

**Appendix 4:** Temporal change in indices and calculating GDP threshold in time

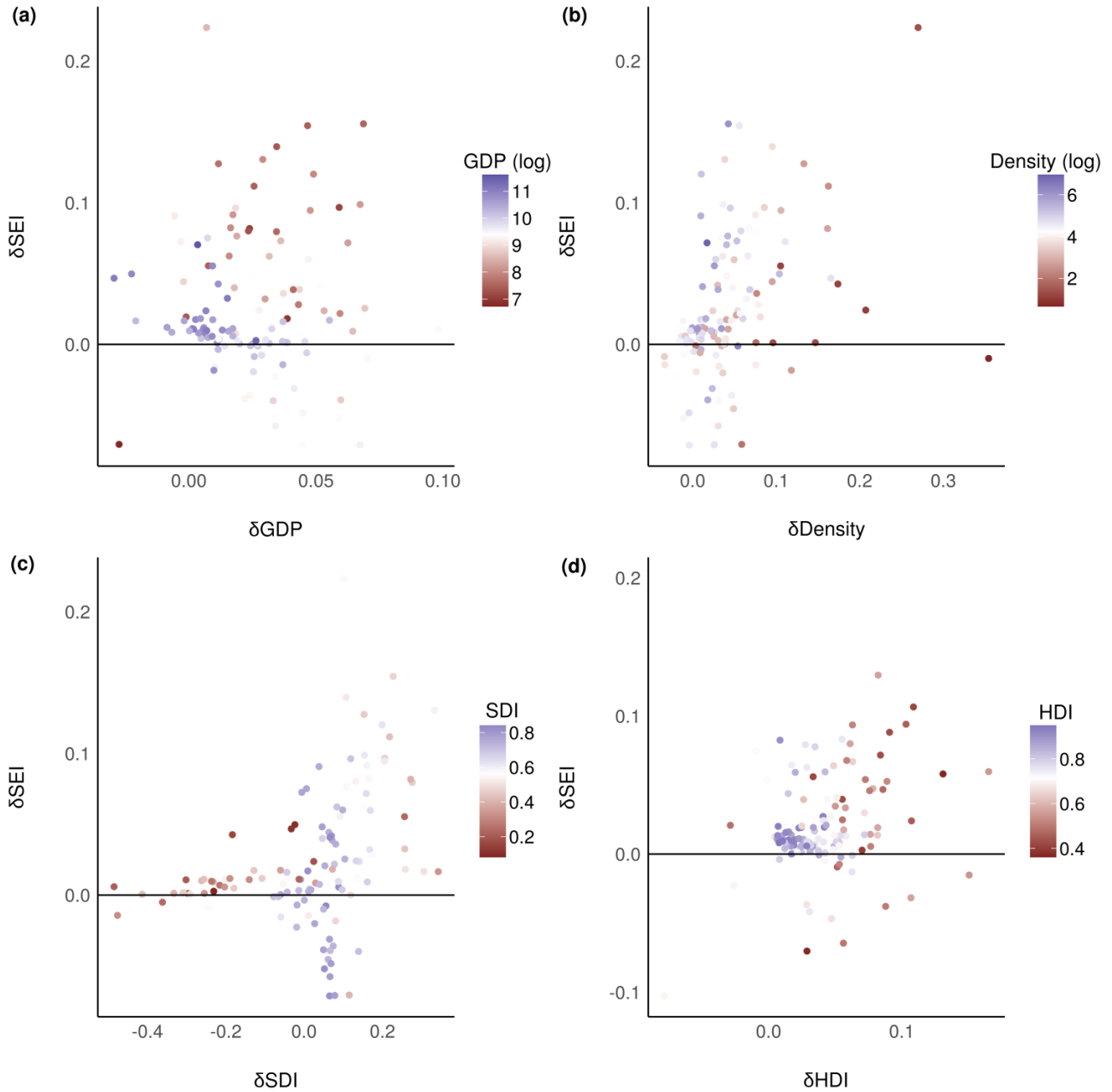


Figure A4.1: Changes in SEI between 2005 and 2015 related to (a) change in GDP, (b) change in population density, (c) change in SDI and (d) change in HDI. The solid horizontal line corresponds to an absence of change in SEI and dot colors show the 2005 value in GDP, population density, SDI or HDI.

The model is constructed as follows (log value for GDP):

$$dSEI = \alpha + \beta_1 GDP_{log} + \beta_2 dGDP_{log} + \gamma GDP_{log} \times dGDP_{log} + \varepsilon$$

with  $\alpha = 0.11 \pm 0.08$ ,  $\beta_1 = -0.01 \pm 0.01$ ,  $\beta_2 = 6.55 \pm 2.59$ ,  $\gamma = -0.75 \pm 0.28$  and  $\varepsilon \sim N(\mu, \sigma^2)$

By definition, the total coefficient of the slope between  $dSEI$  and  $dGDP_{log}$  is  $(\beta_2 + \gamma GDP_{log})$ .  
So  $dSEI(dGDP_{log}) = 0$  when  $GDP_{log} = -\beta_2/\gamma$  therefore  $GDP_{log} = 8.682$  and  $GDP = \text{Int\$ } 5\,897$ .