

Long-Term Effects Of The 1959-1961 China Famine: Mainland China and Hong Kong

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本文以 1959-1961 年的中国大饥荒作为一个自然实验，估算了孕产妇营养不良的影响。在 2000 年中国人口普查的 1% 的样本中，我们发现，胎儿受到急性孕产妇营养不良的影响损害了一系列社会经济结果，包括：识字率、劳动力市场地位、财富和婚姻市场结果。妇女与受教育程度较低的配偶结婚，后来，与男性一样，如果有的话，也是如此。此外，孕产妇营养不良可能通过提高男性死亡率，降低了两代人的性别比（男性对女性），即胎儿及其子女的性别比。根据 Trivers-Willard(1973 年) 的假设，这种倾向于雌性后代的趋势是可以解释的。1984-2004 年香港出生的微观数据进一步证实了这一模式，在子宫内营养不良的内地居民中，女性后代的性别比例偏向于女儿。

1.1 Introduction:Background

1959 年秋季开始的饥荒影响整个中国全境，导致粮食减产，一直持续到 1962 年出生和死亡率才恢复正常。有很多原因：天灾、人祸 (大跃进被认为是主因)

分为两个部分：流行病学研究和经济学研究

- 流行病学：针对健康的 Y 变量
- 经济学：对生存者的社会经济产出的影响 (CHNS)，但是存在一些缺点，要么饥荒严重程度的构造存在问题，结论是都比较 mixed，

例如 Meng and Qian[2006] 以 1961-1964 年的人群作为参照组，1952-54；1955-58；1959-60 被视为实验组，用每个队列的 **人口缩减比例**(这里需要到原文中看具体的指标构建) 衡量饥荒的严重程度，但是得出来的结果却不是很理想，几乎没有证据表明饥荒对于 1959-60 年队列的人口有影响，利用 1997 年农作物的人均产量作为工具变量发现，在 1959-60 年的队列中，教育程度的负效应较小，但工作时间的大幅减少 (25%)。

数据 1:2000 年 1% 人口普查的数据, Y 变量: 受教育程度、职业地位、居住信息、个体特征 (性别、出生年月、婚姻和生育信息)

数据与 CHNS 的不同点在于减少了一些混杂因素: 迁移,2000 年普查数据优势多, 将样本限制在 1956-1964 年间, 饥荒前三年和后三年

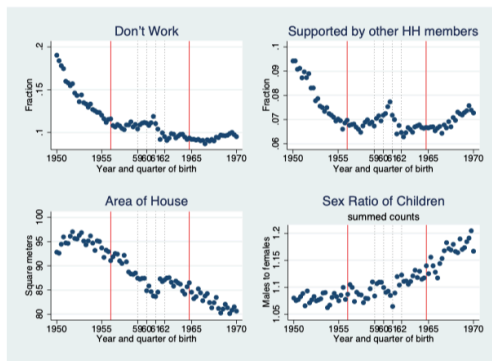
数据 2: 香港 1984-2004 年出生记录的微观数据: 包含母亲出生的城市, 将样本限制在 1957-1965 年出生在香港或者大陆的单身母亲 (600000 个样本), 1/3 的样本来自大陆, 香港的样本提供了一个很好的对照组, 因为大陆全境在当时都遭受了饥荒。

2.1 Measuring the Famine

根据 2000 年的普查数据有各省各年各年龄段的死亡数据，构建两个变量以代表饥荒的严重程度。

- 死亡率 (Death rate) 加权死亡率 (Weighted death rate) wdr_{jt} 例子：一个 1960 年 1 月出生在北京的人：分配到 $1/9$ 的 1960 年的北京死亡率 + $8/9$ 的 1959 年北京死亡率（从怀孕到出生 9 个月）
- 总加权死亡率 $awdr_t$ we collapse this weighted death rate by month of birth, thus calculating a population weighted national average for each month and year, henceforth “aggregate weighted death rate”
- 平均月出生率

Result: Descriptive Results



2000 年的统计微观数据显示: 在 1960 年前后出生的人, 与同期预测相比有更差的社会经济产出。在 1960 年出生的人在 2000 年普查时特征: 没有工作; 受其他家庭成员支持; 住在很小的地方; 女童的父母

Result: Regression Results

$$y_{it} = \beta_0 + \theta \text{ awdr}_t + \beta_1 YOB + \beta_2 YOB^2 + \beta_3 YOB^3 + \lambda_{\text{province}} + \varepsilon_{it}$$

y_{it} 代表 t 时期出生的 i 个体的结果变量, awdr_t 表示按出生年份和出生月份计算的总加权死亡率; YOB 出生年份, 加入平方和立方项控制非线性趋势 (图五的四幅图); $\lambda_{\text{province}}$ 省的虚拟变量, 由于出生月份存在明显的内生性, 所以不包括月份的虚拟变量

Result: Regression Results

Table 1: 2000 Census: Labor and Housing Outcomes for 1956-

1964 Birth Cohorts

	Illiterate	Don't work	Disabled	Dependent	House area
	<u>Women</u>				
mean	0.081	0.189	0.004	0.119	87.162
awdr	0.5052**	0.4714***	0.0448*	0.3972***	-220.1528***
	[0.2169]	[0.1530]	[0.0250]	[0.1354]	[48.4753]
N	786156	786156	786156	786156	772260
	<u>Men</u>				
mean	0.021	0.082	0.006	0.019	83.933
awdr	0.1585*	0.4017***	0.0657	0.1399**	-104.7566**
	[0.0784]	[0.1131]	[0.0426]	[0.0674]	[38.3963]
N	818103	818103	818103	818103	790342

awdr – aggregate weighted death rate by birth year and month.

mean – mean of dependent variable.

Standard errors clustered at province of birth in square brackets. * signif-

icant at 10%; ** significant at 5%; *** significant at 1%.

Greater famine intensity is associated with a higher likelihood of being illiterate and not working.

awdr 提高 1.2 个百分点, 意味着: 饥荒经历的女性有 $0.502 \times 0.012 / 0.081 = 7.5\%$ 的可能性是文盲, 但是这个普查的数据没有其他直接的关于收入的数据

Result: Regression Results

Table 2: 2000 Census, Marriage Market Outcomes, 1956-1964

Birth Cohorts

	Unmarried	Never married	Spousal ed. ^a	Marriage age ^b	Household head ^c
<u>Women</u>					
mean	0.061	0.004	9.057	269.237	0.118
awdr	0.2608	-0.0013	-6.3342**	67.4994**	-0.0998
	[0.1632]	[0.0249]	[2.4652]	[28.5417]	[0.1633]
N	786156	786156	685989	783015	786156
<u>Men</u>					
mean	0.090	0.039	8.060	290.898	0.870
awdr	0.4902***	0.2676**	-0.1692	125.1309***	-0.5145**
	[0.1285]	[0.1035]	[2.5349]	[28.5395]	[0.2302]
N	818103	818103	683041	785927	818103

awdr – aggregate weighted death rate by birth year and month.

mean – mean of dependent variable.

表 2 主要研究对于婚姻市场的影响：对于女性而言不显著，但是女性更易的伴侣通常的教育程度更低，但是男性更易受到影响：未婚等，结婚年龄的影响，主要解释：婚姻市场挤压

Result: Regression Results

Table 3: 2000 Census: Sex Ratio outcomes, 1956-1964 Birth Cohorts

horts

	Male ^a	Women ^b	
		Sons/Kids	No child
mean	0.51	0.548	0.007
awdr	-1.3147*** [0.2651]	-0.3194** [0.1368]	0.0712 [0.0503]
N	1604259	773291	786156

awdr – aggregate weighted death rate by birth year and month.

mean – mean of dependent variable.

^a Dummy – equals 1 if respondent was male.

^b Pertains to children borne.

Standard errors clustered at province of birth in square brackets. * significant at 10%; ** significant at 5%; *** significant at 1%.

男性死亡率提高，母亲经历过饥荒的越严重，后代中女性更多，因此需要香港数据进行验证

Result: Geographic variation in Famine intensity

将饥荒的地域差异控制住，研究出生队列间的差异，这样会降低未来生活中其他因素与特定年龄混杂的可能性

$$y_{it} = \beta_0 + \theta \text{ wdr}_t + \gamma_{yob} + \lambda_{\text{province}} + \varepsilon_{itj}$$

Result: Geographic variation in Famine intensity

Table 4: **2000 Census: Cross-sectional Variation in Famine Severity, Labor Market and Housing Outcomes, 1956-1964 Birth Cohorts**

	Illiterate	Don't work	Disabled	Dependent	House area
Women					
wdr	0.1659 [0.1269]	0.0953 [0.1657]	0.0418*** [0.0116]	0.0755 [0.0917]	-58.9501** [22.0095]
<i>N</i>	764786	764786	764786	764786	751352
Men					
wdr	0.1231* [0.0688]	0.1628** [0.0666]	0.0585*** [0.0170]	0.0321 [0.0376]	-52.1040* [28.5949]
<i>N</i>	795408	795408	795408	795408	768522

Standard errors clustered at province of birth in square brackets. * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 4 shows that local famine severity indeed corresponds to the magnitude of damage in Census outcomes. Women born in high-Famine areas had larger increases in disability rates and larger reductions in house sizes. For men, differences in literacy, work status, disability, and house size correspond to Famine severity in the expected direction.

Result: Geographic variation in Famine intensity

Table 5: 2000 Census: Cross-sectional Variation in Famine Severity, Marriage Market Outcomes, 1956-1964 Birth Cohorts

	Unmarried	Never married	Spousal ed. ^a	Marriage age ^b	Household head ^c
Women					
wdr	0.0505	0.0217	0.0794	14.7224	-0.0701
	[0.0623]	[0.0130]	[1.5906]	[19.9378]	[0.1297]
<i>N</i>	764786	764786	668672	761879	760726
Men					
wdr	0.2666***	0.1555**	1.5938	67.6296***	-0.5089***
	[0.0696]	[0.0634]	[1.3770]	[22.8696]	[0.1183]
<i>N</i>	795408	795408	665857	764670	779087

wdr Weighted average death rate for the gestation period, assuming 9

month gestation. Varies by province and month and year of birth.

^a Includes head-spouse couples only. Education is in years.

^b Marriage age is in months. ^c Includes those residing in family units (i.e., excludes those residing in collectives).

Standard errors clustered at province of birth in square brackets. * significant at 10%; ** significant at 5%; *** significant at 1%.

Men from high-Famine areas were less likely to be married (3.5%), more likely to never have married (5%), married older (.8 months), and were less likely to head their households (.7%) (Table 5). For women, the point estimates have the expected signs, but are not statistically significant.

Result: Geographic variation in Famine intensity

Table 6: 2000 Census: Cross-sectional Variation in Famine Severity, Sex ratio outcomes, 1956-1964 Birth Cohorts

	Male ^a	Women ^b	
		Sons/Kids	No child
wdr	-0.3264**	-0.1693**	0.0325
	[0.1390]	[0.0797]	[0.0251]
<i>N</i>	1560194	752418	764786

^a Dummy – equals 1 if respondent was male.

^b Pertains to children borne.

Standard errors clustered at province of birth in square brackets. * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 6 shows that coefficients for the sex ratio are significant in the expected direction, but roughly one-third the size of the corresponding estimates in Table 3.

这没看懂

饥荒提高死亡率的同时也降低了出生率，2000 年的普查数据显示经历过饥荒的人群比相近队列人群要少大约 25-50%，饥荒造成的死亡是负面的，那么对幸存者所受损害估计的偏误是向下的。

Result: Birth Outcomes in Hong Kong

香港的数据提供了一个很好的对照组，当时政府严格禁止向外移民，但是在 1962 年相当大一部分人逃往香港，难民中有内地出生的孩子。饥荒期间或者饥荒以后从大陆迁徙到香港的群体，提供了很好的对照：迁往香港的群体与香港本地出生的人。

Result: Birth Outcomes in Hong Kong

Table 7: 1984-2004 Natality outcomes in Hong Kong: mainland
vs Hong Kong born mothers

	Mother born:			
	Mainland		Hong Kong	
	Low BWT ^a	Son ^b	Low BWT ^a	Son ^b
mean	0.031	0.52	0.039	0.517
I(1961)	0.247**	-0.629***	0.014	-0.009
	[0.099]	[0.121]	[0.037]	[0.074]
N	198452	198452	393419	393419

I(1961) – dummy, equals 1/100 if mother born in 1961.

mean – mean of dependent variable.

^a – dummy, equals 1 if birth weight was less than 2,500 grams.

^b – dummy, equals 1 if child male.

Regression results from estimating equation 1 where I(1961) substitutes for **awdr** and without the province dummies. The birth weight regressions also include a dummy for the sex of the child.

Standard errors clustered by year of birth in square brackets. * significant at 10%; ** significant at 5%; *** significant at 1%.

We find that mothers born in 1961 were 8% = $(0.247/0.030)$ more likely to give birth to a child of low birth weight (less than 2,500 grams) and 1.2% $(0.00629/0.52)$ less likely to give birth to a son than mothers born in adjacent years (Table 7).

Summary and Discussion

Higher Famine intensity was associated with greater risk of being illiterate, out of the labor force, marrying later (men), and marrying spouses with less education (women)

Perhaps the most intriguing result is that Famine exposure lowered the sex ratio of not only the first but also the second generation.

文章的贡献在于这篇文章是第一篇准实验研究来给 Trivers-Willard 提供证据，也是第一篇产妇营养状况对性别比的代际“回声”的研究

父母经历过饥荒对于孩子的影响，这样数据会很丰富，也是个很好的研究点
这篇文章是 NBER 的 working paper 但是却一直没发表。