

# Pandemic and Fertility: Lessons from the Brazilian Zika virus epidemic

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## Take away:

Thinking about human behavior is important (there are common patterns) but there are vast differences between Zika epidemic and Covid-19 pandemic!

But maybe some insights from Zika: **human response is large, fast, and possibly long lasting** – it may be contributing to a long-term recognition of rising costs of raising kids in the developing world (specially to those that have kids already)

Independent of “quantity”, composition plays a key role – it reveals **inequality in ability to respond and possibly in exposure to risk and exacerbates inequality transmission across generations**

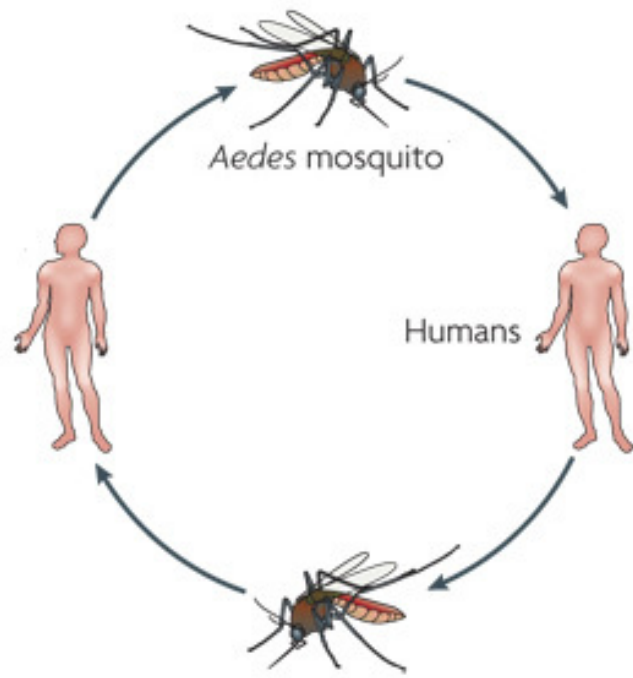
## Take away:

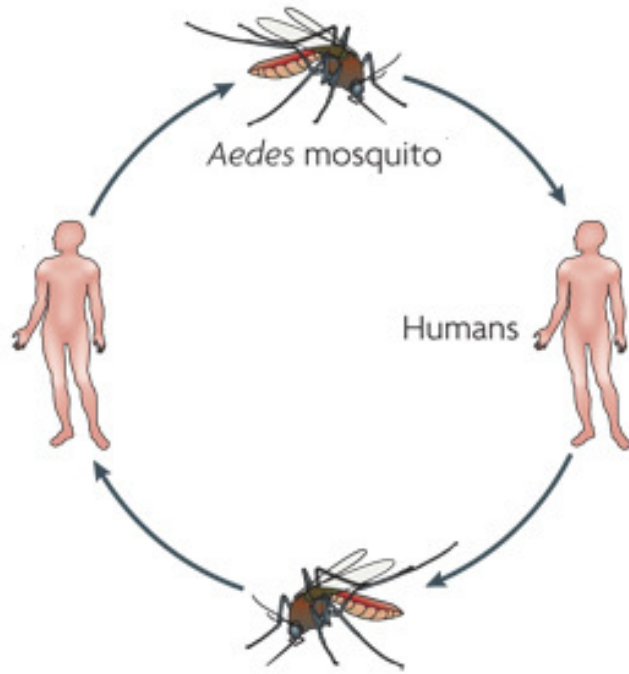
In Zika scenario I focused on separating economic conditions from the health crisis, but considering with the current epidemics the economic impact and health crisis are way more connected and likely have complimentary effects – any prediction needs to take them both into account.

It is important to be rigorous in evidence analysis – extrapolation from past trends is likely the wrong contrast to draw in these situations

Open question: Is there a Zika-Covid exposure interaction in decision making for family planning – “scarring”?



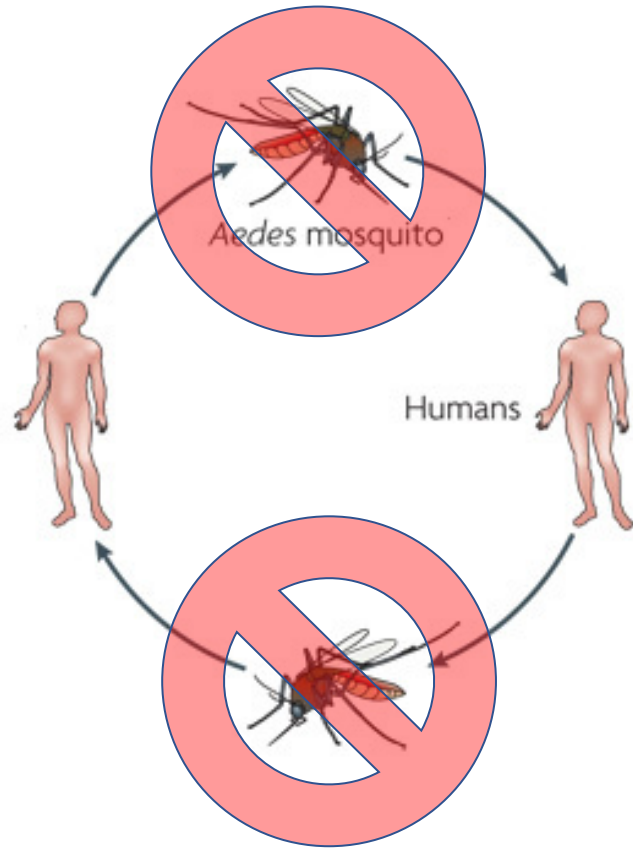




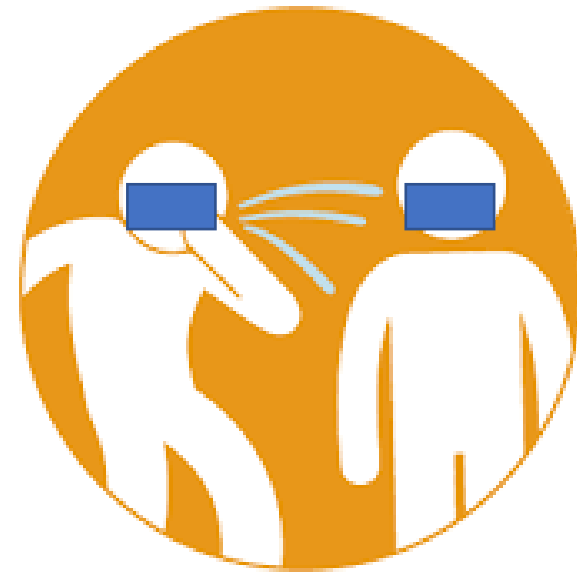
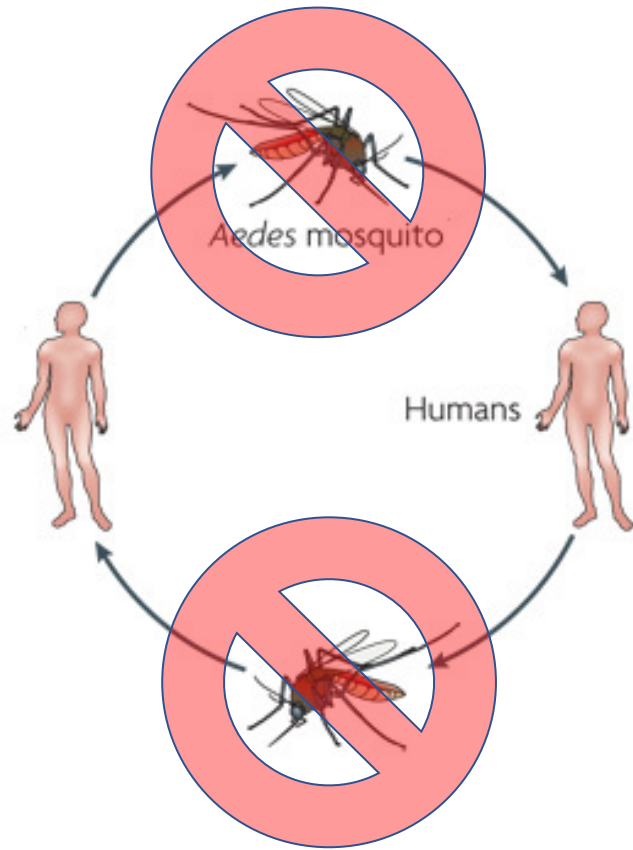
Geographic concentration as a function of mosquito suitability

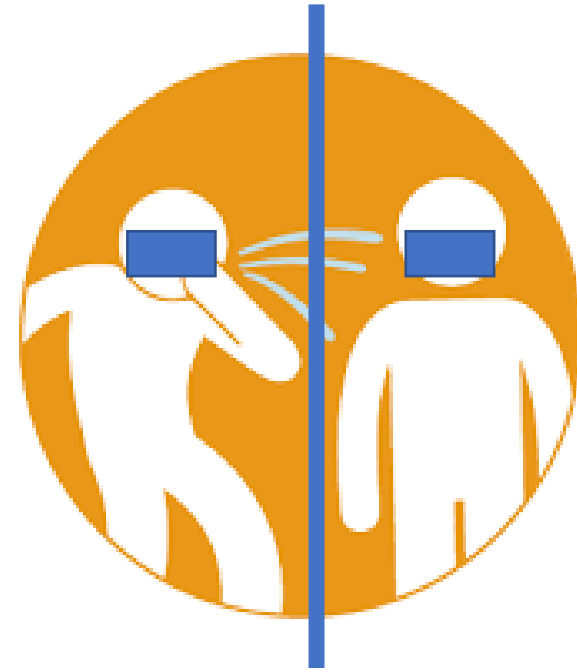
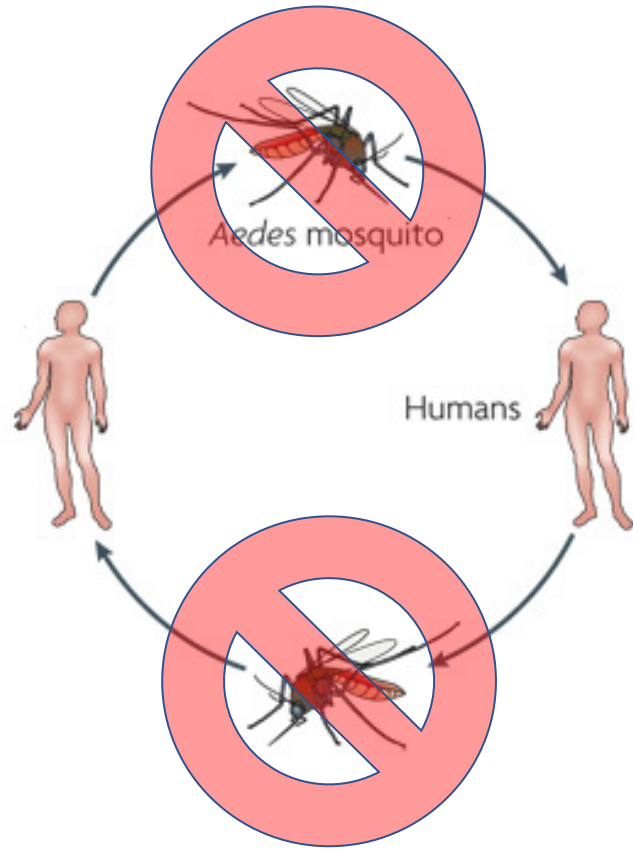


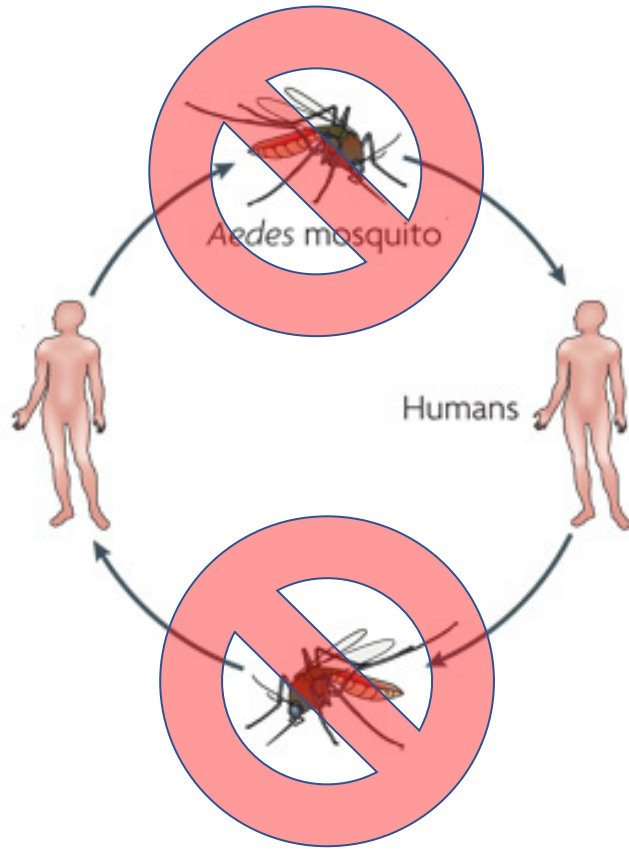
Widespread, goes with humans



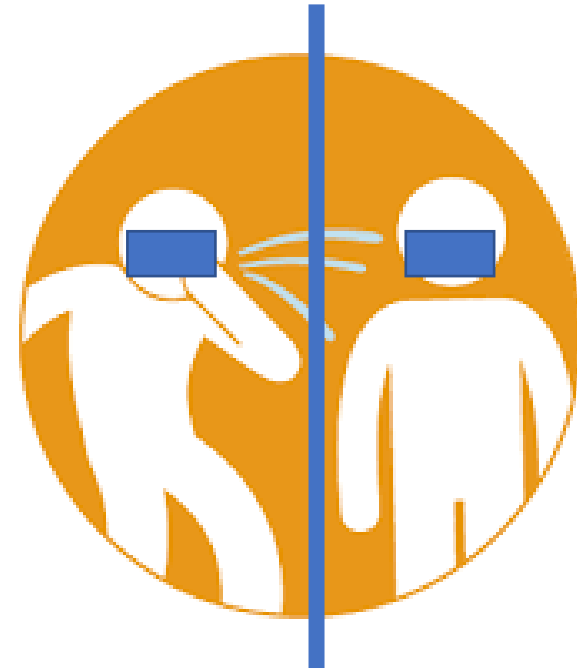




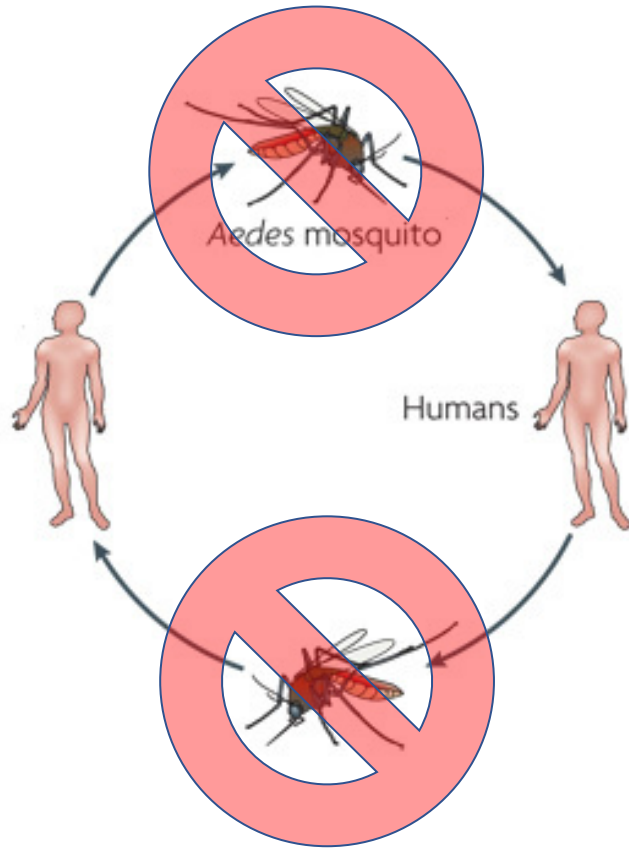




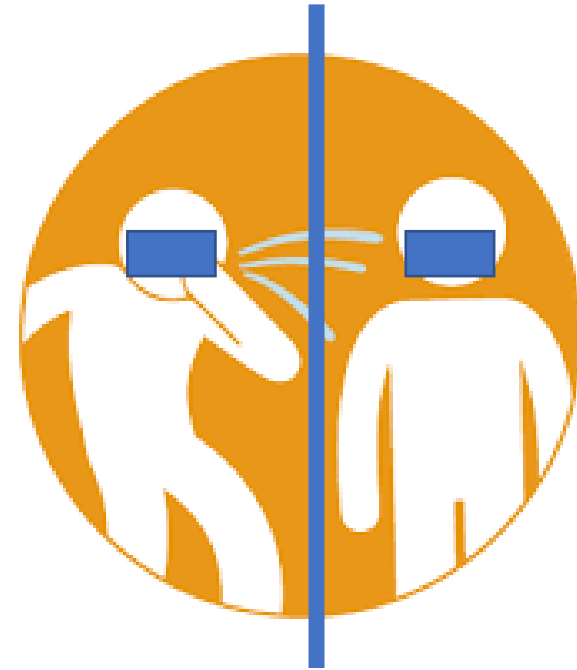
➔ Relatively limited economic consequences of containment



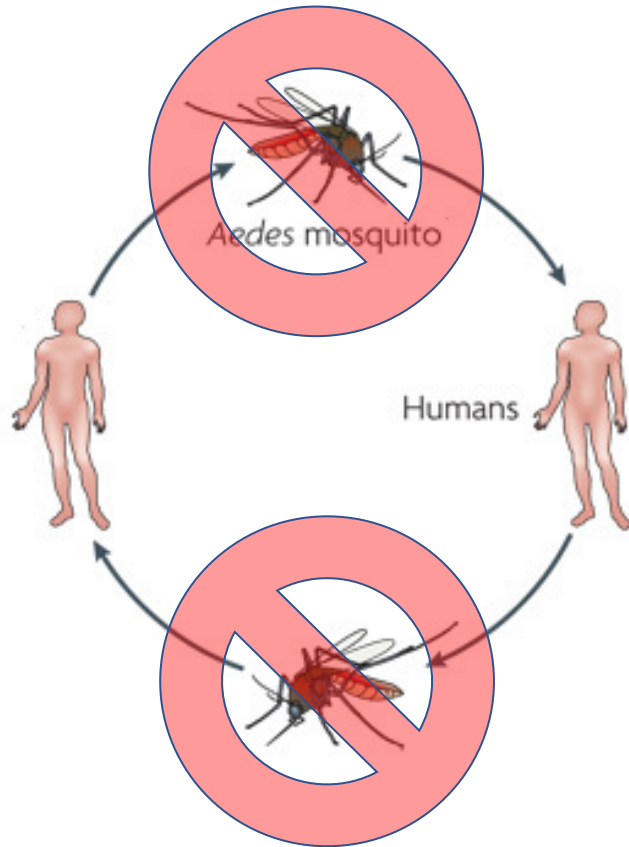
➔ Large economic consequences of containment (including costs of raising children!)



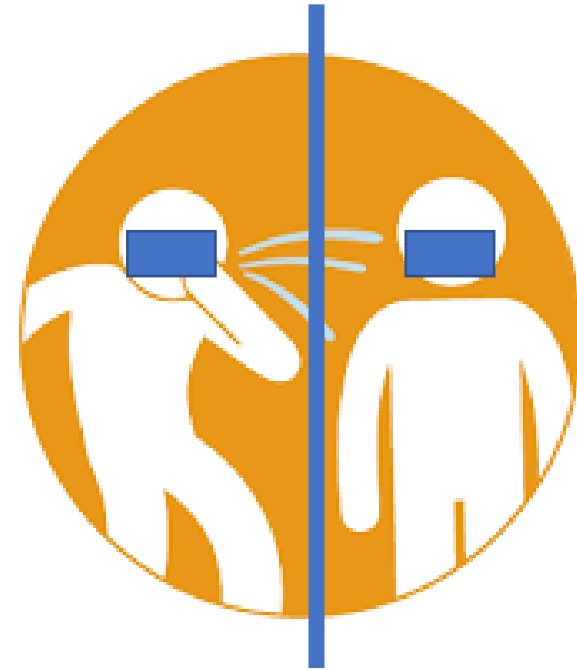
Low mortality across all ages (except maybe fetal death) – *mild* symptoms common to well-known dengue



Mortality among elderly and (by now) serious hospitalization issues among working-age adults



➔ Pregnant women are not more exposed but consequences for fetal development are clear and were made salient to general public



➔ Pregnant women are at an increased risk for severe illness from COVID-19 compared to non-pregnant women. Additionally, pregnant women with COVID-19 might have an increased risk of adverse pregnancy outcomes, such as preterm birth. (But no clear warning here)

## Questions answered in Zika work:

Turning to population...we want to think about biological and behavioral channels and holding constant the impact of economic factors

It is also essential to think about heterogeneity...

How good is individual health risk assessment?

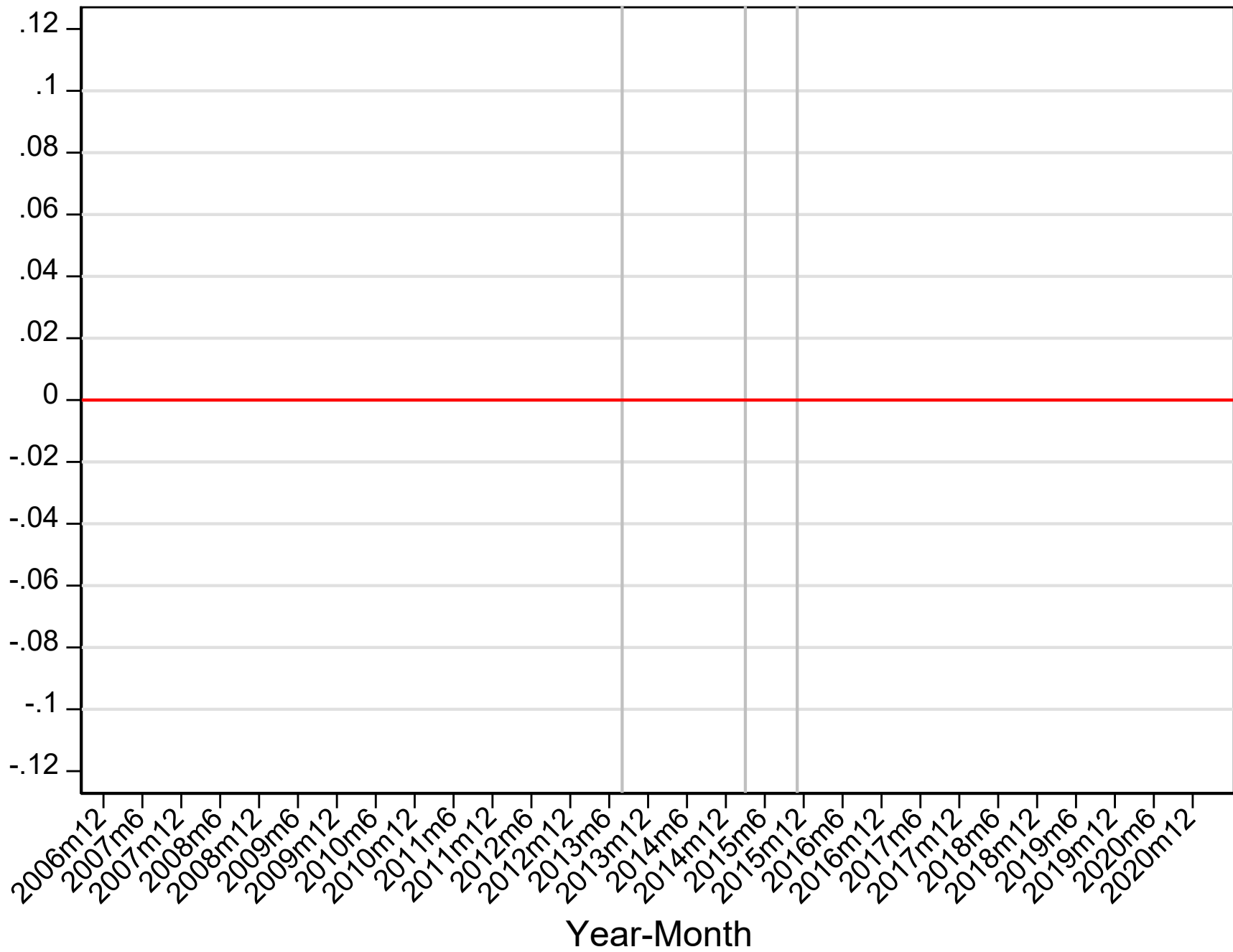
Do people respond?

Who is at health risk?

And...who is “better able” to respond?

Results on Zika:

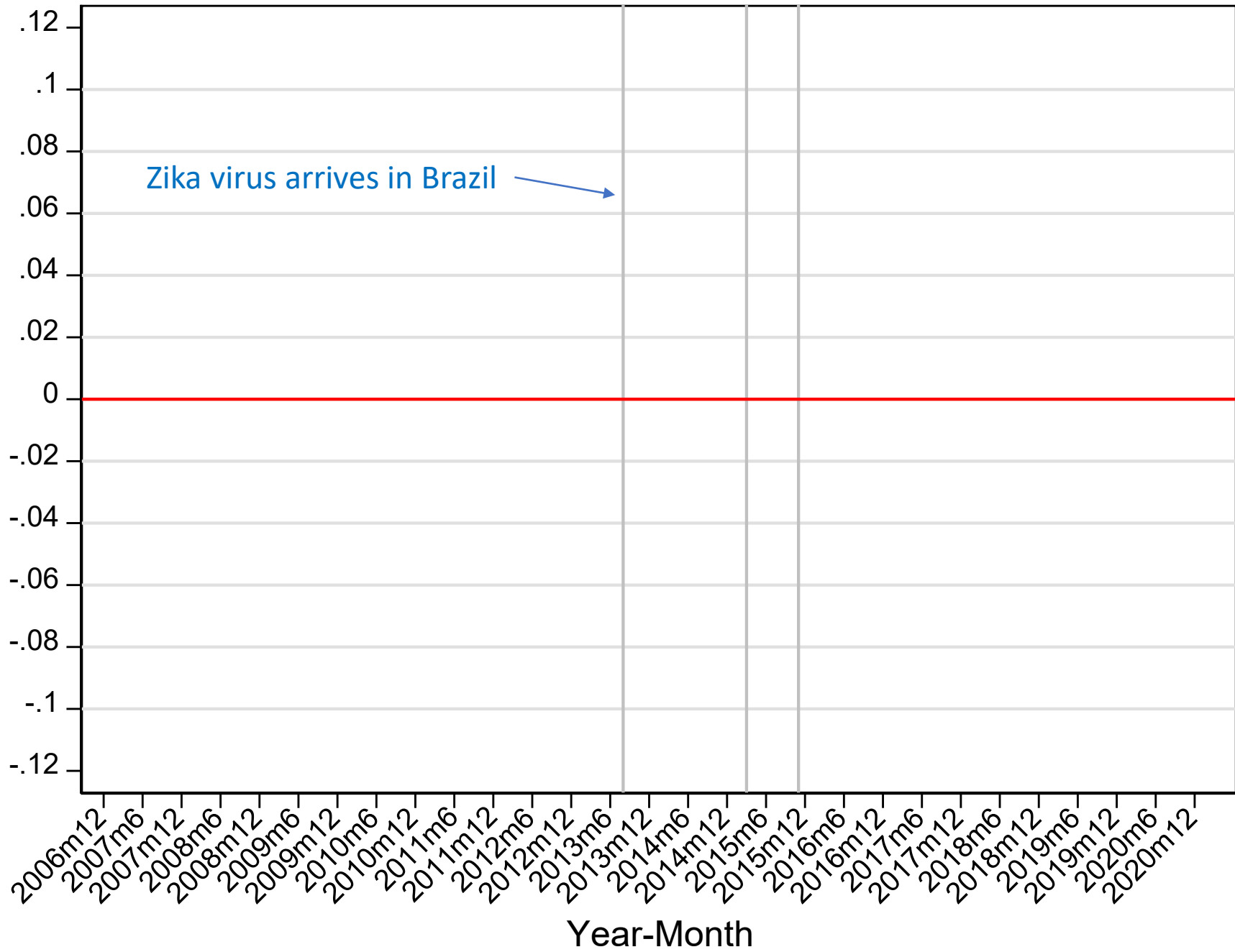
Year to year change



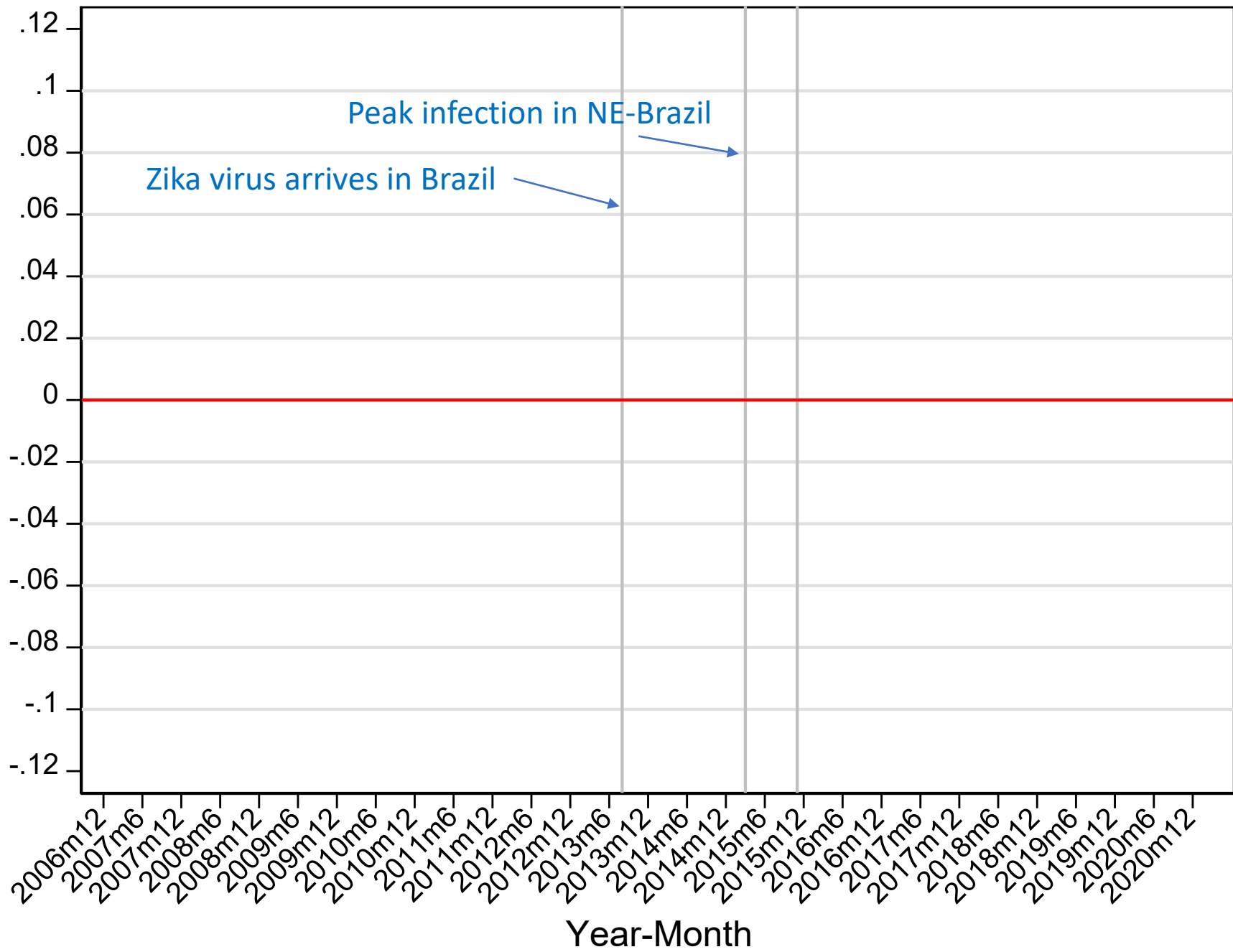
Year-Month



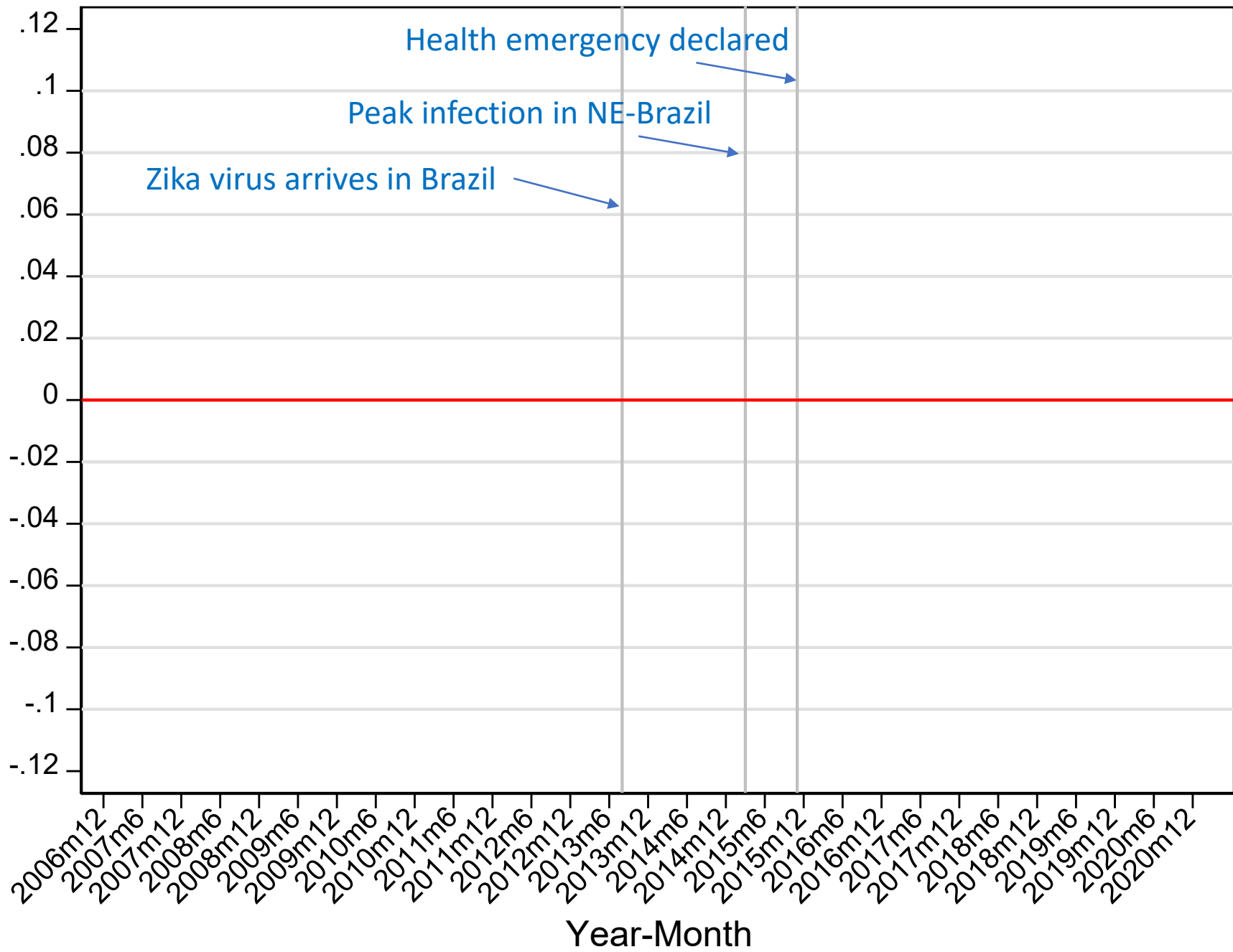
Year to year change



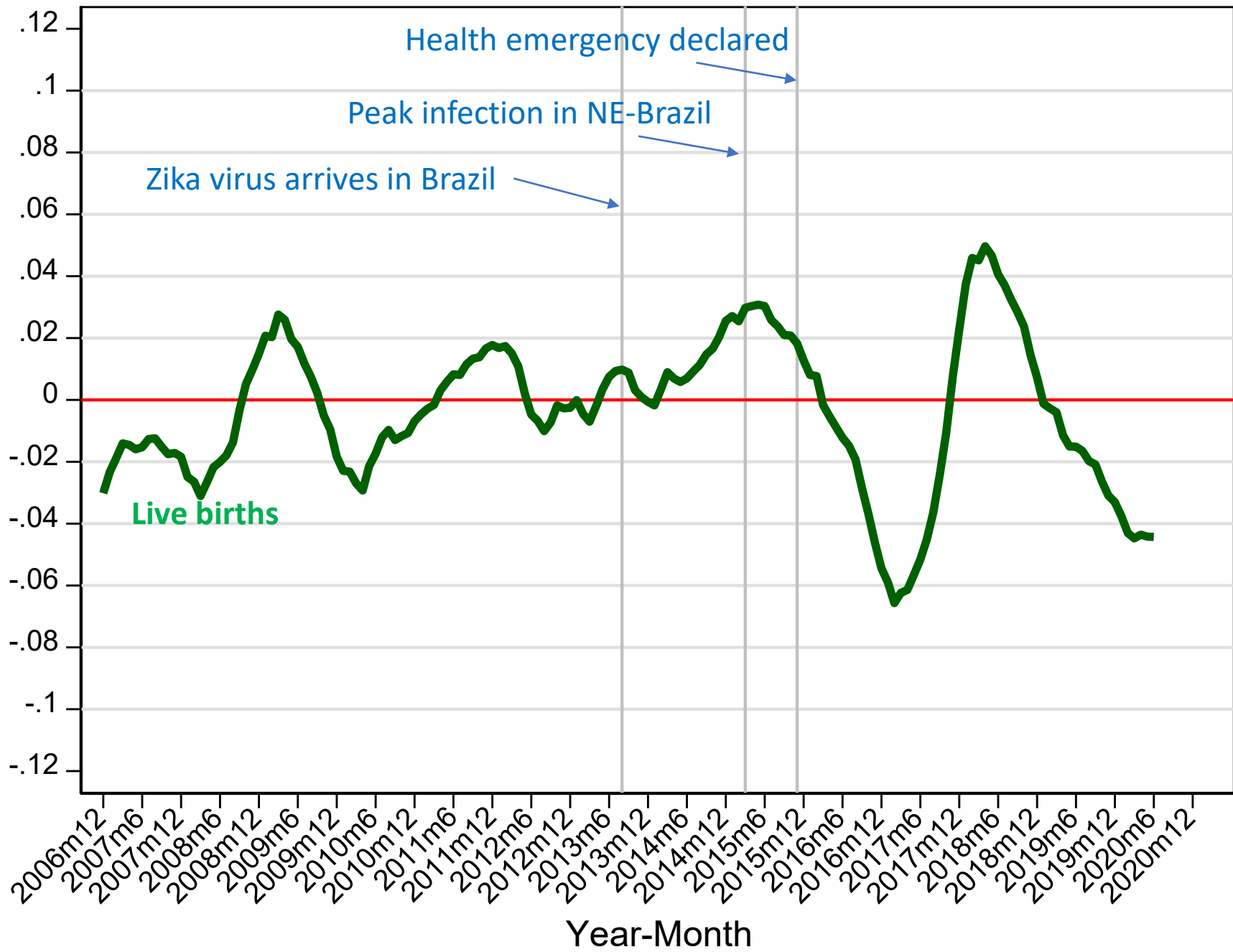
Year to year change



Year to year change



Year to year change



Health emergency declared

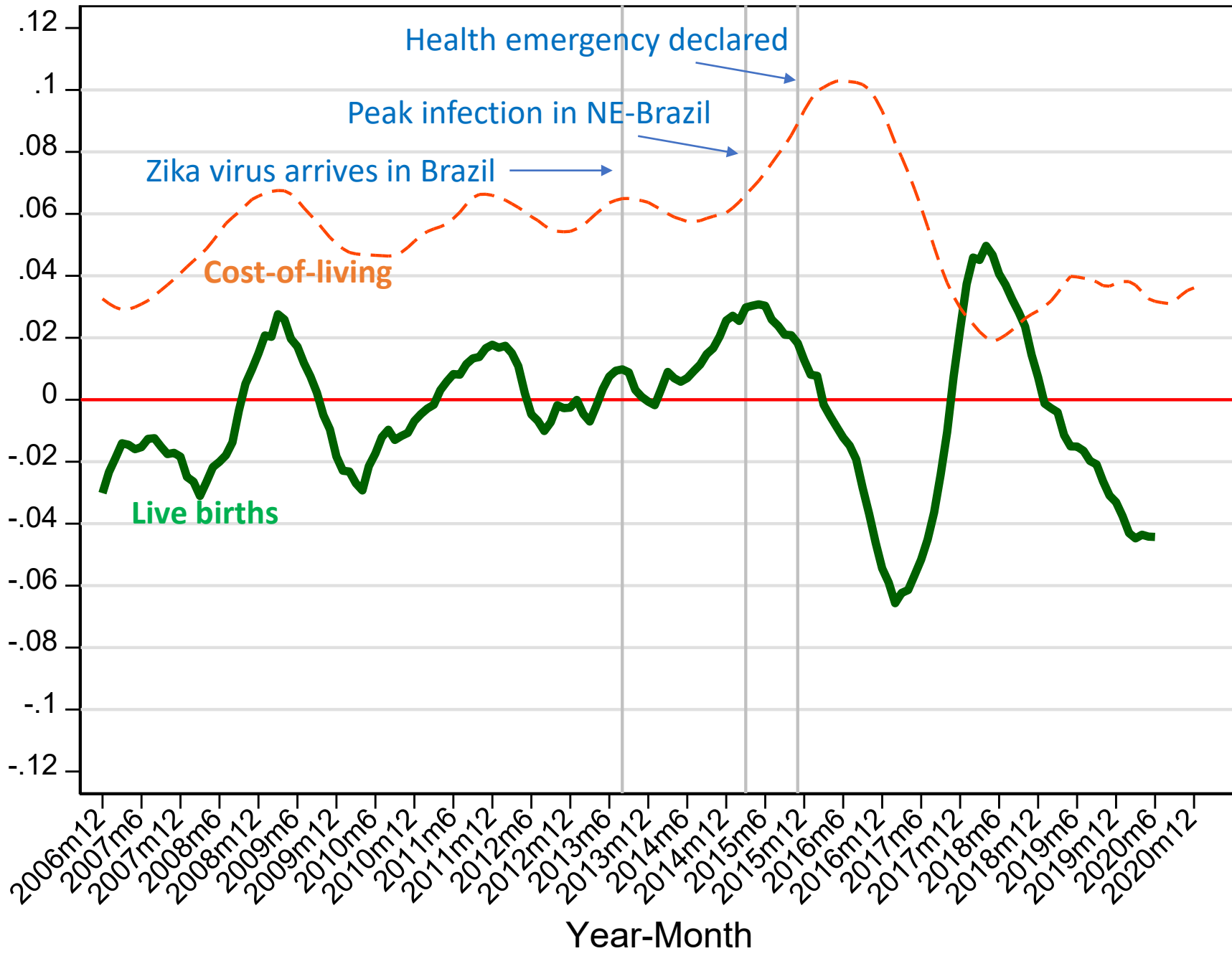
Peak infection in NE-Brazil

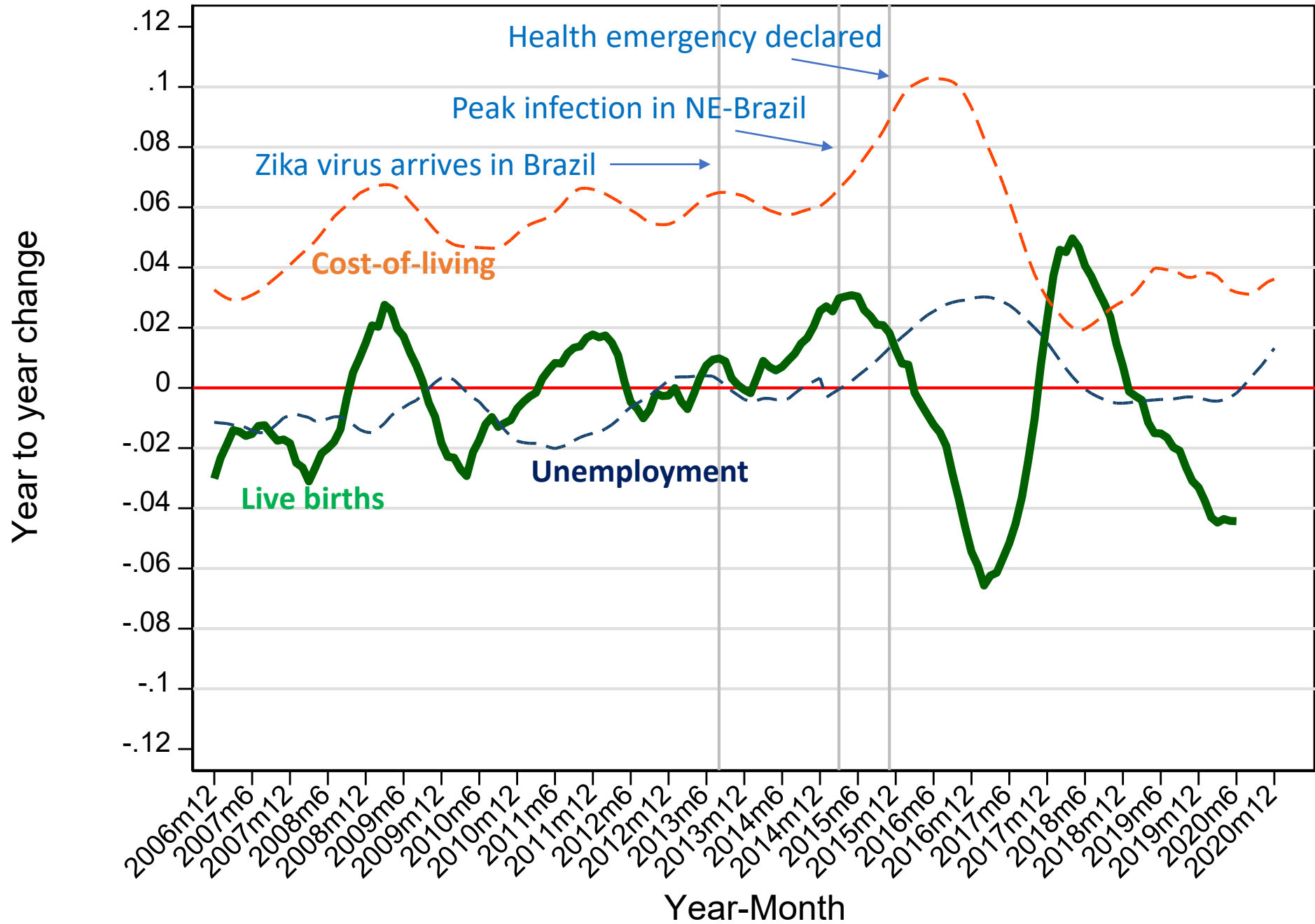
Zika virus arrives in Brazil

Live births

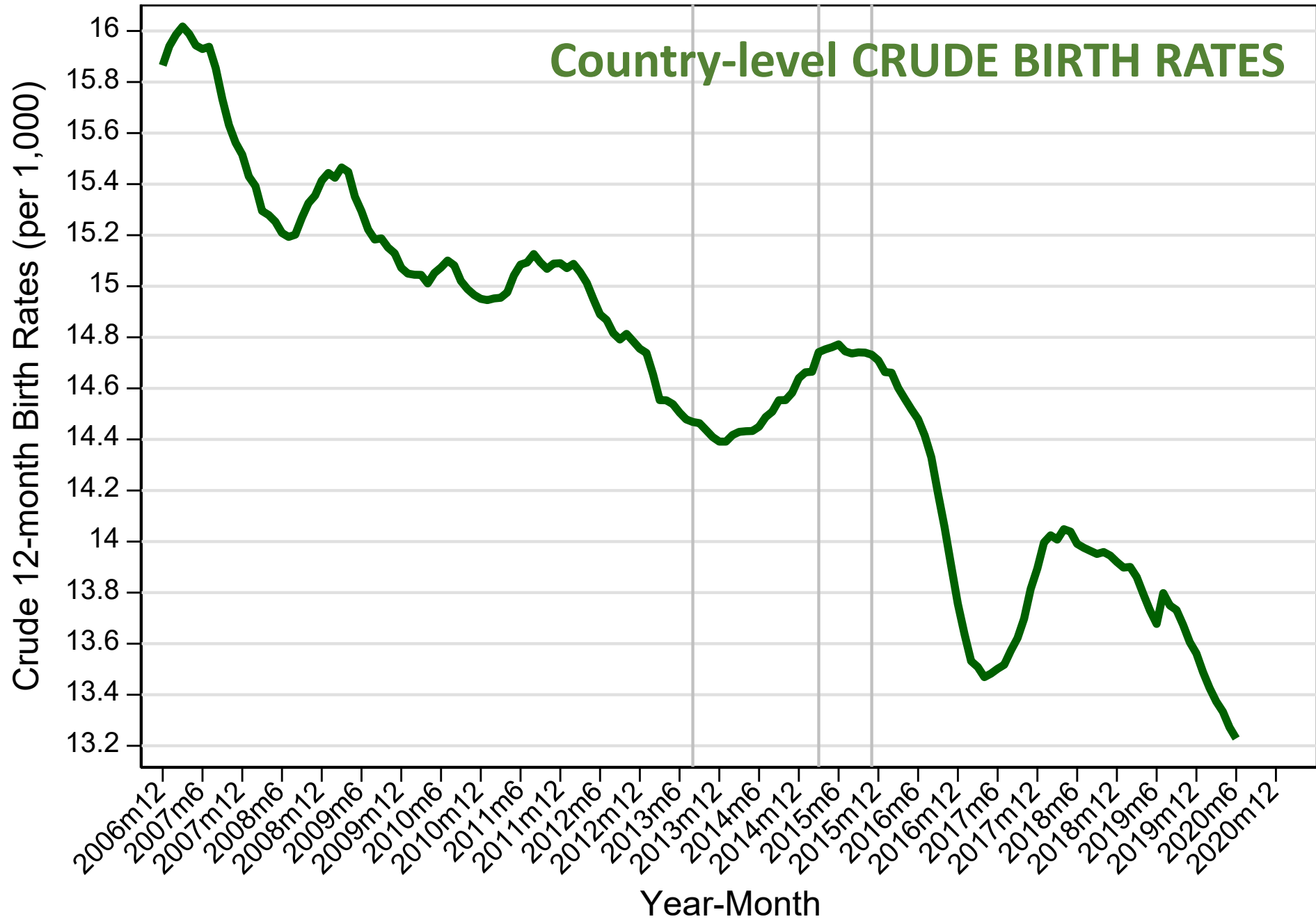
Year-Month

Year to year change

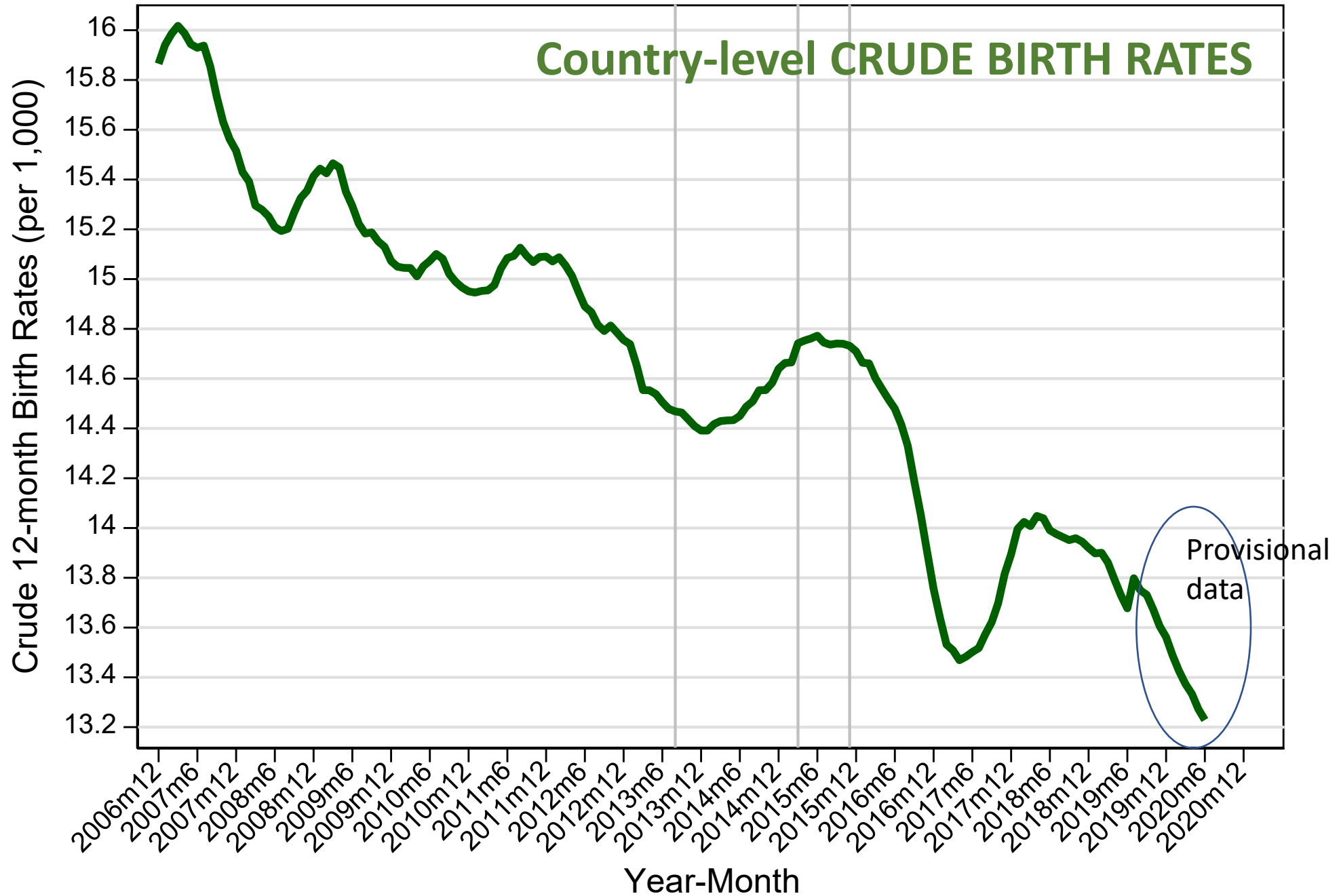




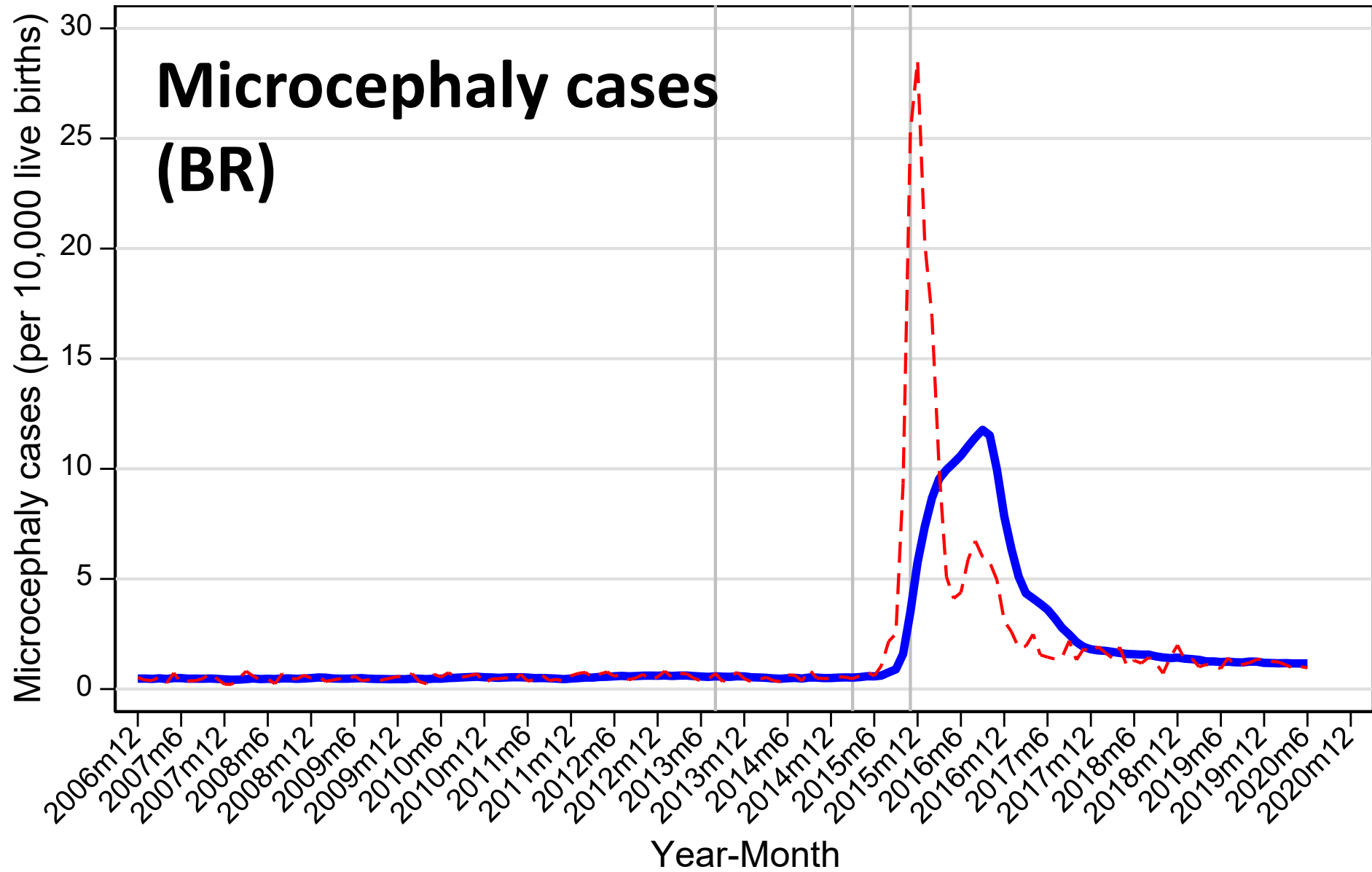
# Country-level CRUDE BIRTH RATES

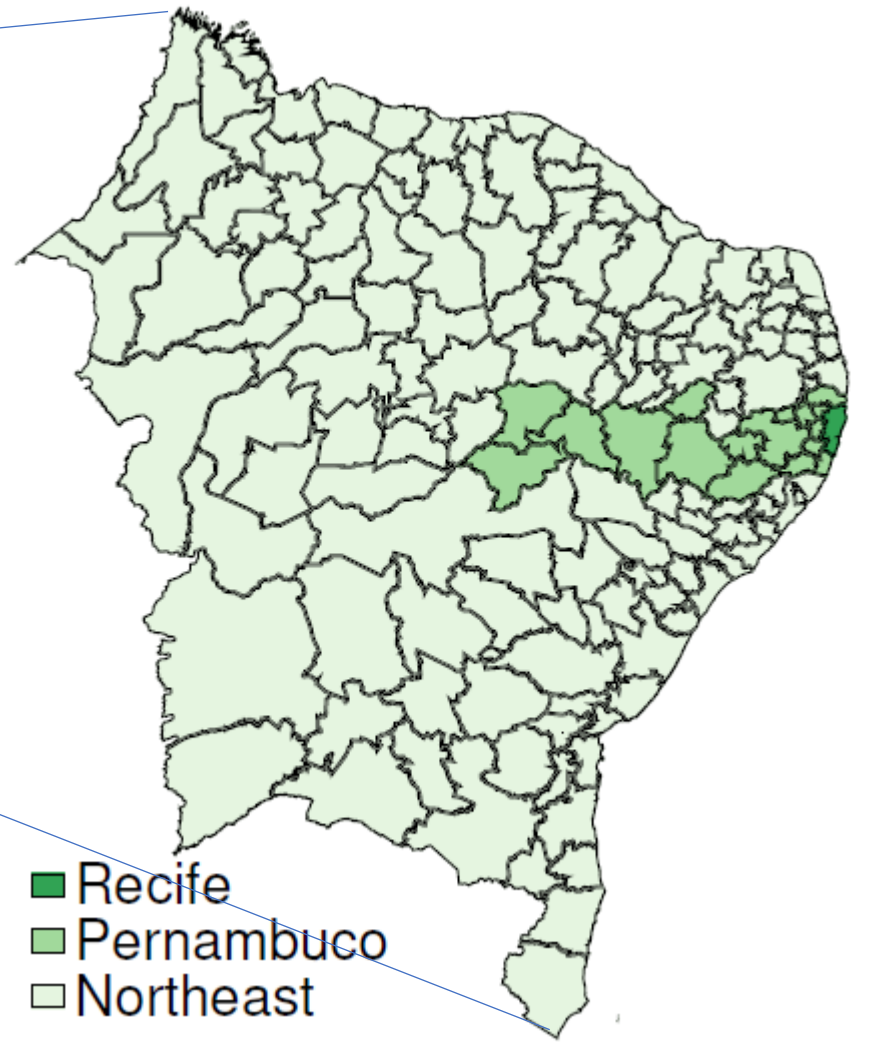
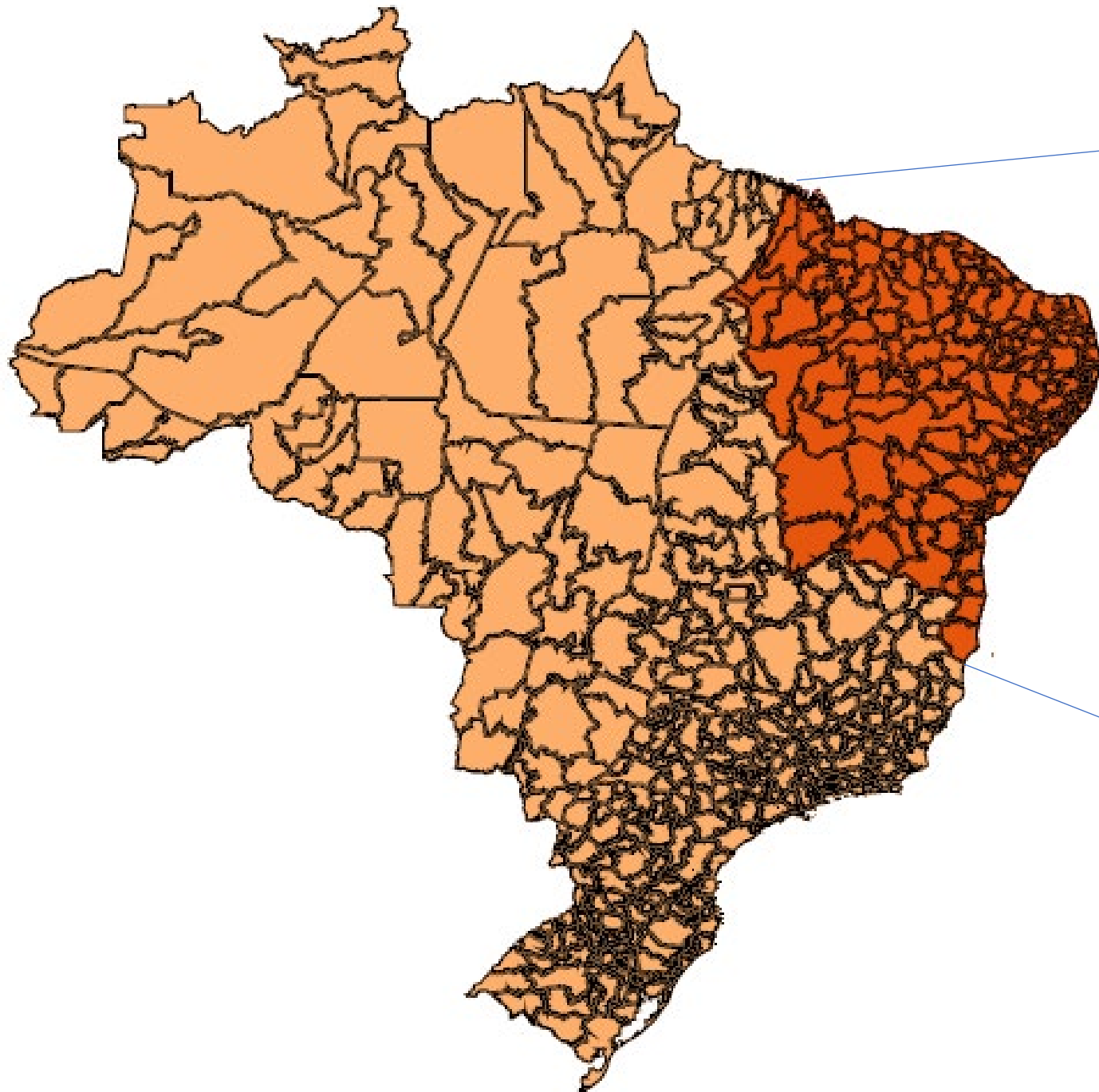


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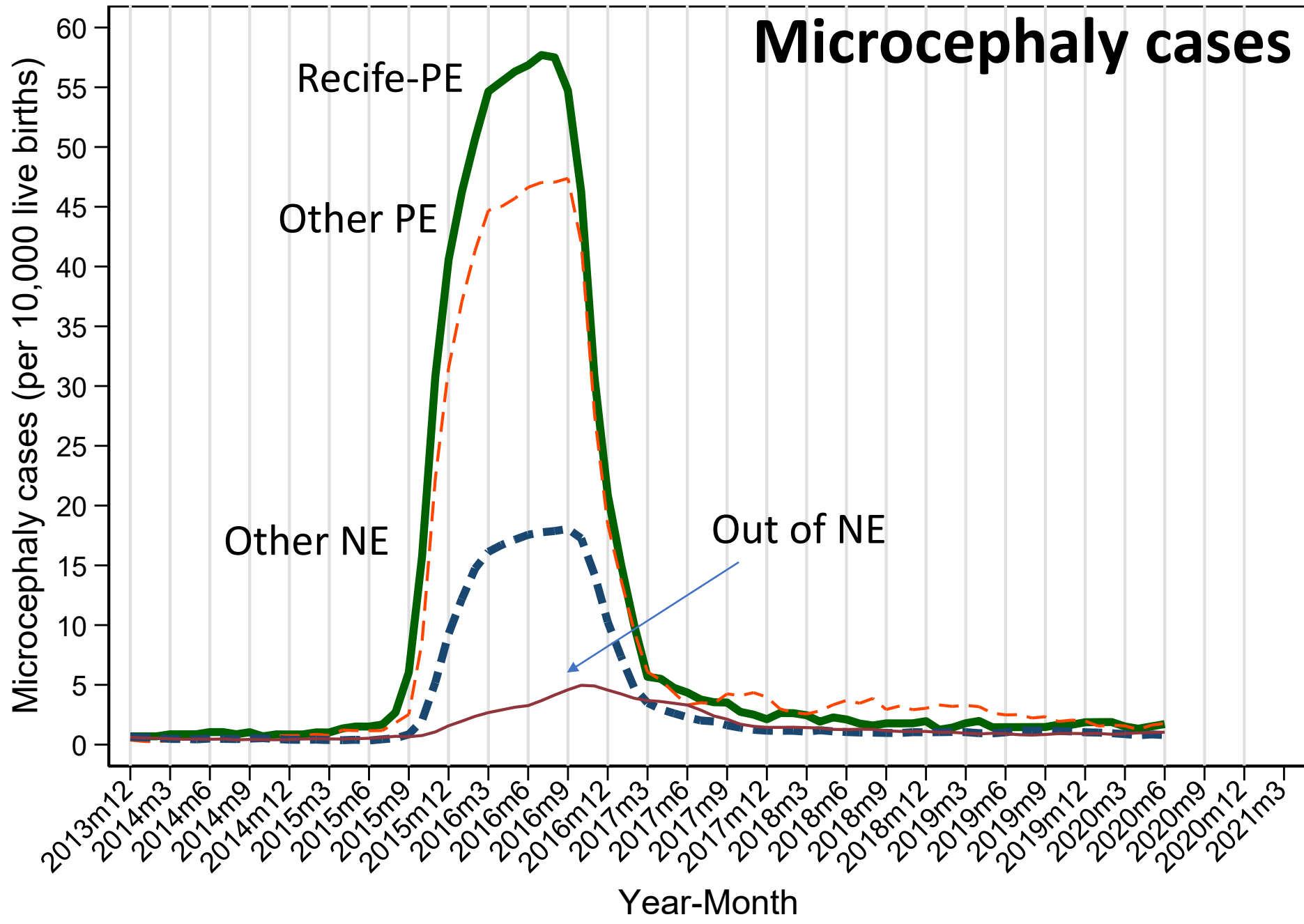


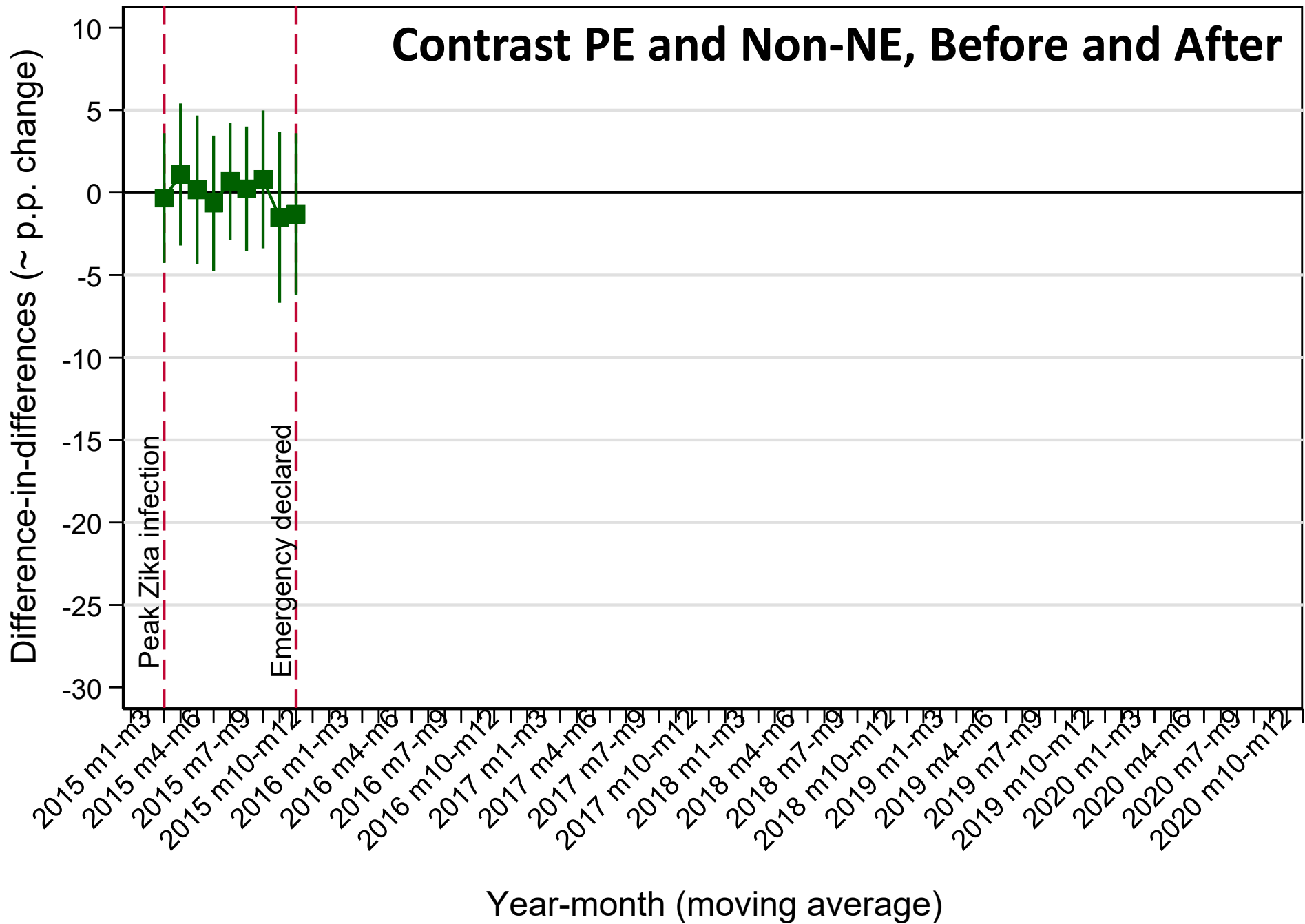


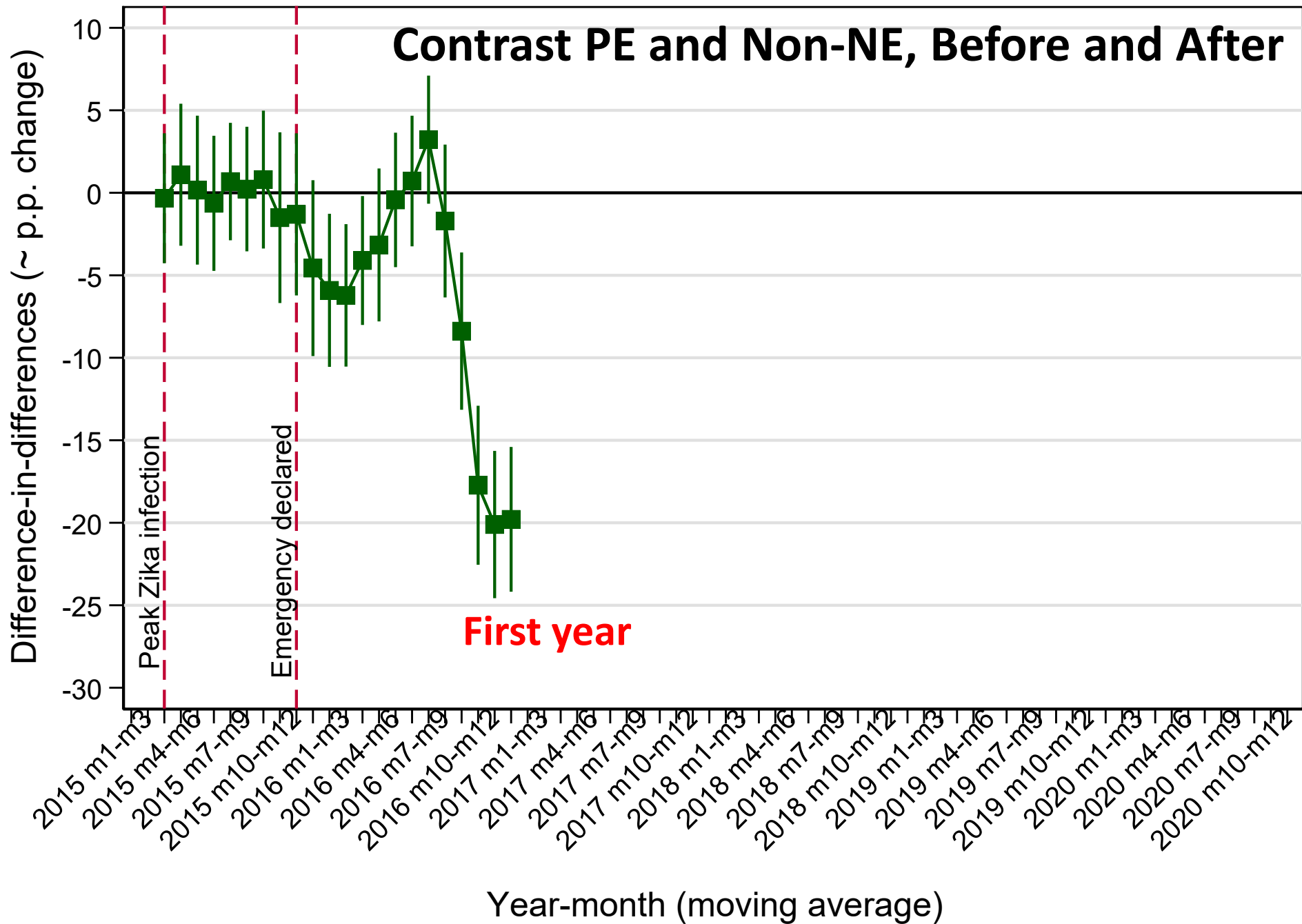


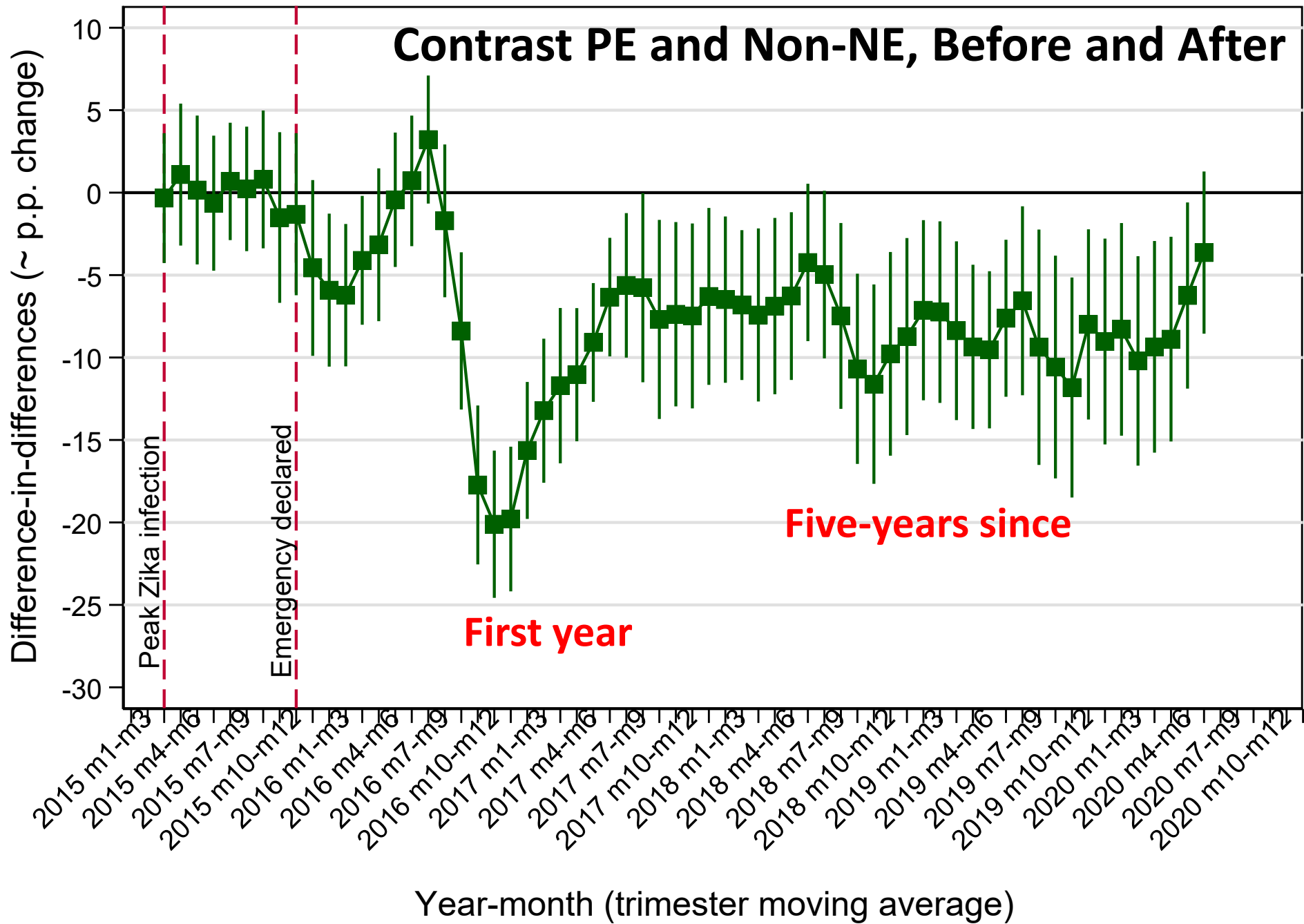


# Microcephaly cases

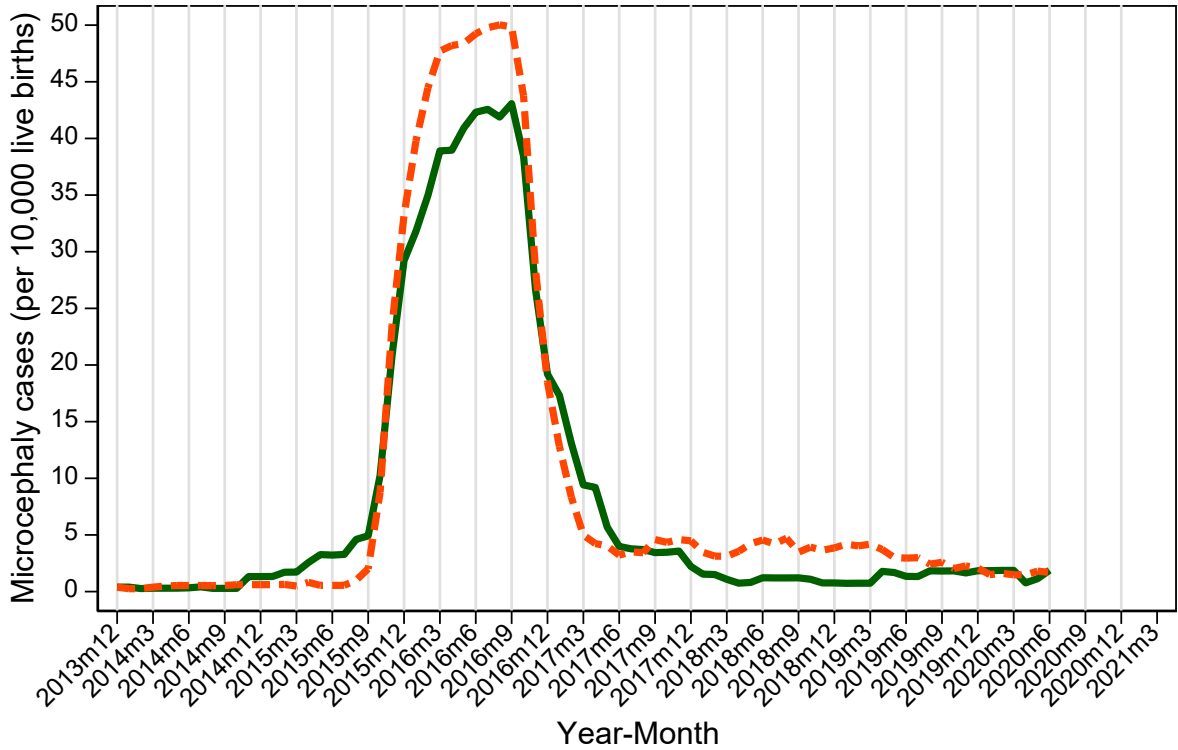




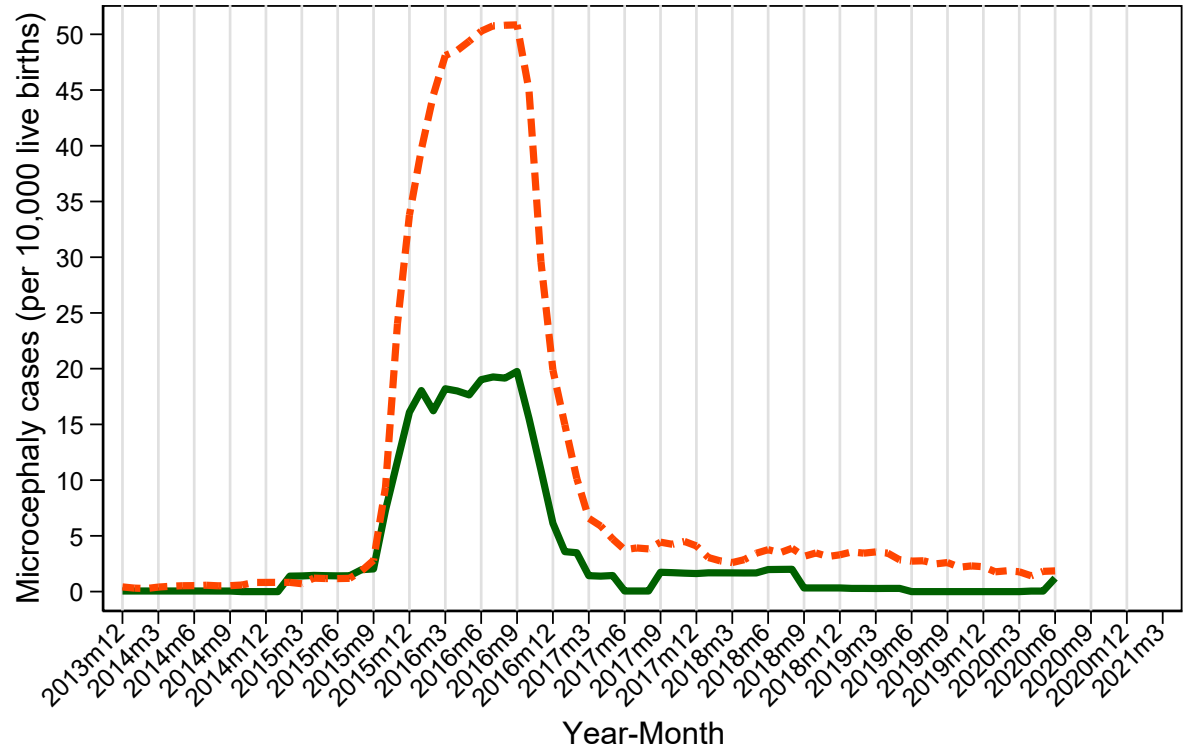




Heterogeneous exposure/response

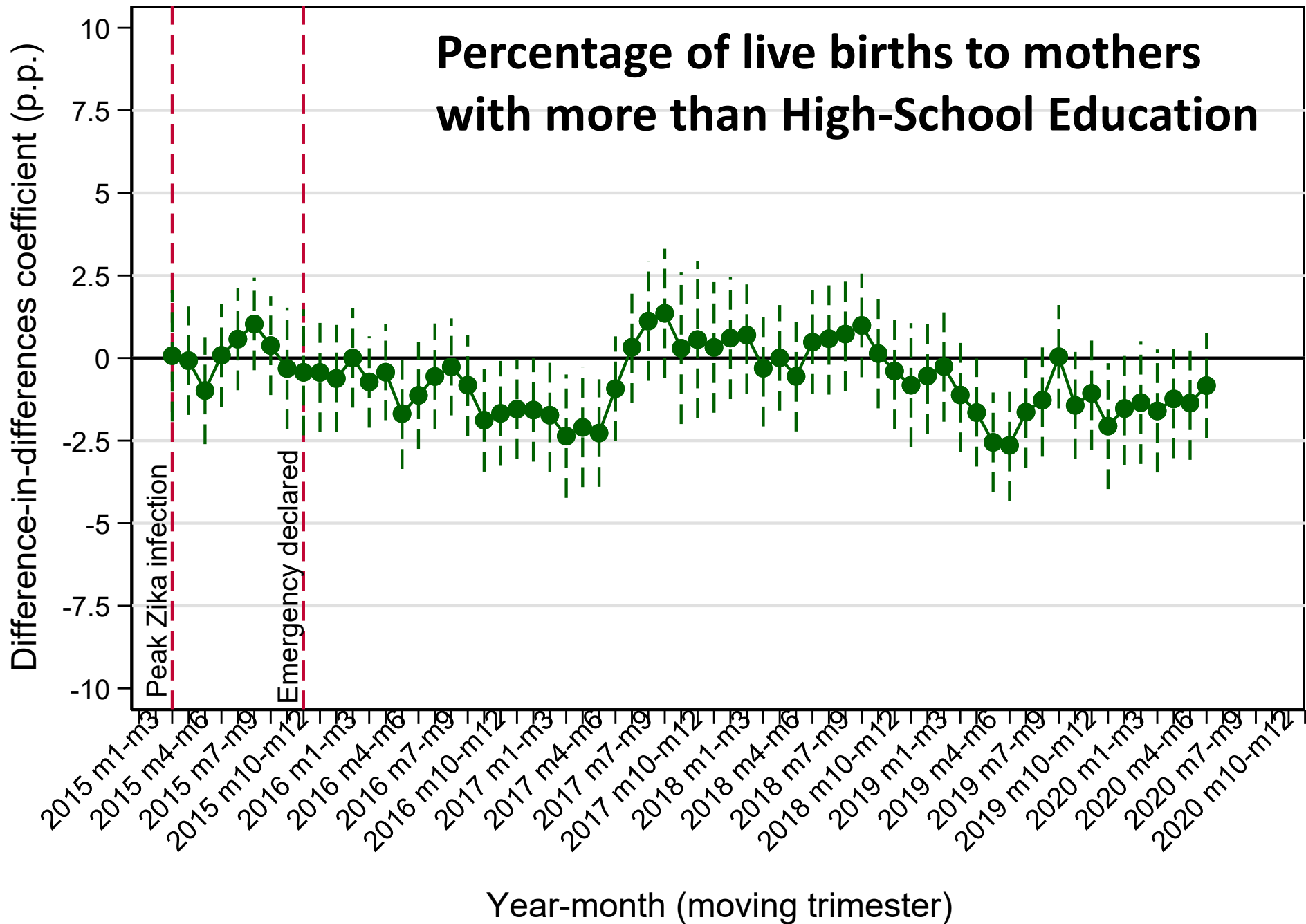


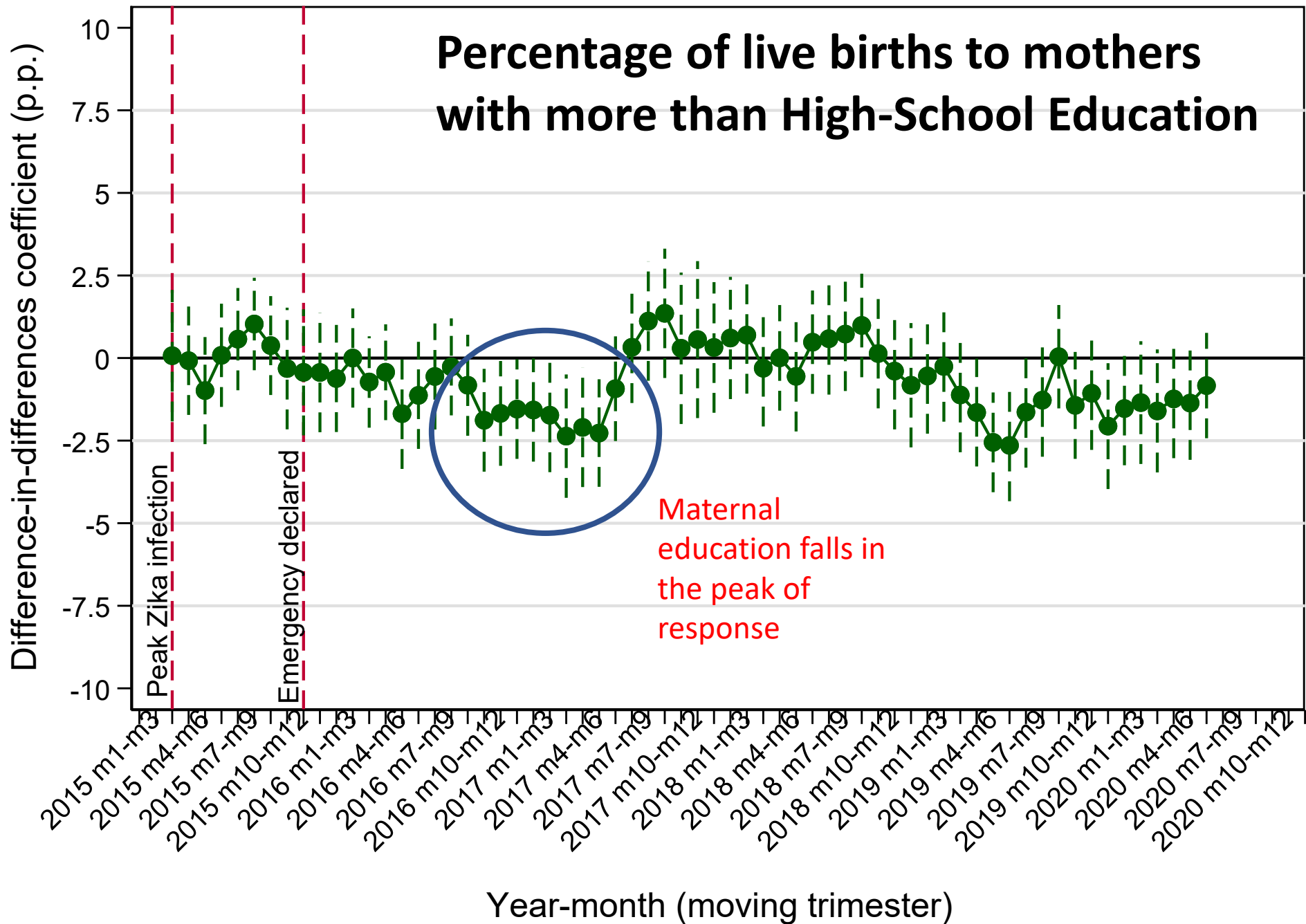
— 30 and older    - - - 29 and younger



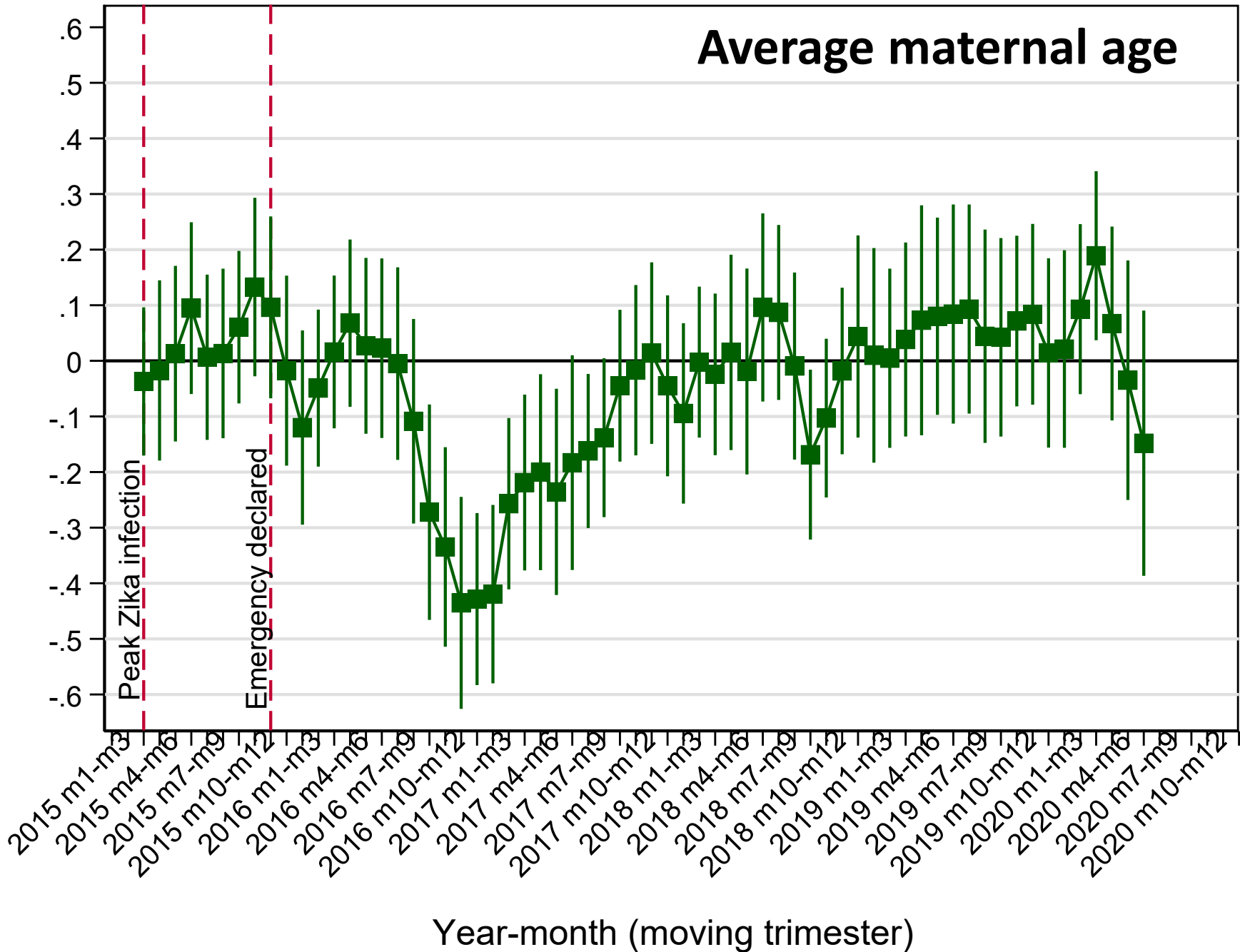
— More than HS    - - - HS or less



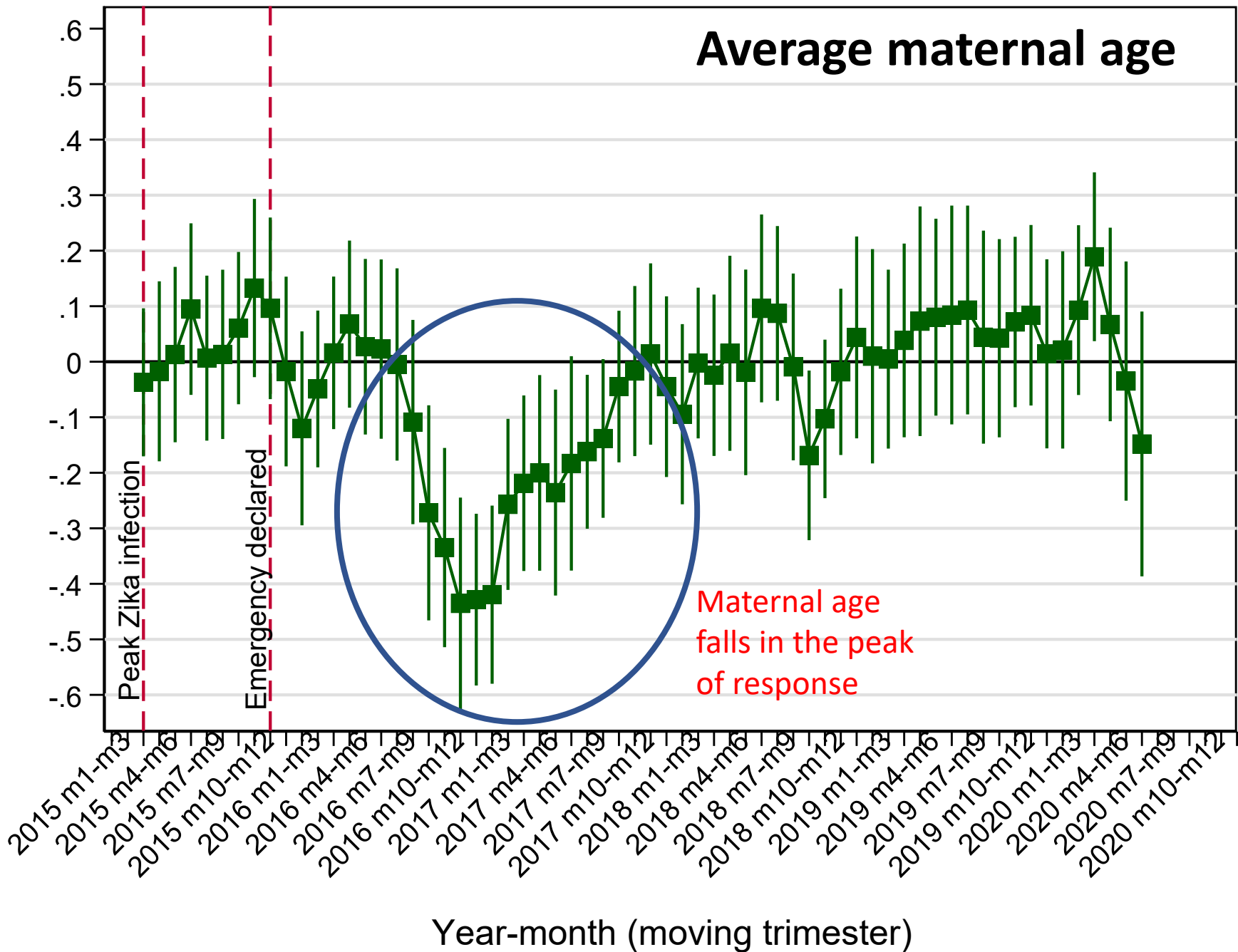




Difference-in-differences coefficient (ln scale)



Difference-in-differences coefficient (ln scale)



## In sum:

Behavioral response to public health crisis seems...

large,

relatively fast

and fairly heterogeneous

For COVID-19 these effects are likely augmented by adult-risk and economic shock – which are themselves heterogeneous

Open question: Not clear how COVID-19 may have impacted supply side of family planning.