	16.5	85.7	86
% voted	34.564	(12.827)	4.122	52.967	87
Income Variables					
Real pc state Y	1179.393	(442.412)	394.463	2244.478	87
Pc public and private relief	27.531	(24.866)	0.292	98.173	67

Stillbirths are per 10,000 births. Infant mortality per 1000 live births.

City Infant Mortality and City Income Inequality - Gini (unBalanced)

Table 4: Regression Results of City Income Inequality on City Infant Mortality Rates

Dependent variable: Infant deaths per 1000 live births

	OLS				Fixed Effects			
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
gini	0.483**	0.576**	0.457**	0.293†	-0.215	0.0228	0.00851	0.00361
	(0.099)	(0.104)	(0.0810)	(0.147)	(0.322)	(0.290)	(0.230)	(0.229)
Demographic								
% Black		0.223	0.752†	0.747†		5.571†	2.692	2.96
		(0.311)	(0.373)	(0.366)		(2.969)	(5.165)	(5.263)
% illiterate		4.516**	2.042*	2.349*		5.430	5.018	5.061
		(1.193)	(0.801)	(0.852)		(6.164)	(6.007)	(5.997)
% foreign born		-0.728**	-0.353†	-0.341†		0.170	-0.903	-0.995
		(0.239)	(0.184)	(0.182)		(1.362)	(1.576)	(1.618)
% Black∗%*illiterate*		-0.0851*	-0.0888**	-0.0910**		-0.305	-0.236	-0.239
		0.0333)	(0.0301)	(0..0301)		(0.216)	(0.227)	(0.226)
Institutional								
% hospital births		-24.02**	-20.45**	-17.41**		-8.465	-13.15	-13.44
		(5.661)	(5.165)	(5.125)		(11.27)	(9.008)	(9.173)
% voted		-0.0303	-0.279†	-0.196		0.418	0.0108	0.00267
		(0.184)	(0.135)	(0.161)		(0.315)	(0.175)	(0.177)
Income								
Real pc state income		-0.00503	0.000169	-0.000850		0.00784	0.00793	0.00783
		(0.00308)	(0.00316)	(0.00296)		(0.00782)	(0.00951)	(0.00967)
Pc public and private releif spending				-0.112				-0.0234
				(0.0778)				(0.0875)
Constant	31.37**	41.28**	46.84**	53.81**	79.19**	-2.176	43.59	42.81
	(5.554)	(12.81)	(13.64)	(12.86)	(19.26)	(46.83)	(45.04)	(45.80)
N	97	97	67	67	97	97	67	67
R2	0.122	0.661	0.8	0.805	0.703	0.74	0.811	0.811
cities	42	42	26	26	42	42	26	26

Significance levels : † : 10% ∗ : 5% ∗∗ : 1%

City Infant Mortality and City Income Inequality - Gini (Balanced)

Table 5: Regression Results of City Income Inequality on City Infant Mortality Rates

Dependent variable: Infant deaths per 1000 live births

	OLS				Fixed Effects			
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
gini	0.633**	0.589**	0.451**	0.288†	-0.433†	-0.156	-0.0290	-0.0341
	(0.0626)	(0.130)	(0.0875)	(0.154)	(0.219)	(0.171)	(0.232)	(0.231)
Demographic								
% Black		0.341	0.835	0.831		5.147*	3.116	3.394
		(0.410)	(0.523)	(0.513)		(2.431)	(5.029)	(5.186)
% illiterate		3.064†	1.997†	2.390*		6.978	4.744	4.789
		1.504)	(1.019)	(1.081)		(4.816)	(5.925)	(5.914)
% foreign born		-0.648*	-0.336	-0.338		-0.260	-0.61	-0.705
		(0.254)	(0.242)	(0.237)		(1.196)	(1.53)	(1.564)
% Black*%*illiterate*		-0.0509	-0.101†	-0.104†		-0.343*	-0.248	-0.251
		0.0509)	(0.0549)	(0..0547)		(0.160)	(0.222)	(0.221)
Institutional								
% hospital births		-20.30**	-21.00**	-17.68**		-13.60*	-10.48	-10.77
		(5.631)	(5.755)	(5.553)		(6.423)	(9.265)	(9.457)
% voted		-0.0598	-0.280†	-0.198		0.169	0.112	0.129
		(0.202)	(0.141)	(0.164)		(0.164)	(0.166)	(0.165)
Income								
Real pc state income		-0.00147	-0.000477	-0.000735		0.00740	0.00756	0.00745
		(0.004)	(0.00361)	(0.00345)		(0.00779)	(0.00943)	(0.00962)
Pc public and private releif spending				-0.114				-0.0243
				(0.0783)				(0.0889)
Constant	22.06**	36.93*	46.84**	53.97**	89.90**	22.36	36.56	35.89
	(3.307)	(14.94)	(13.64)	(15.14)	(13.14)	(25.83)	(43.50)	(44.38)
N	81	81	63	63	81	81	63	63
R2	0.233	0.703	0.796	0.802	0.802	0.836	0.82	0.82
cities	27	27	21	21	27	27	21	21

Significance levels : † : 10% ∗ : 5% ∗∗ : 1%

City Infant Mortality and City Income Inequality - Distribution (unBalanced)

Table 6: Regression Results of City Income Inequality on City Infant Mortality Rates

Dependent variable: Infant deaths per 1000 live births	OLS				Fixed Effects			
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
% Population within the following income range:								
$0 income	-0.421	-0.795	-0.575	-0.294	0.605	0.531	0.0565	0.282
	(0.678)	(0.497)	(0.462)	(0.559)	(0.465)	(0.459)	(0.560)	(0.503)
below $249	0.583	-0.113	-0.299	-0.0316	0.890	0.291	-0.255	-0.244
	(0.538)	(0.493)	(0.433)	(0.584)	(0.565)	(0.437)	(0.490)	(0.444)
$250-499	2.561*	0.620	1.144	0.704	-0.834	-0.953	-0.289	-0.134
	(1.212)	(0.838)	(0.776)	(0.865)	(0.668)	(0.701)	(0.827)	(0.802)
$500-749	0.0594	-0.693	-0.619	-0.326	0.852	0.779	-0.355	-0.385
	(1.065)	(0.593)	(0.710)	(0.824)	(0.690)	(0.585)	(0.699)	(0.681)
$1000-1499	-0.248	-0.262	0.211	0.376	0.549	0.322	0.0206	0.349
	(0.944)	(0.647)	(0.603)	(0.554)	(0.462)	(0.467)	(0.601)	(0.430)
$1500-1999	1.365	1.201	-0.325	-0.253	1.258†	1.250†	0.164	0.169
	(1.053)	(0.851)	(0.749)	(0.692)	(0.742)	(0.678)	(0.712)	(0.716)
$2000-2999	-0.112	-0.304	0.514	0.557	-0.345	-0.733	-0.174	0.0115
	(0.848)	(0.565)	(0.646)	(0.594)	(0.500)	(0.460)	(0.526)	(0.500)
$3000-4499	1.939*	-0.220	0.175	0.343	0.415	0.297	0.367	0.786
	(0.899)	(0.579)	(0.637)	(0.675)	(0.782)	(0.774)	(0.755)	(0.656)
$4500-7499	3.140**	-0.546	-1.045	-1.686	1.270	1.463	-1.136	-0.434
	(1.137)	(1.175)	(1.567)	(1.569)	(1.179)	(1.076)	(1.421)	(1.398)
over $7500	-0.979	0.535	0.788	1.291†	-0.0419	-0.389	0.425	0.224
	(0.851)	(0.643)	(0.894)	(0.728)	(0.592)	(0.503)	(0.615)	(0.619)
Constant	2.731	68.55	75.39	53.25	29.10	26.54	63.09	108.3*
	(70.78)	(42.55)	(71.09)	(51.60)	(34.09)	(41.37)	(50.06)	(47.63)
Demographic	N	Y	Y	Y	N	Y	Y	Y
Institutional	N	Y	Y	Y	N	Y	Y	Y
Real pc state Y	N	Y	Y	Y	N	Y	Y	Y
Relief	N	N	N	Y	N	N	N	Y
N	126	126	80	80	126	126	80	80
R2	0.349	0.685	0.823	0.823	0.73	0.79	0.834	0.854
cities	50	50	30	30	50	50	30	30

Significance levels : $\dagger$: 10% $*$: 5% $**$: 1%

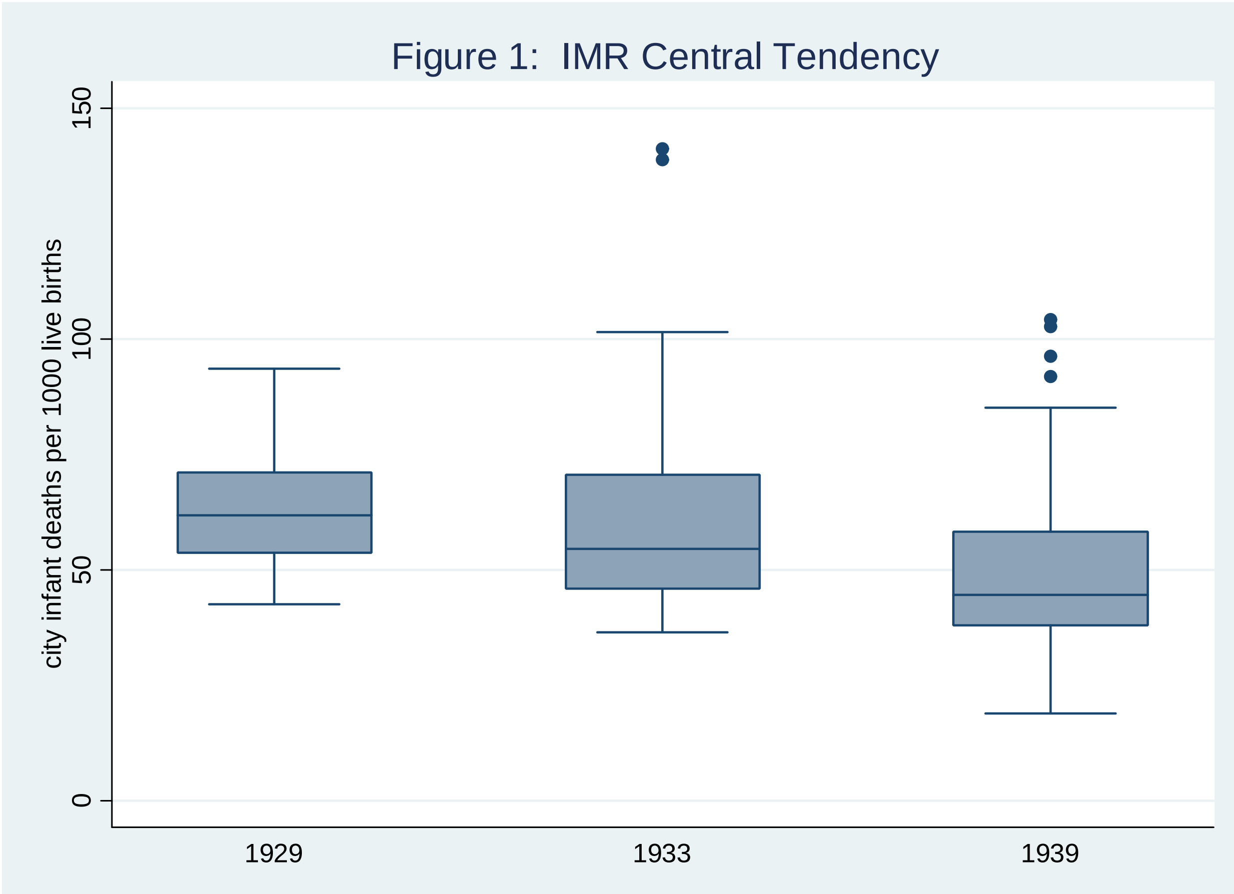


Figure 1: IMR Central Tendency
city infant deaths per 1000 live births
0
50
100
150
1929
1933
1939

City Infant Mortality and City Income Inequality - Distribution (Balanced)

Table 7: Regression Results of City Income Inequality on City Infant Mortality Rates

Dependent variable: Infant deaths per 1000 live births

	OLS				Fixed Effects			
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
% Population within the following income range:								
$0 income	-1.637**	-1.533**	-1.482**	-1.222**	0.215	0.413	0.0590	0.0634
	(0.490)	(0.452)	(0.406)	(0.370)	(0.474)	(0.433)	(0.593)	(0.609)
below $249	-0.361	-0.614†	-0.427	-0.344	-0.251	-0.135	-0.437	-0.454
	(0.441)	(0.341)	(0.325)	(0.284)	(0.420)	(0.432)	(0.508)	(0.528)
$250-499	0.420	-1.219	-2.114*	-1.984*	-1.432	-1.160	-1.363	-1.316
	(1.002)	(1.168)	(0.848)	(0.885)	(0.995)	(0.759)	(1.015)	(1.016)
$500-749	-1.284*	-1.332†	-0.980	-0.658	-0.0046	0.100	-0.412	-0.472
	(0.617)	(0.665)	(0.616)	(0.543)	(0.539)	(0.558)	(0.765)	(0.847)
$1000-1499	-0.720	-0.156	-0.273	-0.139	0.226	0.510	0.225	0.272
	(0.764)	(0.630)	(0.588)	(0.498)	(0.488)	(0.424)	(0.548)	(0.553)
$1500-1999	-1.635*	-1.013†	-1.516*	-1.408*	-0.303	-0.0764	-0.300	-0.297
	(0.765)	(0.556)	(0.603)	(0.577)	(0.524)	(0.437)	(0.756)	(0.766)
$2000-2999	-0.177	-0.541	-0.558	-0.485	-0.471	-0.400	-0.340	-0.303
	(0.732)	(0.594)	(0.530)	(0.508)	(0.501)	(0.427)	(0.656)	(0.702)
$3000-4499	0.467	-1.031	-0.358	-0.174	0.469	0.386	0.599	0.617
	(0.492)	(0.630)	(0.547)	(0.551)	(0.540)	(0.726)	(0.657)	(0.651)
$4500-7499	0.502	-1.160	-2.175	-1.814	0.737	0.176	-0.502	-0.538
	(1.609)	(1.554)	(1.462)	(1.472)	(1.188)	(1.081)	(1.273)	(1.318)
over $7500	-1.209	-0.265	0.004	-0.015	-0.708	-0.159	-0.164	-0.131
	(1.033)	(0.837)	(0.789)	(0.726)	(0.527)	(0.503)	(0.721)	(0.742)
Constant	116.7*	138.7**	155.8**	140.1**	76.94*	57.37	47.09	99.02
	(45.78)	(38.82)	(30.02)	(28.29)	(35.48)	(39.48)	(49.59)	(69.36)
Demographic	N	Y	Y	Y	N	Y	Y	Y
Institutional	N	Y	Y	Y	N	Y	Y	Y
Real pc state Y	N	Y	Y	Y	N	Y	Y	Y
Relief	N	N	N	Y	N	N	N	Y
N	84	84	66	66	90	90	66	66
R2	0.456	0.737	0.842	0.846	0.854	0.863	0.873	0.873
cities	28	28	22	22	28	28	22	22

Significance levels : † : 10% ∗ : 5% ∗∗ : 1%

City Stillbirths and City Income Inequality - Gini (unBalanced)

Table 8: Regression Results of City Income Inequality on City Stillbirth Rates

Dependent variable: Stillbirths per 10000 births

	OLS				Fixed Effects			
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
gini	-0.205	-0.474	-1.420	0.550†	-2.039**	-3.410**	-3.706*	-3.808*
	(0.460)	(0.980	(1.423)	(1.108)	(0.672)	(1.243)	(1.647)	(1.592)
Demographic								
% Black		14.92**	19.88**	19.94**		-40.08	-81.49	-75.90
		(4.342)	(6.456)	(6.315)		(29.32)	(68.04)	(62.59)
% illiterate		-12.40	-27.37	-31.07		39.82	27.82	28.72
		8.521)	(18.26)	(19.03)		(39.28)	(43.64)	(43.02)
% foreign born		10.43*	15.54*	15.40*		20.52†	17.80	15.88†
		(5.021)	(7.289)	(7.141)		(11.55)	(10.55)	(8.794)
% Black∗%*illiterate*		-0.858*	-0.972†	-0.945†		0.0910	0.660	0.599
		0.413)	(0.483)	(0.460)		(1.642)	(2.189)	(2.158)
Institutional								
% hospital births		-7.549	-42.08	-78.67		-26.29	-21.39	-27.33
		(57.21)	(66.60)	(79.08)		(34.69)	(51.19)	(51.77)
% voted		0.682	0.381	-0.617		0.201	-0.0303	0.303
		(1.076)	(1.202)	(1.337)		(0.659)	(0.832)	(0.890)
Income								
Real pc state income		0.00734	-0.0126	-0.000308		0.201	-0.0425	-0.0446
		(0.0288)	(0.0354)	(0.0342)		(0.659)	(0.0652)	(0.0658)
Pc public and private releif spending				1.348†				-0.489
				(0.717)				(0.562)
Constant	131.0**	-28.29	43.12	-40.63	268.9**	380.6†	764.9*	748.6*
	(29.64)	(101.1)	(123.1)	(110.1)	(43.39)	(204.7)	(349.2)	(324.9)
N	97	97	67	67	97	97	67	67
R2	0	0.362	0.462	0.473	0.348	0.513	0.591	0.601
cities	42	42	26	26	42	42	26	26

Significance levels : † : 10% ∗ : 5% ∗∗ : 1%

City Stillbirths and City Income Inequality - Gini (Balanced)

Table 9: Regression Results of City Income Inequality on City Stillbirth Rates

Dependent variable: Stillbirths per 10000 births	OLS				Fixed Effects			
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
gini	-0.0524	-0.880	-1.417	0.930	-2.025**	-3.183*	-3.803*	-3.907*
	(0.431)	(1.204)	(1.344)	(1.057)	(0.707)	(1.230)	(1.687)	(1.620)
Demographic								
% Black		17.57*	21.06*	21.36*		-37.88	-80.39	-74.76
		(8.103)	(9.278)	(9.049)		(29.67)	(67.85)	(62.48)
% illiterate		-38.05†	-35.44	-41.09†		46.36	27.11	28.00
		(20.55)	(22.79)	(23.50)		(43.88)	(43.35)	(42.67)
% foreign born		16.20*	17.02†	17.05†		21.57	18.56	16.64†
		(7.915)	(8.558)	(8.392)		(12.80)	(10.96)	(9.160)
% Black∗%*illiterate*		-0.339	-0.811	-0.769		-0.0110	0.631	0.570
		0.820)	(0.886)	(0.854)		(1.753)	(2.188)	(2.157)
Institutional								
% hospital births		-5.542	-38.95	-86.69		-39.38	-14.46	-20.35
		(61.09)	(63.49)	(76.62)		(38.55)	(52.55)	(52.61)
% voted		1.031	0.739	-0.439		0.0979	0.233	0.571
		(1.250)	(1.238)	(1.356)		(0.727)	(0.894)	(0.986)
Income								
Real pc state income		0.0136	0.00131	0.0187		-0.0382	-0.0435	-0.0456
		(0.0235)	(0.0336)	(0.0317)		(0.0371)	(0.0656)	(0.0663)
Pc public and private releif spending				1.644*				-0.489
				(0.717)				(0.572)
Constant	136.1**	-49.35	3.754	-99.53	281.1**	325.6	711.2*	697.5*
	(30.57)	(107.9)	(119.3)	(107.0)	(45.08)	(201.8)	(324.5)	(305.1)
N	81	81	63	63	81	81	63	63
R2	0	0.422	0.473	0.489	0.358	0.523	0.593	0.602
cities	27	27	21	21	27	27	21	21

Significance levels : † : 10% ∗ : 5% ∗∗ : 1%

City Stillbirth and City Income Inequality - Distribution (unBalanced)

Table 10: Regression Results of City Income Inequality on City Stillbirth Rates

Dependent variable: Stillbirths per 10000 live births								
	OLS				Fixed Effects			
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
% Population within income range								
$0 income	-0.918	1.082	7.306	4.395	0.231	-0.259	2.874	3.021
	(3.627)	(4.117)	(5.987)	(5.399)	(2.197)	(2.434)	(2.922)	(2.620)
below $249	-0.136	-0.616	6.893	5.630	-0.259	-1.046	-0.929	-0.994
	(3.378)	(3.594)	(5.481)	(5.110)	(1.777)	(2.323)	(3.106)	(3.080)
$250-499	4.043	4.651	1.566	1.092	-3.316	-3.387	-0.309	-0.640
	(5.070)	(6.322)	(7.283)	(7.408)	(2.549)	(2.866)	(4.357)	(3.619)
$500-749	1.074	-0.615	13.95	9.921	-1.368	-1.715	1.320	2.445
	(5.544)	(4.915)	(9.326)	(8.673)	(2.042)	(2.770)	(3.091)	(3.368)
$1000-1499	0.693	6.620	9.457	7.588	-0.776	-1.344	1.284	0.877
	(5.360)	(5.291)	(6.633)	(6.176)	(2.318)	(2.668)	(3.113)	(2.662)
$1500-1999	-3.880	-3.730	-2.877	-3.120	-1.894	-2.867	0.606	0.475
	(4.306)	(4.687)	(6.337)	(6.148)	(1.783)	(2.032)	(3.122)	(3.308)
$2000-2999	4.024	0.673	9.501	8.062	-3.377	-2.693	-3.580	-4.018
	(6.502)	(4.408)	(6.735)	(6.340)	(2.031)	(2.715)	(3.712)	(3.104)
$3000-4499	8.170	8.181	10.05	8.158	-1.360	-0.359	-0.206	-0.861
	(4.974)	(5.777)	(8.283)	(7.742)	(1.853)	(2.758)	(3.620)	(3.116)
$4500-7499	-1.106	-2.051	6.691	3.793	3.829	1.593	19.10*	18.91*
	(7.863)	(8.584)	(13.50)	(13.78)	(6.073)	(5.315)	(7.788)	(6.998)
over $7500	4.309	7.573	8.503	8.219	-2.686	-1.980	-8.209*	-8.376**
	(5.477)	(4.955)	(7.769)	(7.052)	(3.003)	(2.539)	(3.039)	(2.751)
Constant	7.584	-126.2	-538.2	-367.3	278.2†	217.8	125.0	66.27
	(365.7)	(380.9)	(508.0)	(469.3)	(165.4)	(210.1)	(199.3)	(225.9)
Demographic	N	Y	Y	Y	N	Y	Y	Y
Institutional	N	Y	Y	Y	N	Y	Y	Y
Real pc state Y	N	Y	Y	Y	N	Y	Y	Y
Relief	N	N	N	Y	N	N	N	Y
N	126	126	80	80	126	126	80	80
R2	0.084	0.329	0.477	0.485	0.371	0.425	0.598	0.622
cities	50	50	30	30	50	50	30	30

Significance levels : † : 10% ∗ : 5% ∗∗ : 1%

City Stillbirth and City Income Inequality - Distribution (Balanced)

Table 11: Regression Results of City Income Inequality on City Stillbirth Rates

Dependent variable: Stillbirths per 10000 live births								
	OLS				Fixed Effects			
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
% Population within income range								
$0 income	2.934	6.754	8.425	3.889	2.719	0.877	3.336	3.220
	(4.622)	(4.758)	(5.500)	(3.906)	(2.299)	(3.430)	(4.147)	(3.967)
below $249	2.927	2.169	3.666	2.232	-1.105	-2.091	-0.871	-0.423
	(3.613)	(4.699)	(5.834)	(4.832)	(1.863)	(3.148)	(3.759)	(4.025)
$250-499	11.05	7.259	8.538	6.266	0.144	-0.550	1.175	-0.0645
	(8.367)	(5.964)	(8.353)	(7.959)	(2.922)	(4.815)	(6.486)	(6.189)
$500-749	8.811	7.380	12.32	6.719	-1.424	-2.868	2.771	4.348
	(7.998)	(6.503)	(9.145)	(7.763)	(2.552)	(3.851)	(4.440)	(4.993)
$1000-1499	1.407	13.45*	13.17†	10.84†	1.781	-0.908	-0.552	-1.007
	(6.436)	(6.426)	(7.447)	(5.898)	(2.210)	(3.873)	(4.015)	(3.764)
$1500-1999	1.153	1.756	0.179	-1.693	0.864	0.792	4.278	4.193
	(6.070)	(4.596)	(7.026)	(6.170)	(1.788)	(2.823)	(4.918)	(4.959)
$2000-2999	8.943	5.212	9.742	8.485	-2.745	-4.156	-5.592	-6.591
	(8.802)	(6.243)	(7.626)	(6.248)	(1.891)	(3.494)	(4.203)	(3.859)
$3000-4499	9.155	8.476	8.906	5.709	-1.754	-1.329	2.872	2.413
	(6.480)	(5.502)	(7.499)	(6.494)	(1.641)	(3.579)	(5.181)	(4.662)
$4500-7499	11.34	11.72	13.92	7.650	15.73	13.97	23.51*	24.46*
	(14.39)	(9.866)	(12.80)	(12.21)	(10.69)	(10.09)	(9.190)	(8.650)
over $7500	3.442	6.988	7.142	7.479	-5.898	-7.294	-11.12*	-11.98**
	(8.024)	(6.257)	(8.624)	(7.217)	(4.939)	(5.677)	(5.128)	(4.550)
Constant	-351.1	-716.7†	-810.4†	-538.2	126.4	273.1	299.3	233.3
	(455.9)	(421.2)	(454.2)	(330.9)	(140.6)	(293.4)	(437.5)	(440.2)
Demographic	N	Y	Y	Y	N	Y	Y	Y
Institutional	N	Y	Y	Y	N	Y	Y	Y
Real pc state Y	N	Y	Y	Y	N	Y	Y	Y
Relief	N	N	N	Y	N	N	N	Y
N	84	84	66	66	84	84	66	66
R2	0.113	0.468	0.522	0.539	0.436	0.515	0.642	0.658
cities	28	28	22	22	28	28	22	22

Significance levels : † : 10% ∗ : 5% ∗∗ : 1%

Table 12: Household Income and Housing Values Correlations, 1940

City, State, and Correlation					
Akron, OH	0.35	Lansing, MI	0.3879	San Jose, CA	0.3478
Albany, NY	0.3955	Lawrence, MA	0.6222	Seattle, WA	0.3962
Albuquerque, NM	0.5306	Little Rock, AR	0.7879	South Bend, IN	0.2405
Allentown, PA	0.4032	Lorain, OH	0.2649	Spokane, WA	0.3128
Atlanta, GA	0.5273	Los Angeles, CA	0.4063	Springfield, MA	0.1798
Austin, TX	0.5342	Louisville, KY	0.5619	Stockton, CA	0.659
Baltimore, MD	0.3768	Lowell, MA	0.3002	Syracuse, NY	0.4209
Baton Rouge, LA	0.0294	Madison, WI	0.6534	Tacoma, WA	0.4714
Beaumont, TX	0.4938	Memphis, TN	0.6439	Tampa, FL	0.3122
Birmingham, AL	0.3543	Miami, FL	0.3081	Trenton, NJ	0.5738
Boston, MA	0.1337	Milwaukee, WI	0.324	Tulsa, OK	0.58
Bridgeport, CT	0.1844	Minneapolis, MN	0.4141	Utica, NY	0.2808
Buffalo, NY	0.4097	Mobile, AL	0.6916	Washington, DC	0.4531
Canton, OH	0.4896	Muncie, IN	0.513	Waterbury, CT	0.2301
Charleston, SC	0.4618	Nashville, TN	0.4855	Winston-Salem, NC	0.6634
Charlotte, NC	0.5951	New Bedford, MA	0.5875	Worcester, MA	0.5544
Chattanooga, TN	0.5106	New Haven, CT	0.5128	Youngstown, OH	0.5326
Chicago, IL	0.3553	New Orleans, LA	0.4877		
Cincinnati, OH	0.3784	New York, NY	0.2027		
Cleveland, OH	0.2916	Norfolk, VA	0.6123		
Columbia, SC	0.656	Oklahoma City, OK	0.4025		
Columbus, OH	0.3569	Omaha, NE	0.6121		
Dallas, TX	0.5449	Orlando, FL	0.6409		
Dayton, OH	0.1643	Peoria, IL	0.3688		
Denver, CO	0.5218	Philadelphia, PA	0.3016		
Des Moines, IA	0.5334	Phoenix, AZ	0.6643		
Detroit, MI	0.4002	Pittsburgh, PA	0.3988		
Erie, PA	0.5616	Portland, OR	0.4378		
Flint, MI	0.393	Providence, RI	0.4179		
Fort Wayne, IN	0.4083	Raleigh, NC	0.4342		
Fort Worth, TX	0.2135	Richmond, VA	0.6186		
Fresno, CA	0.4166	Rochester, NY	0.3164		
Grand Rapids, MI	0.4799	Rockford, IL	0.3626		
Hamilton, OH	0.5373	Sacramento, CA	0.4211		
Hartford, CT	0.1631	Saint Louis, MO	0.323		
Houston, TX	0.6318	Salt Lake City, UT	0.4852		
Indianapolis, IN	0.5066	San Antonio, TX	0.4869		
Jacksonville, FL	0.3179	San Bernardino, CA	0.4705		
Kansas City, MO	0.5542	San Diego, CA	0.443		
Knoxville, TN	0.8244	San Francisco, CA	0.3098		

All correlations significant at the %5 level

Table 13: Household Income and Housing Values Correlations, 1940

City, State, and Correlation					
Akron, OH	0.2754	Lansing, MI	0.1163	San Jose, CA	0.3755
Albany, NY	-0.0148	Lawrence, MA	0.2858	Seattle, WA	0.32
Albuquerque, NM	0.7478	Little Rock, AR	0.0274	South Bend, IN	0.3801
Allentown, PA	0.3528	Lorain, OH	-0.0731	Spokane, WA	-0.1029
Atlanta, GA	0.5442	Los Angeles, CA	0.0195	Springfield, MA	0.225
Austin, TX	0.5344	Louisville, KY	0.3392	Stockton, CA	0.3753
Baltimore, MD	0.0809	Lowell, MA	0.3911	Syracuse, NY	0.41
Baton Rouge, LA	0.6826	Madison, WI	0.3787	Tacoma, WA	0.5889
Beaumont, TX	0.5831	Memphis, TN	-0.0244	Tampa, FL	0.5323
Birmingham, AL	-0.0208	Miami, FL	0.2046	Trenton, NJ	0.3761
Boston, MA	0.001	Milwaukee, WI	0.4282	Tulsa, OK	0.0285
Bridgeport, CT	0.1412	Minneapolis, MN	0.441	Utica, NY	0.4196
Buffalo, NY	-0.0244	Mobile, AL	0.3687	Washington,DC	0.4502
Canton, OH	0.5215	Muncie, IN	0.5659	Waterbury, CT	0.5203
Charleston, SC	0.203	Nashville, TN	-0.0371	Winston-Salem, NC	-0.0402
Charlotte, NC	0.2721	New Bedford,MA	-0.0944	Worcester, MA	-0.005
Chattanooga, TN	0.0974	New Haven,CT	0.437	Youngston, OH	-0.1115
Chicago, IL	0.0276	New Orleans,LA	0.3934		
Cincinnati, OH	0.3306	New York, NY	0.0267		
Cleveland, OH	-0.0199	Norfolk, VA	0.0746		
Columbia, SC	0.6799	Oklahoma City, OK	0.6625		
Columbus, OH	0.3339	Omaha, NE	0.0444		
Dallas, TX	0.5888	Orlando, FL	0.5733		
Dayton, OH	0.3067	Peoria, IL	0.3688		
Denver, CO	0.0189	Philadelphia, PA	0.3016		
Des Moines, IA	0.4268	Phoenix, AZ	0.6643		
Detroit, MI	0.0998	Pittsburgh, PA	0.3988		
Erie, PA	0.1615	Portland, OR	0.4378		
Flint, MI	0.359	Providence, RI	0.4179		
Fort Wayne, IN	0.0974	Raleigh, NC	0.4342		
Fort Worth,TX	0.6675	Richmond, VA	0.6186		
Fresno, CA	0.2771	Rochester, NY	0.3164		
Grand Rapids, MI	-0.0124	Rockford, IL	0.3626		
Hamilton, OH	0.5605	Sacramento, CA	0.4211		
Hartford, CT	0.2157	Saint Louis, MO	0.323		
Houston, TX	-0.0461	Salt Lake City, UT	0.4852		
Indianapolis, IN	0.263	San Antonio, TX	0.4869		
Jacksonville, FL	0.5293	San Bernardino, CA	0.4705		
Kansas City, MO	0.4912	San Diego, CA	0.443		
Knoxville, TN	0.7402	San Franciscon, CA	0.3098		

All correlations except Boston, Grand Rapids, and Worcester significant at the %5 level.

City Infant Mortality and City Income Inequality - Housing (unBalanced)

Table 14: Regression Results of City Income Inequality on City Infant Mortality Rates

Dependent variable: Infant deaths per 1000 live births	OLS				Fixed Effects			
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
% Population within income range								
Housing								
$0-1499	0.675	1.135	0.240	0.231	5.438	17.14	0.191	0.148
	(1.262)	(1.143)	(0.615)	(0.564)	(4.449)	(11.24)	(0.880)	(0.885)
$1500-2999	-0.735	1.750	-0.387	-0.0786	6.489†	8.038	0.770*	0.822**
	(0.773)	(2.008)	(0.358)	(0.339)	(3.913)	(5.627)	(0.302)	(0.300)
$3000-4999	0.104	-0.408	0.193	0.112	3.486	6.920	0.0823	0.100
	(0.482)	(0.728)	(0.347)	(0.308)	((2.641)	(4.405)	(0.363)	(0.371)
$5000-9999	0.942	2.983	0.336	0.198	8.244	11.80	0.0952	0.160
	(1.291)	(2.468)	(0.318)	(0.259)	(6.092)	(8.294)	(0.289)	(0.301)
Rent per week								
$10.00-14.99	1.316	0.924	0.287	0.411	3.136	5.357	-0.143	-0.176
	(1.102)	(0.846)	(0.477)	(0.435)	(2.968)	(4.071)	(0.514)	(0.522)
$15-29.99	-0.261	1.153	0.231	0.288	3.699	7.016	0.183	0.218
	(0.566)	(0.907)	(0.284)	(0.250)	(2.575)	(4.759)	(0.271)	(0.278)
$30-49.99	-0.919*	0.00649	-0.0419	0.0362	3.174	5.659	0.0915	0.124
	(0.361)	(0.287)	(0.320)	(0.279)	(2.037)	(3.863)	(0.297)	(0.299)
$50-99.99	2.230	3.638	0.682†	0.595†	8.297	12.65	0.411	0.386
	(2.686)	(2.973)	(0.369)	(0.316)	(5.892)	(8.619)	(0.392)	(0.395)
$100 and up	-4.417†	-0.887	-0.169	-0.388	-2.088	5.875	-1.228	-1.172
	(2.393)	(1.217)	(1.292)	(1.202)	(10.37)	(10.75)	(1.652)	(1.675)
Constant	50.61	-34.95	75.92**	65.85**	-380.9	-750.8	89.27*	91.10*
	(59.24)	(107.7)	(24.60)	(21.20)	(313)	(560.9)	(41.13)	(41.14)
Demographic	N	Y	Y	Y	N	Y	Y	Y
Institutional	N	Y	Y	Y	N	Y	Y	Y
Real pc state Y	N	Y	Y	Y	N	Y	Y	Y
Relief	N	N	N	Y	N	N	N	Y
N	731	596	223	223	731	596	223	223
R2	0.054	0.116	0.311	0.686	0.196	0.324	0.855	0.858
cities	413	410	115	115	413	410	115	115

Significance levels : $\dagger$: 10% $*$: 5% $**$: 1%

City Stillbirths and City Income Inequality - Housing (unBalanced)

Table 15: Regression Results of City Income Inequality on City Stillbirth Rates

Dependent variable: Stillbirths per 10000 births								
	OLS				Fixed Effects			
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
% Population within income range								
Housing								
\$0-1499	6.680	17.75	56.70	56.80	0.959	-5.842	-10.91	-11.22
	(8.955)	(16.62)	(48.57)	(48.43)	(3.504)	(19.53)	(29.41)	(29.65)
\$1500-2999	3.009	6.303	$35.88^{\dagger}$	$32.51^{\dagger}$	-4.232	-7.467	-14.09	-13.73
	(2.775)	(4.709)	(18.29)	(17.01)	(2.892)	(6.193)	(12.32)	(12.05)
\$3000-4999	7.772	18.70	45.55	46.43	0.987	0.371	0.656	0.784
	(5.635)	(12.85)	(31.65)	(32.07)	((2.247)	(6.580)	(9.114)	(9.007)
\$5000-9999	1.812	7.484	36.62	38.13	0.264	-1.632	-5.631	-5.171
	(2.872)	(5.755)	(25.02)	(25.73)	(2.555)	(6.356)	(11.21)	(11.02)
Rent per week								
\$10.00-14.99	16.84	21.10	46.31	44.96	-0.838	-5.949	-8.270	-8.506
	(10.60)	(14.27)	(33.81)	(33.02)	(2.208)	(9.245)	(14.35)	(14.42)
\$15-29.99	5.221	10.71	31.31	30.68	-0.478	-2.780	-5.903	-5.658
	(4.223)	(6.561)	(20.24)	(19.85)	(1.863)	(6.819)	(10.49)	(10.40)
\$30-49.99	12.57	15.82	47.86	47.01	1.212	-0.515	-0.742	-0.509
	(9.539)	(11.30)	(35.80)	(35.25)	(0.917)	(4.555)	(7.396)	(7.354)
\$50-99.99	20.84	26.81	$67.58^{\dagger}$	$68.54^{\dagger}$	2.050	0.160	4.167	3.990
	(13.08)	(17.10)	(35.89)	(36.24)	(7.209)	(11.30)	(16.51)	(16.62)
\$100 and up	17.66	29.04	243.3	245.7	-5.594	-3.828	-33.43	33.03
	(25.78)	(31.62)	(261.8)	(264.1)	(18.83)	(20.45)	(76.23)	(76.46)
Constant	-636.0	-1335	-4257	-4147	100.3	315.6	383.1	396.1
	(529.0)	(956)	(2752)	(2689)	(210)	(609.3)	(570.1)	(577.4)
Demographic	N	Y	Y	Y	N	Y	Y	Y
Institutional	N	Y	Y	Y	N	Y	Y	Y
Real pc state Y	N	Y	Y	Y	N	Y	Y	Y
Relief	N	N	N	Y	N	N	N	Y
N	731	596	223	223	731	596	223	223
R2	0.076	0.101	0.311	0.314	0.037	0.085	0.133	0.134
cities	413	410	115	115	413	410	115	115

Significance levels : † : 10% ∗ : 5% ∗∗ : 1%

Figure 2: Infant mortality: 1929 and 1933

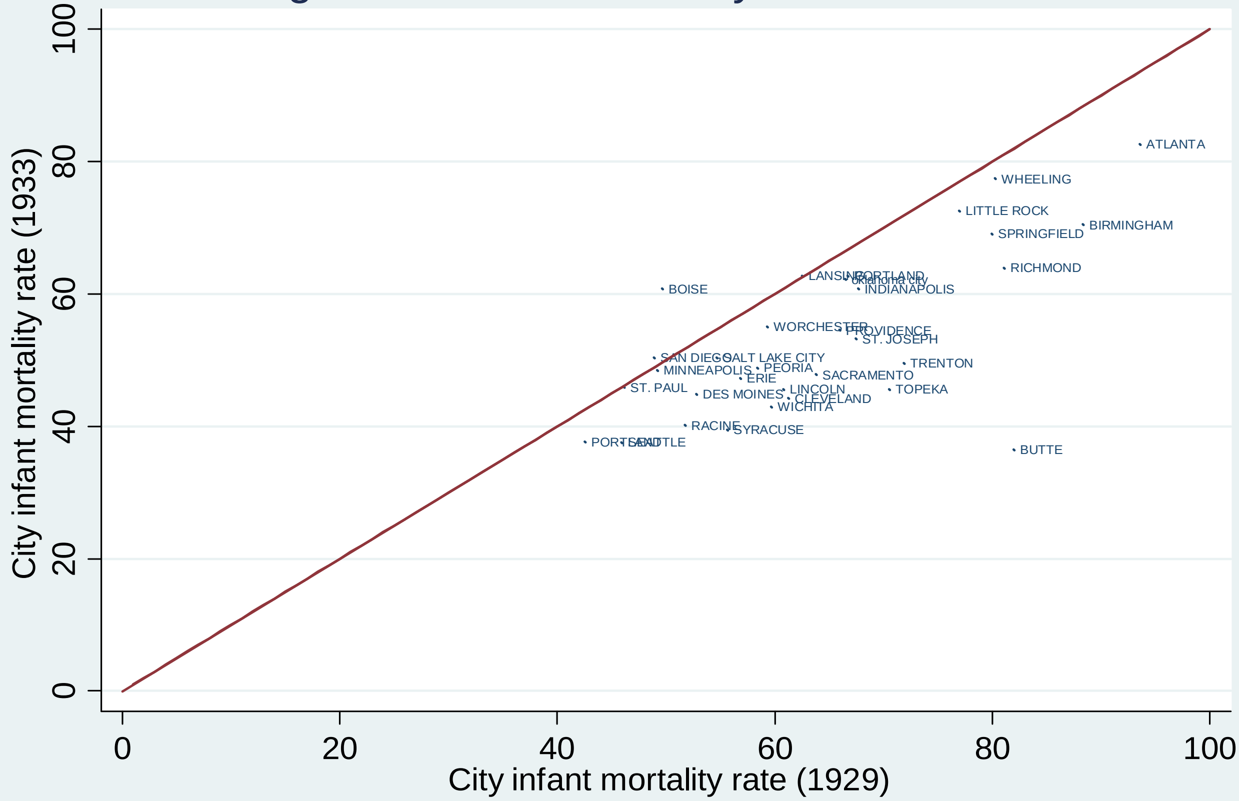


Figure 3: Infant mortality: 1933 and 1939

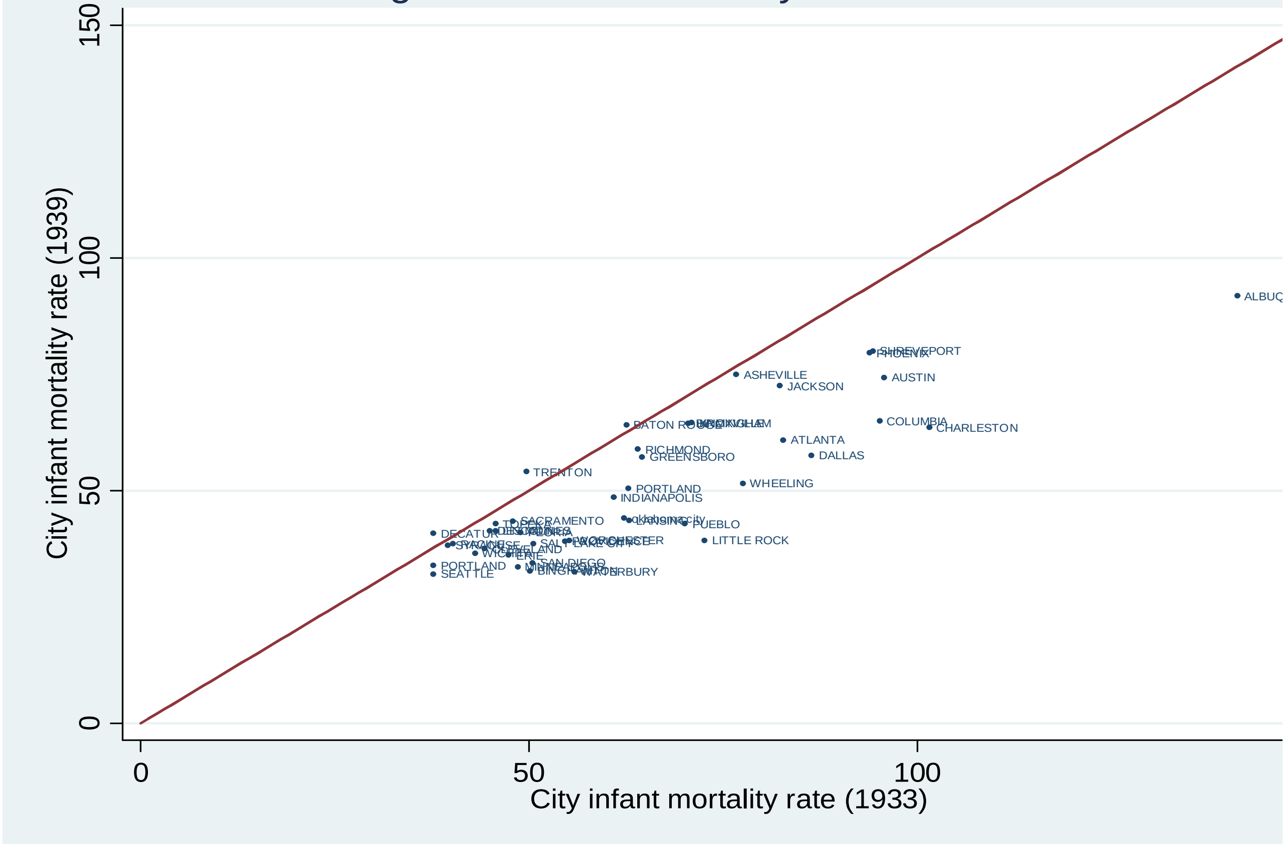


Figure 4: Gini Central Tendency

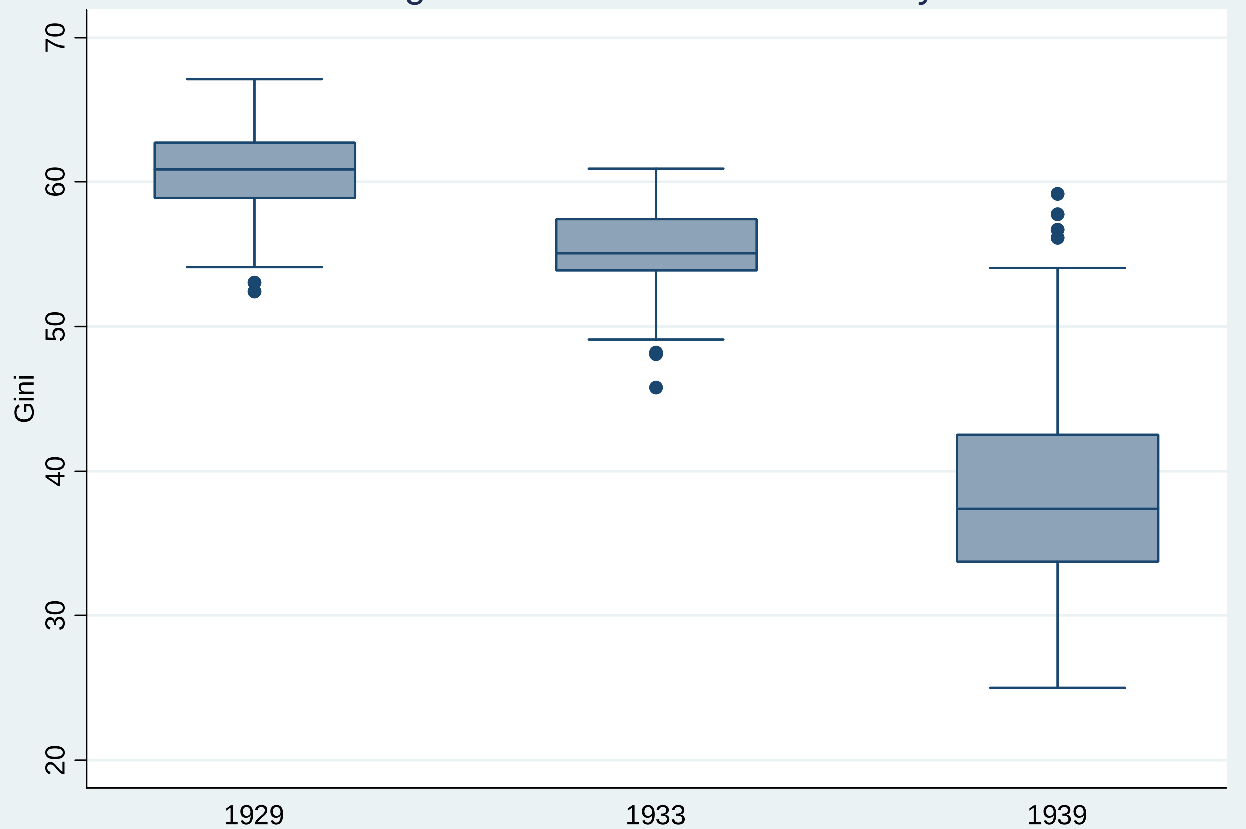
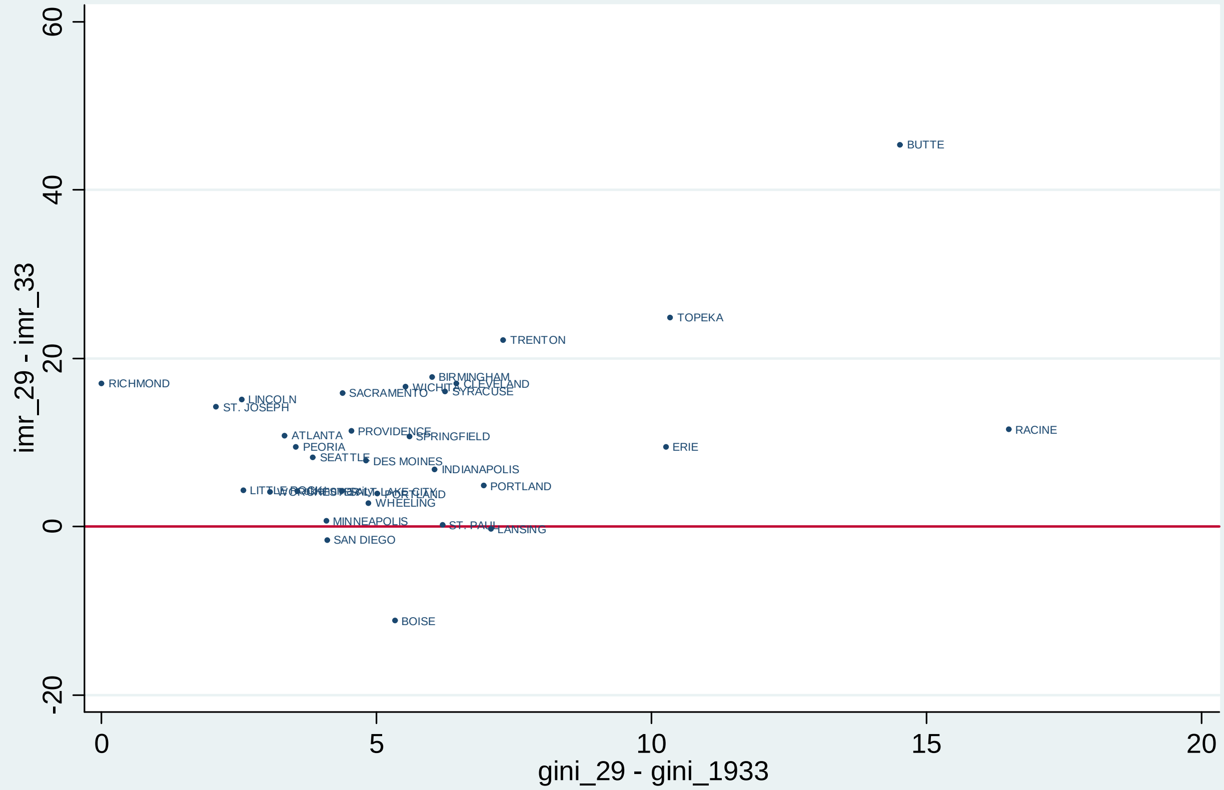


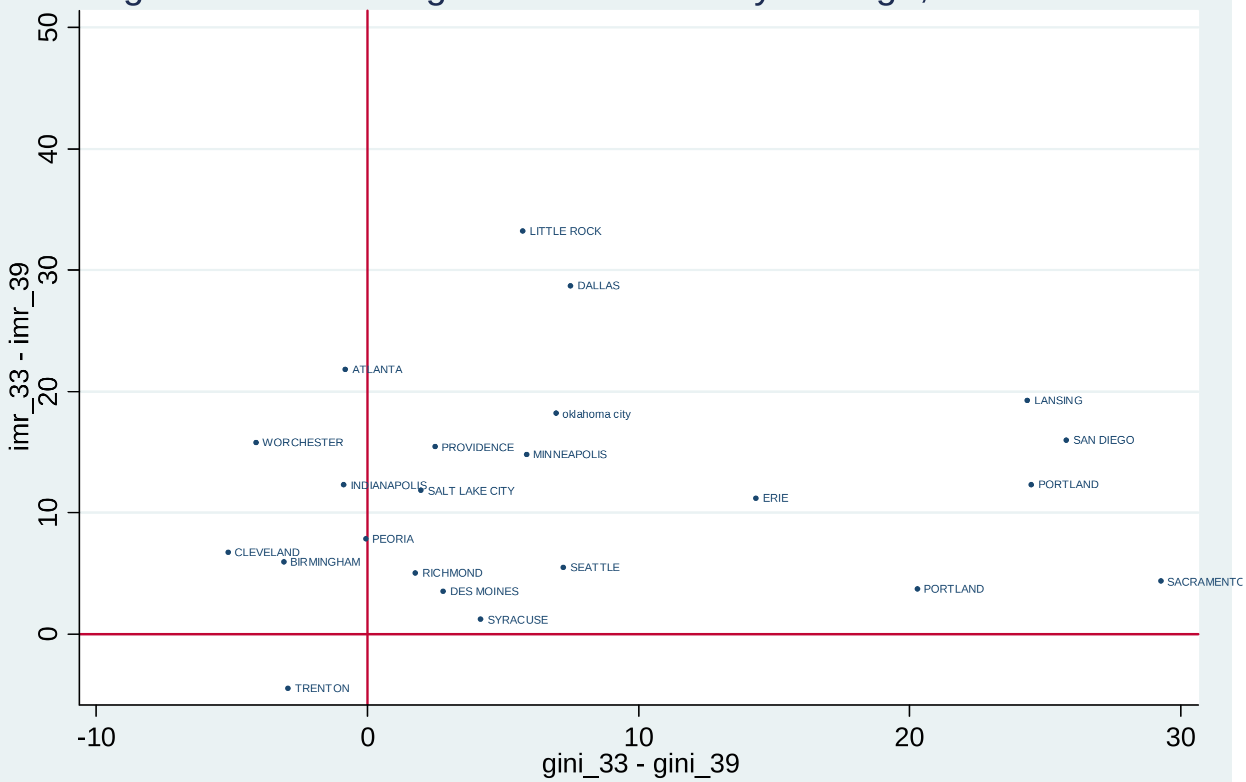

Figure 5: Cross-section Correlation IMR and Gini
1929
1933
1939
Infant Mortality Rate
0
50
100
150
20
40
60
80
Gini
95% CI
Fitted values
city infant deaths per 1000 live births

Figure 6: Gini Change to Infant Mortality Change, 1929 and 1933



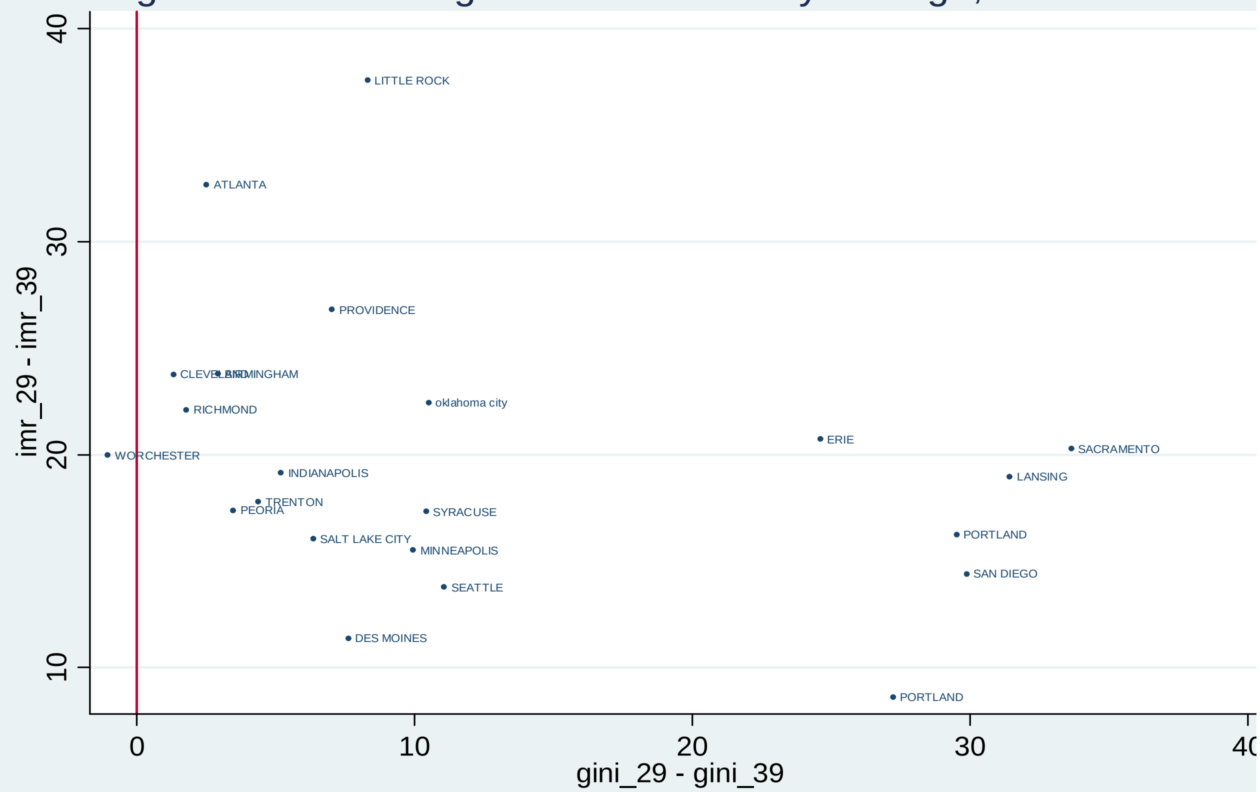
*Positive differences indicate a decrease in the variable over time.

Figure 7: Gini change to Infant Mortality Change, 1933 and 1939



*Positive differences indicate a decrease in the variable over time.

Figure 8: Gini change to Infant Mortality Change, 1929 and 1939



*Positive differences indicate a decrease in the variable over time.

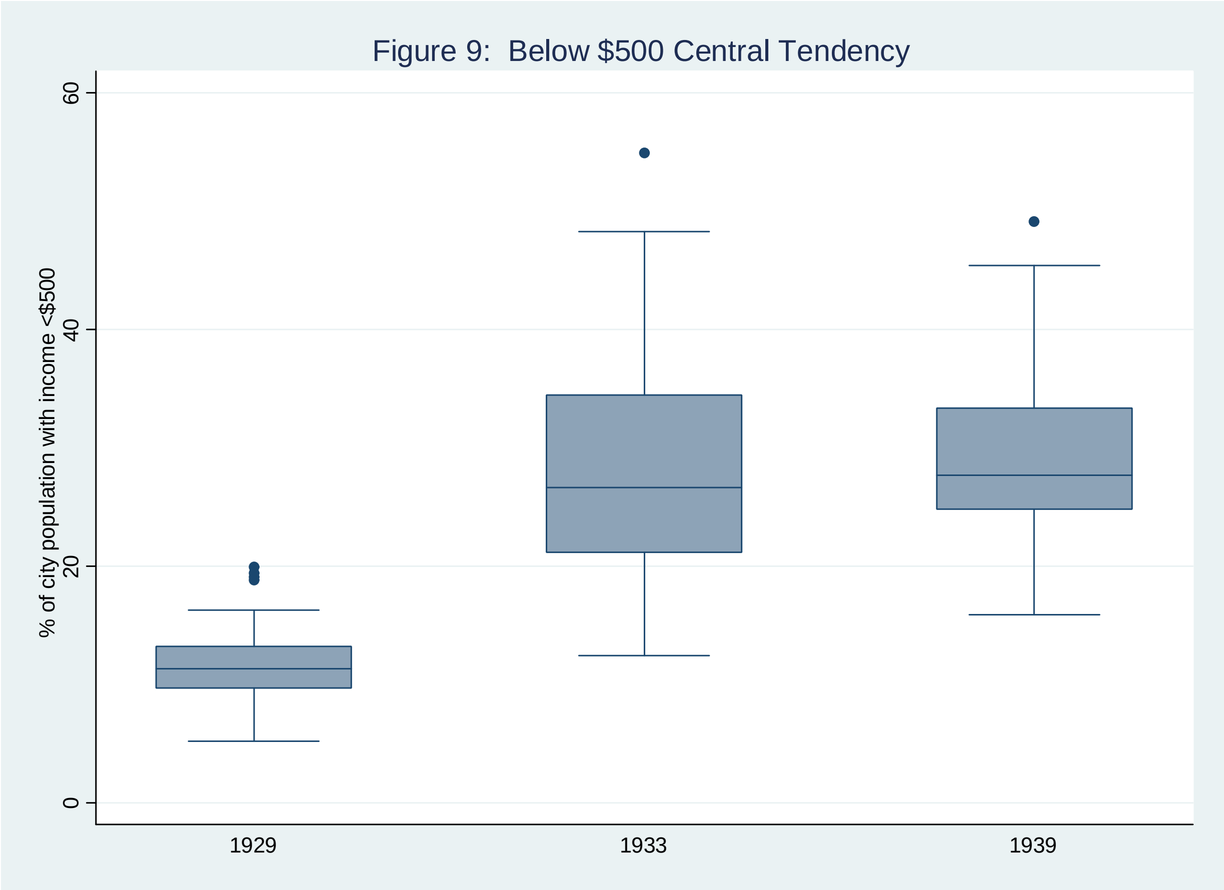


Figure 9: Below $500 Central Tendency
% of city population with income <$500
0
20
40
60
1929
1933
1939

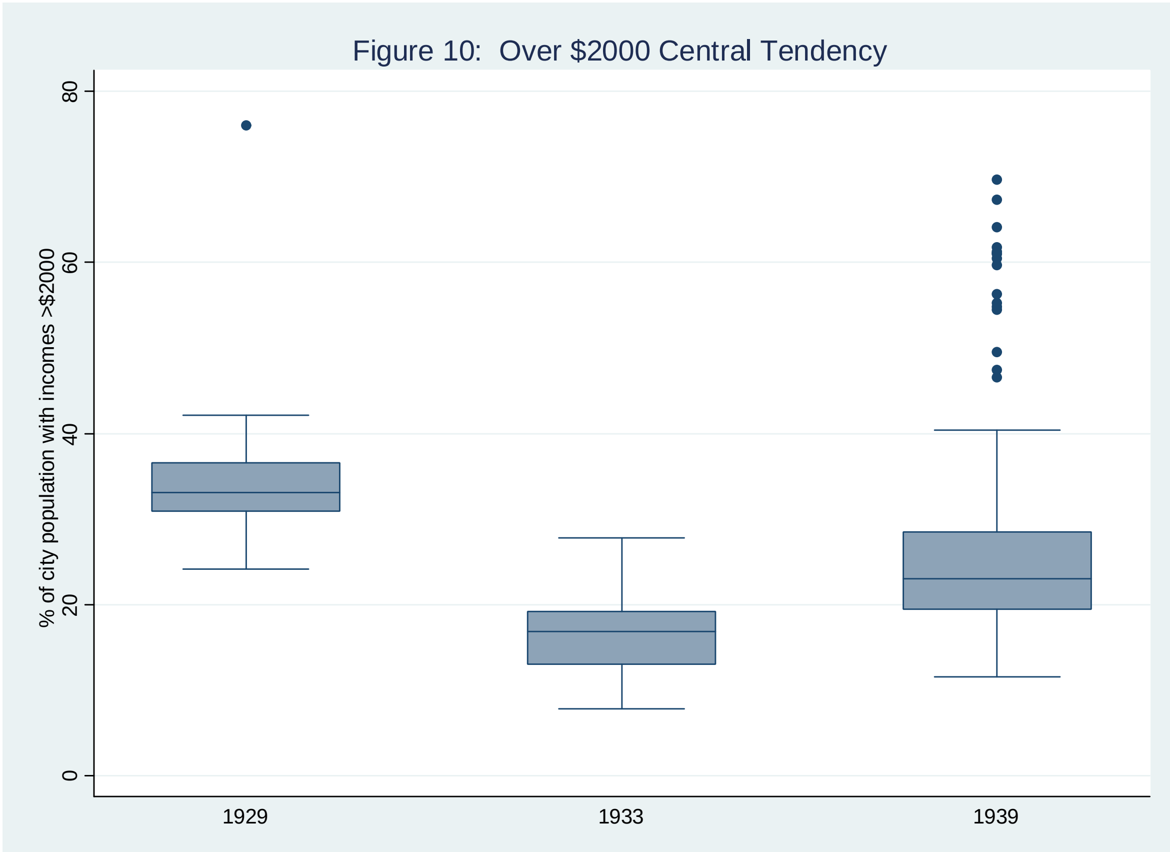


Figure 10: Over $2000 Central Tendency
% of city population with incomes >$2000
0
20
40
60
80
1929
1933
1939