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Did the Great Recession Affect Sex Ratios at Birth for Groups with a Son Preference?

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Abstract

This paper examines the extent to which the Great Recession affected gender composition at birth. We focus on ethnic minorities in the US known for a son preference – Chinese, Indians, and Koreans. Using the DID method, we find that in response to the Great Recession, the fraction of newborn boys increased among Chinese Americans. Our results suggest that a cultural norm, namely son preference, may be directly affected by economic conditions.

JEL Classification: J1, I1
Keywords: Son Preference, Great Recession, Missing Girls, Sex Ratios, Fertility

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The Supplementary Materials are available at: www.soohyunglee.com/research and https://sites.google.com/site/chiaraorsinisite/research.

I. Introduction

The Great Recession greatly changed Americans' lives, and fertility is no exception (Livingston, 2010; Percheski, 2014). Studies find that the Great Recession decreased the US fertility rate by reducing the value of wealth or income (Dettling and Kearney, 2014; Lovenheim and Mumford, 2013; Schneider, 2015). This paper contributes to this literature by examining the extent to which the Great Recession had a gender-differential impact on fertility, particularly for the ethnic minorities in the US with a son preference. China, India, and South Korea are well known for their son preference: the number of boys per 100 girls among newborns (i.e., sex ratio) in each country persistently exceeds 105, the number considered the sex ratio without human intervention. This cultural norm persists among those who immigrate to another country or who are descendants of those immigrants. For example, researchers find that among the US residents who have ethnic roots in China, India, or South Korea, the sex ratio among newborns is higher than the natural level for higher parities (e.g., Abrevaya, 2009; Almond and Edlund, 2008). However, little is known about the factors that affect sex-selective fertility behavior among these groups. This paper aims to fill this gap in the literature by empirically investigating the possibility that a severe change in economic environment in a country of residence, namely the Great Recession, may alter sex ratios at birth for those with a son preference.

We identify the causal impact of the Recession using a Difference-in-Difference (DID) framework. Specifically, we examine the extent to which sex ratios at birth among ethnic groups with a son preference (i.e., Chinese, Indians, and Koreans in the US) changed under the Great Recession, relative to non-Hispanic Whites who exhibit no son preference. We analyze live births between 2005 and 2010 based on the restricted-use

micro data provided by the Center for Disease Control and Prevention (CDC). Following the NBER analysis, we classify January 2008 to December 2010 (the latest month of our dataset) as the period under the Great Recession and choose a pre-recession period of an equal length (i.e., between January 2005 and December 2007). Our identification crucially relies on the assumption that these ethnic groups with a son preference and the non-Hispanic Whites share the same time trend. Using the pre-recession periods, we present supporting evidence that this assumption is likely to hold for most groups. We find that the Great Recession exacerbated sex-selective fertility behavior among these minorities, particularly the Chinese. For example, our estimates suggest that the Great Recession increased the number of newborn boys among Chinese Americans by 1 percent.

II. Data and Sample

Our data is based on the CDC's restricted-use micro data of birth records from January 2005 to December 2010. We focus on live births to ethnic Chinese, Indians, and Koreans as well as non-Hispanic Whites. The former three groups are Asian groups shown to have skewed sex ratios at birth, particularly at higher parity, a sign of a son preference. We classify a baby's ethnicity based on its mother's ethnicity because the father's ethnicity is sometimes unreported. Note that qualitatively our findings remain the same if we use a narrower sample with information about both parents. See details on our sample in Section A of the Supplementary Material. As the NBER reports that January 2008 is the first month in which economic activities contracted, we divide the sample period into two sub-periods with equal length: January 2005 to December 2007 (pre-recession period) and January 2008 to December 2010 (the pre-recession period).

In our sample, Chinese, Indians and Koreans account for 1.8 percent, 2.0 percent, and 0.7 percent of newborns, respectively. The rest of the sample (95.5 percent) is represented by births to Non-Hispanic White mothers. Our outcome variable of interest is the fraction of boys among newborns, instead of sex ratio (i.e., number of boys per 100 girls). This is done to follow the existing studies on Asian Americans and birth rate (e.g., Abrevaya 2009), making it easy to compare our results to theirs.

Table 1 shows the fraction of newborn boys among Asians and non-Hispanic Whites, before and during the Great Recession by parity. Assuming the natural sex ratio at birth (105 boys per 100 girls), the fraction of newborn boys will be approximately 51.2 percent. Column (1) shows the statistics before the Great Recession. As for Parities 1 and 2 (first born and the second born, respectively), Asians were comparable to Whites, close to the value under the natural sex ratio. However, for parity 3 (the 3rd born), the fraction of newborn boys is 53.2 percent (i.e., 114 boys per 100 girls), suggesting sex-selective fertility behaviors. By comparing columns (1) and (2), we can see that the fraction of newborn boys among Asians increased for parity 2 after the start of the Great Recession, while the fraction of newborn boys remained stable for Whites. This data pattern suggests a possible impact of the Great Recession on gender composition at birth among Asians.

III. Econometric Framework and Identification Strategy

We compare the changes in the fraction of newborn boys for the Asian groups defined in the previous section versus the changes in the fraction of newborn boys among non-Hispanic Whites by estimating the following DID specification:

$$Boy_{i,m,y,s} = \alpha_m + \beta_y + \gamma_s + \delta(i: Asian) \quad (1)$$
$$+\theta_1 1(i: Asian, (m,y): after1) + \theta_2 1(i: Asian, (m,y): after2) + \varepsilon_{i,m,y,s}$$

$Boy_{i,m,y,s}$ is a dummy equal to 1 if the newborn child *i* is a boy, born in state *s* in month *m* and year *y*. Parameters α_m, β_y, and γ_s are month-, year-, and state-specific fixed effects, respectively. Variable $1(i: Asian)$ is 1 if the newborn's ethnicity is one of the minorities exhibiting a son preference (i.e., Chinese, Indian, and Korean) and 0 if the newborn is born to a non-Hispanic white mother. Variable $\varepsilon_{i,m,y,s}$ captures the unexplained random shock. We cluster the standard errors at the state level to allow the random shock to be correlated with others within the same state. Notice that we do not include characteristics of the newborn's parents to avoid selection bias. That is because a parental observable characteristic may account for the likelihood of abortion or for selection into pregnancy as well as son preference. Thus, we do not include the parental characteristics in equation (1), but we conduct subsample analyses depending on parental characteristics. See Section C of the Supplementary Material.

In our estimation, we split the period under the Great Recession into two sub-periods: the first period is indicated with the dummy "after1" covering January to May 2008 and the second period is indicated with the dummy "after2" starting from June 2008 to December 2010. By doing so, we allow for the possibility that the impact of the Great Recession may vary by the two sub-periods.

We divide our sample period into two subperiods that reflect different health risks to mothers opting for sex-selective abortion. According to Abrevaya (2009), sex-selective abortion may prevalently account for the high fraction of newborn boys among Asian Americans. Therefore, we chose the first period so that sex-selective abortion is more costly than the second period with respect to health risk to mothers. We use 4 months as the cut-off period because, until then, relatively cheap and safe abortion methods (i.e.,

abortion pill and suction abortion) can be used.[1] In contrast, mothers who were in a relatively advanced stage of pregnancy (5 months or more) when the Great Recession started may have to rely on a more aggressive abortion method (e.g., Dilation and Evacuation (D&E)) to terminate a pregnancy, which likely generates health risks for them. Assuming a gestation period of 9 months, babies born between January and May 2008 are the babies who had been in utero for 5 months or more when the Great Recession started. Likewise, the babies born after June 2008 are babies who had not yet been conceived or had been in utero less than 4 months when the Great Recession started.

We interact the dummies "after1" and "after2" with the dummy variable called "Asian," which indicates whether the mother belongs to one of the groups studied here. That is, variable $1(i: Asian, (m, y): after1)$ is 1 if the baby is Asian and born between January and May 2008 and 0 otherwise. Variable $(i: Asian, (m, y): after2)$ is defined likewise. Parameters θ_1 and θ_2 in equation (1) capture the impact of the Great Recession during the periods "after1" and "after2," respectively. Since abortion is riskier to maternal health for an advanced pregnancy, as discussed above, we expect that the Great Recession may have a more pronounced impact on sex ratios during "after2" relative to "after1."

Our identifying assumption is that, absent the Great Recession, the trends in the fraction of newborn boys would have been the same for Asians and non-Hispanic Whites. To test the plausibility of our assumption, we restrict our sample to pre-recession period (2005 to 2007) and estimate a linear regression model including the interaction effects between Asian and year-fixed effects. If the two groups share the time trend, then the interaction effects should not be different from 0, which indeed we find for all parities for

[1] See details at https://www.plannedparenthood.org/learn/abortion/in-clinic-abortion-procedures.

all Asians grouped together, for all parities for Chinese, for parity 1 and 3 for Koreans, and for Parity 2 for Indians. See details in Section B of the Supplementary Material.

V. Results

Table 2 presents our estimates of the impact of the Great Recession by parity - θ_1 and θ_2 in equation (1). Results reported in Panel A show that the Great Recession had a strong impact on sex ratios at birth among newborns between June 2008 and December 2010 ("after2"), while it had little impact on those born during the first 5 months of 2008 (the period denoted with "after1"). In particular, the Great Recession increased the fraction of newborn boys for Asians between June 2008 and December 2010 by 0.28 percentage points (0.53 percent) for parity1 and 0.37 percentage points (0.71 percent) for parity 2.

We further investigate whether each ethnic group among the Asians may exhibit a heterogeneous impact of the Great Recession. We focus our discussion of the results only for the parity in an ethnic group satisfying our identification, presented in Table 2 (Panels B and C). We find that the Chinese are the ones responding to the Great Recession, while we do not find such behavioral patterns among Indians or Koreans. For example, from June 2009 to December 2010, the Great Recession increased the fraction of newborn boys to Chinese mothers by 0.65 percentage points (1.3 percent) for parity 1 and 0.59 percentage points (1.2 percent) for parity 2.

This impact of the Great Recession found among the Chinese Americans is qualitatively robust to alternative approaches. For example, if we narrow the sample to the newborns for whom the data indicate the race of both parents and classify a newborn as Chinese only if both parents are Chinese, this alternative approach yields qualitatively the same result as our main findings. See Section C of the Supplementary Material.

IV. Conclusion

This paper examines the impact of the Great Recession on sex ratios at birth, focusing on the ethnic groups known to have a son preference in the US. Using the DID method, we find that in response to the Great Recession, the fraction of newborn boys increased among Chinese Americans. Our findings suggest that a severe economic shock such as the Great Recession could worsen the disadvantage in natality for girls compared to boys for groups with a cultural preference for sons even in a very developed country such as the US. Our results suggest that a cultural norm, namely son preference, may be directly affected by economic conditions.

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Table 1. Fraction of Boys Among Newborns

	2005-2007 (%) (1)	2008-2010 (%) (2)	P-value of testing (1)=(2) (3)
Panel A. Parity 1			
- Asian	51.3	51.5	0.472
	(0.1)	(0.1)	
- White	51.4	51.3	0.205
	(0.0)	(0.0)	
Panel B. Parity 2			
- Asian	51.5	51.9	0.075
	(0.2)	(0.1)	
- White	51.3	51.4	0.367
	(0.0)	(0.0)	
Panel C. Parity 3			
- Asian	53.2	53.1	0.735
	(0.3)	(0.3)	
- White	51.3	51.2	0.285
	(0.0)	(0.1)	

Note: standard deviations are reported in parentheses.

Table 2: Impact of The Great Recession on the Fraction of Newborn Boys

Panel A. All Asians vs. White

	Parity 1	Parity 2	Parity 3
	(1)	(2)	(3)
1(i: Asian, After1)	-0.00377	0.000872	0.00700
	(0.00367)	(0.00314)	(0.00754)
1(i: Asian, After2)	0.00275*	0.00365**	-0.00188
	(0.00153)	(0.00151)	(0.00576)
Obs.	5,582,586	4,455,741	2,060,568

Panel B. Chinese vs. White

	Parity 1	Parity 2	Parity 3
	(1)	(2)	(3)
1(i: Asian, After1)	0.00344	0.00397	0.00859
	(0.00650)	(0.00605)	(0.0187)
1(i: Asian, After2)	0.00652**	0.00594*	0.00199
	(0.00320)	(0.00344)	(0.00733)
Obs.	5,406,348	4,322,772	2,029,679

Panel C. Korean/Indian vs. White

Ethnicity	Korean	Korean	Indian
Parity	Parity 1	Parity 3	Parity 2
	(1)	(2)	(3)
1(i: Asian, After1)	-0.00603	0.02310	-0.00035
	(0.00855)	(0.0177)	(0.00452)
1(i: Asian, After2)	-0.00238	-0.00649	0.00211
	(0.00476)	(0.00801)	(0.00302)
Obs.	5,332,046	2,019,685	4,336,802

Notes: The unit of observations is a birth. "Other controls" include birth- month, year and state fixed effects. * significant at 10%; ** significant at 5%; *** significant at 1%. Standard errors, reported in parentheses, are clustered at state-level.

Highlights

- This study identifies the impact of the Great Recession on sex ratios at birth.
- Chinese, Indians, and Koreans in the US are more likely to have boys than girls.
- We use the DID method to compare these groups, which have a son preference, to non-Hispanic Whites.
- The Great Recession worsened the imbalanced sex ratios at birth for Chinese Americans.