

# TEMPERATURE AND BIRTH RATES IN SINGAPORE

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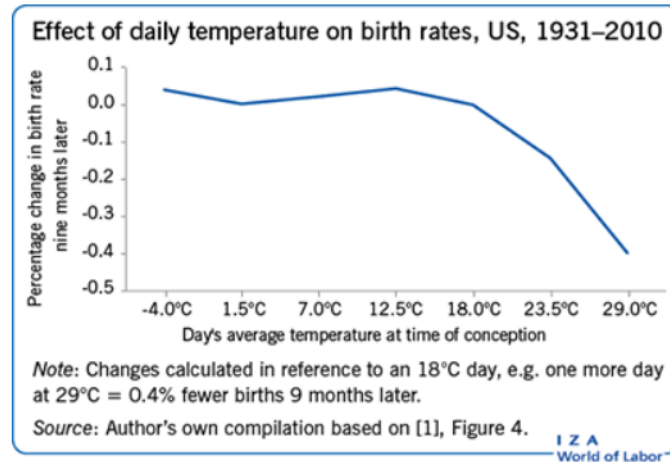
# ANALYZING THE RELATIONSHIP BETWEEN TEMPERATURE AND BIRTH RATES TO INFORM POLICY PLANNING

- ▶ 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

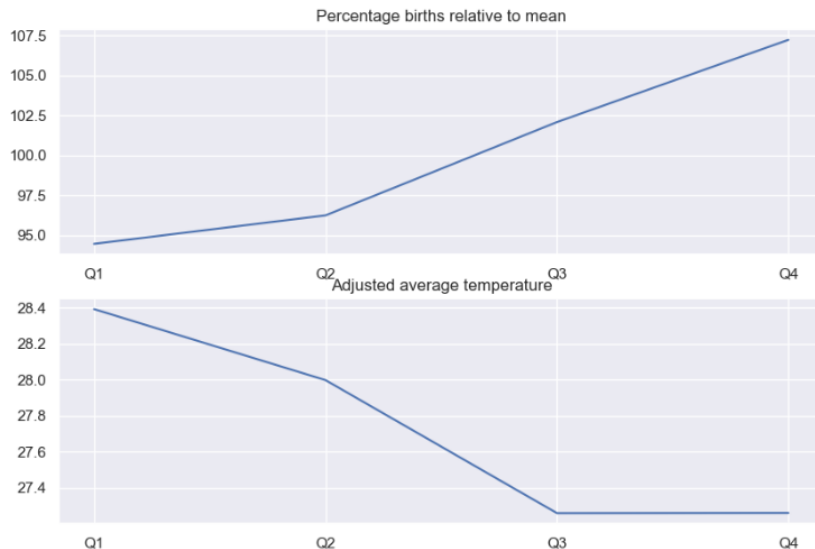
## RESEARCH



**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

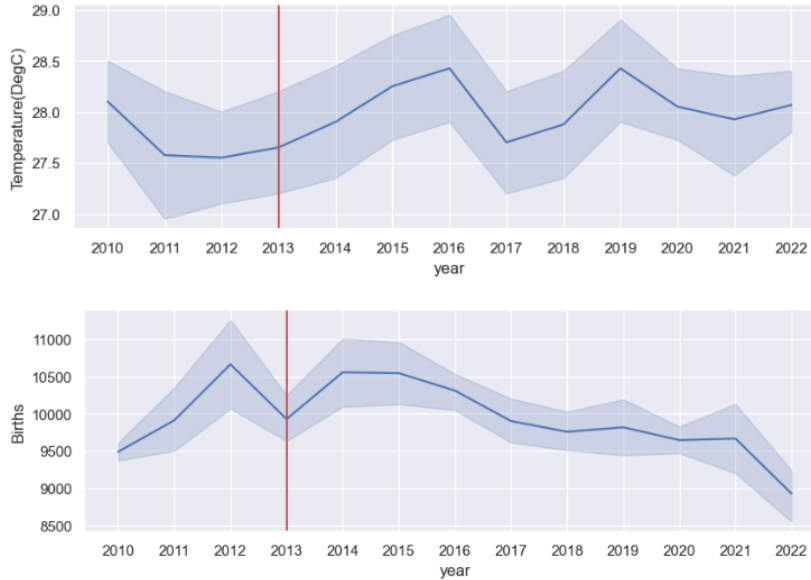


- ▶ The adjusted average temperature graph has been shifted 3 quarters ahead, to better show the effects of how the temperature in a given quarter affects birth 9 months later
- ▶ Similar to Barreca, we find that birth changes negatively with temperature

## 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!

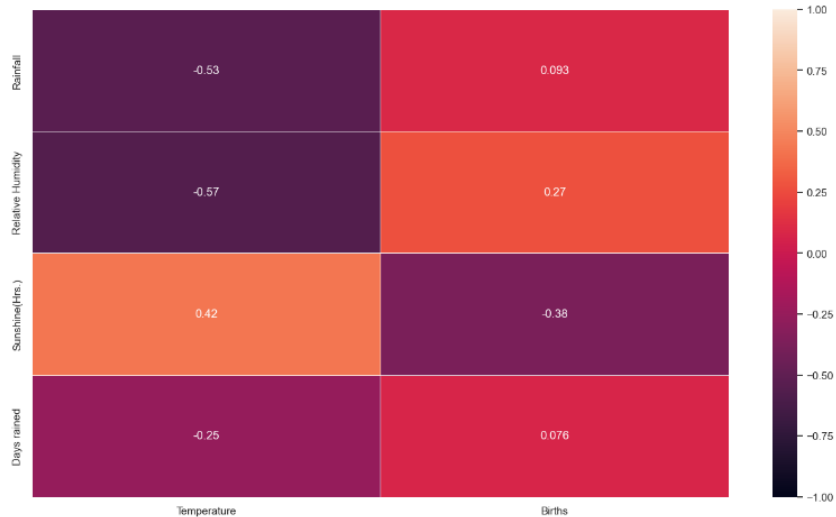
**Married couples had more sex during circuit breaker: Study**  
as reported in The Straits Times on 09 January 2022

## 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
- ▶ Also of note would be

**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).