

TEMPERATURE AND BIRTH RATES IN SINGAPORE

Samuel Koh

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ANALYZING THE RELATIONSHIP BETWEEN TEMPERATURE AND BIRTH RATES TO INFORM POLICY PLANNING

- ▶ Singapore's ageing population: proportion of citizens aged 65+ increasing from 11.1% in 2012 to 18.4% in 2022 (Source: Straits Time report)
- ▶ We analyze the relationship between temperature and birth rates in Singapore
- ▶ Our findings can provide insights for policymakers to plan policies to address the issue of an ageing population
- ▶ We will use historical data on temperature and birth rates to conduct our analysis

ANALYZING THE RELATIONSHIP BETWEEN TEMPERATURE AND BIRTH RATES TO INFORM POLICY PLANNING

- ▶ There are many factors that contribute to an ageing population, and we will be focusing on **Declining birth rates**
- ▶ In particular, we will be focusing our efforts on **the effects temperature has on birth rate**, a factor less studied among other factors affecting fertility

RESEARCH

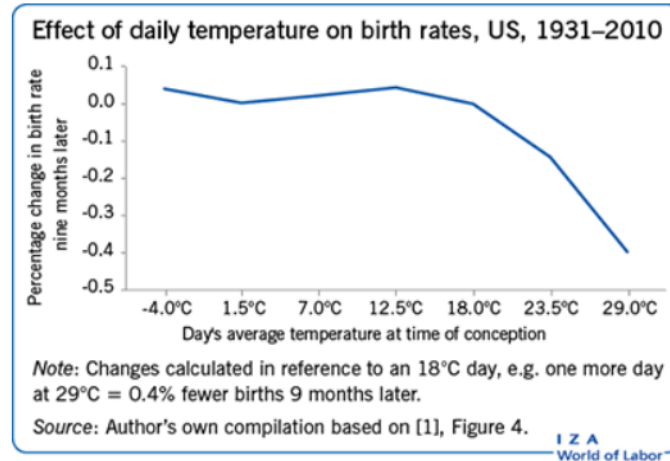
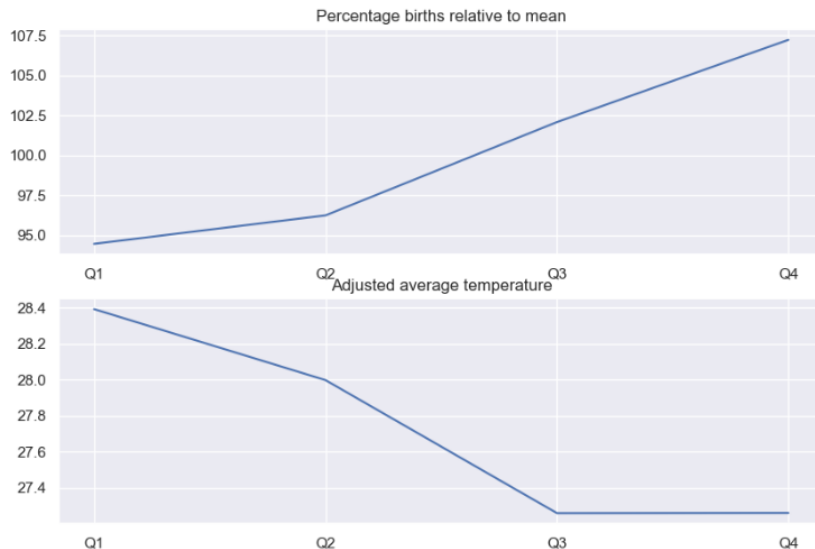


Figure. Barreca (2017)

- ▶ Barreca et al. found that an increase in temperature leads to fewer births 9 months later.
- ▶ According to Barreca (2017), "Cause of decline in births due to increase in temperature likely due to worse reproductive health at conception"

EVIDENCE 1986-2022

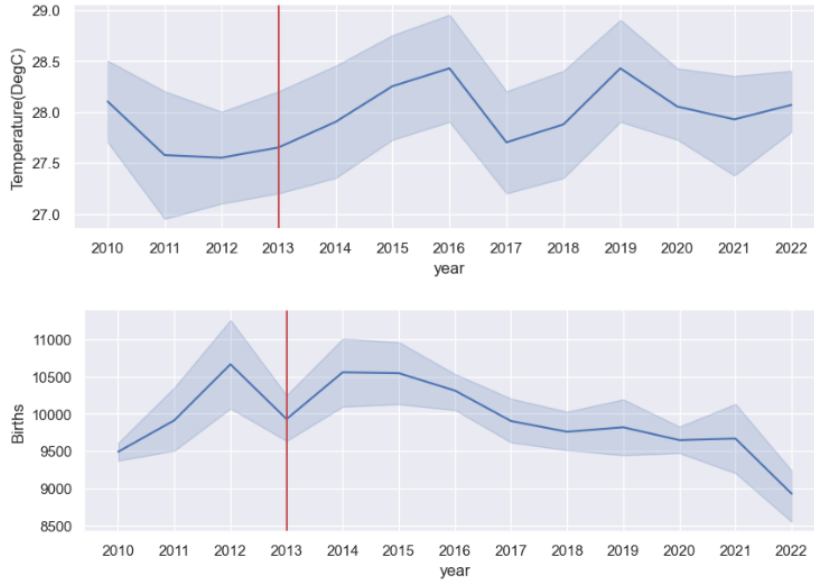


- ▶ The adjusted average temperature graph has been shifted 3 quarters ahead, to better show the effects of how the temperature in a given quarter affects birth 9 months later
- ▶ Similar to Barreca, we find that birth changes negatively with temperature

NOT GOOD ENOUGH!

- ▶ **Resolution** of the data is in quarters
- ▶ While we can see the negative relation, it is hard to judge how significant the effect of a change in temperature is
- ▶ For instance, if the resolution was made worse:

IN YEARS



- Notice that the births no longer change with the change in the yearly average temperature.
- While averaging the temperature, the effect of temperature on births is also averaged out

REGARDLESS...

Birth rate

changes negatively with the temperature

INSPIRATION!

Married couples had more sex during circuit breaker: Study
as reported in The Straits Times on 09 January 2022

RECOMMENDATIONS

Opportunities during the cooler months

for more reproductive behaviours created through policies

OTHER FACTORS THAT COULD AFFECT BIRTH

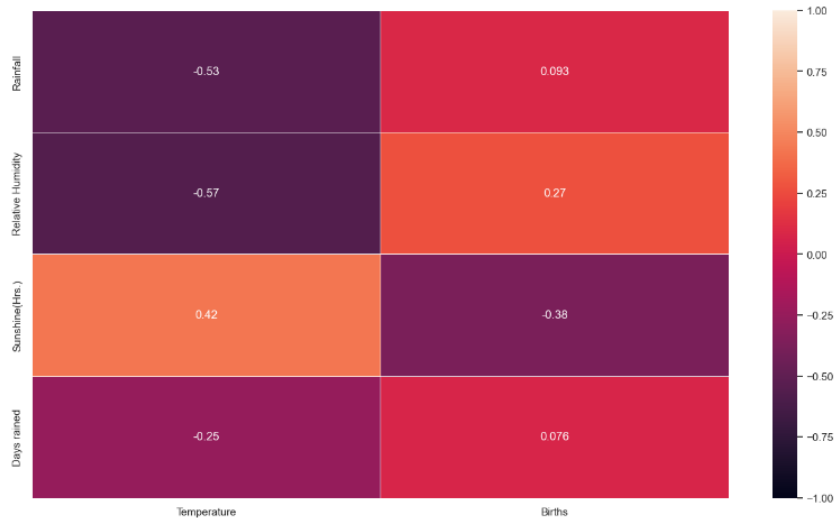


Figure. Correlation coefficient matrix


- ▶ Notice that birth is linearly correlated to relative humidity and the mean sunshine hours in a day
- ▶ But not to rainfall and the number of days rained!

OTHER FACTORS THAT COULD AFFECT BIRTH

- ▶ Recall that birth has a relation to temperature
- ▶ Temperature is also affected by rainfall, relative humidity, amount of sunshine and the number of days rained
- ▶ Intuitively, birth should also be related to the amount of sunshine and the number of days rained!
- ▶ Suggesting that it might be the case that temperature is just a trojan horse for the other factors
- ▶ More research would have to be done to determine this

Questions?

REFERENCES I

 Barreca, A. ((2017)). “Does hot weather affect human fertility?” In: *IZA World of Labor* 375. URL: [10.15185/izawol.375](https://www.iza.org/publications/dp/10711).