LETTER

Uncovering Inquirer's schemes

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I statistically prove that Inquirer is lying in this letter. I refute his insane claim that there are 6 Swedes on SC in favour of my own sane claim that there are 2-3 Swedes on SC, at a bayes factor of 185. Moreover, by straightforward analysis, I show that Inq's claims can be generally ruled out at around 95% probability. QED.

Inq's claim is that there are 6 Swedes on the forum. From a statistical point of view, how probable is this?

You know that the probability of retrieving s Swedish people, given N draws and probability of a single draw being Swedish p

$$p(s|N,p) = \frac{N!}{s!(N-s)!} p^s (1-p)^{N-s}. \tag{1}$$

$p = 1/x$ with x being total number of countries with decent Internet access (high school math).

With European countries + US states, there are $50 + 44 = 94$ possible countries/states a new person can come from. One could argue that perhaps only 30 countries/states would be attracted to SC. Let's be lenient and make it 20. Then if x is the number of states, it should be anywhere in the range $x \in [20, 94]$.

The above yields this agnostic country distribution:

$$p(x) = \Theta(20 < x < 94)/\Delta x, \tag{2}$$

where $\Delta x = 94 - 20 = 74$ just normalizes the PMF so that it adds to one.

So how many swedish people should SC have and with what probability? The posterior mass distribution answers this:

$$p(s|N) = \int p(s,p|N)dp\,, \tag{3}$$

$$= \int p(s|N,p)p(p|N)dp\,, \tag{4}$$

$$= \int p(s|N,p)p(x)dx\,, \tag{5}$$

$$= \frac{1}{\Delta x}\int_{20}^{94} \frac{N!}{s!(N-s)!} p^s (1-p)^{N-s} dx \tag{6}$$

where in the last line I substituted in Eqs. 1-2.

As a result, you get an estimate of the number of Swedes on SC, which should be max 3 (Fig. 1) – definitely not 6.

"But Legga, what about the Bayes factor?"
– My dark-haired postdoc, whose nude milky-white female body I occasionally dream of having lying stretched out in bed erotically with me.

I can also compute the Bayes factor. I.e., compare the likelihood that Inq's story is correct (that there are 6 Swedes) vs my story (that

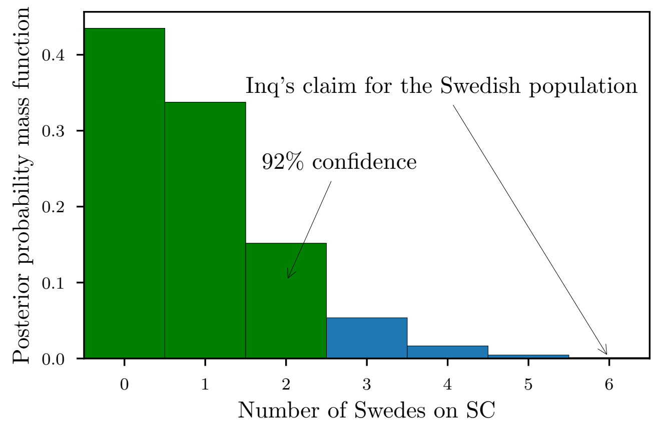

Figure 1 | The expected probability mass function as a function of Swedish members on SC (bars). The green bars are the 92% confidence interval (which means you'd realistically expect 0-2, maybe 3 Swedes). Inquirer claim is that there are 6 Swedes, which seems highly improbable (see that arrow I drew there). Much more likely explanation is that Inq has 3-4 sock puppets.

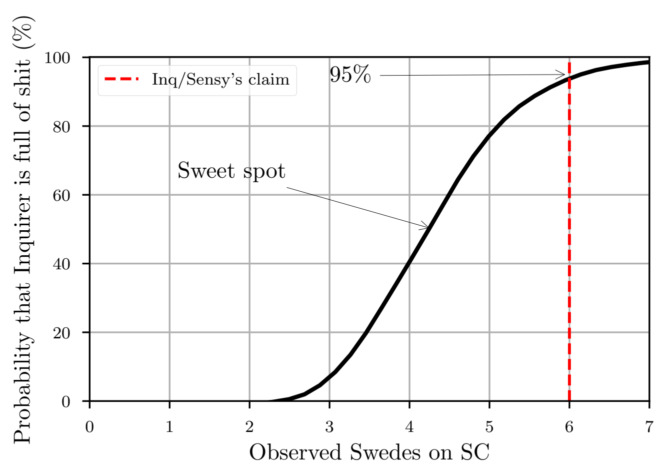

Figure 2 | The probability that Inquirer is full of shit as a function of the number of Swedes on SC. The claimed Swedish population is 6, so Inq is almost 100% full of shit.

there are 2-3 swedes):

$$B^{\text{Legga's sane story}}_{\text{Inquirer's insane story}} = \frac{Z_{\text{Legga's sane story}}}{Z_{\text{Inquirer's BS story}}}, \tag{7}$$

$$= \frac{\int \sum_s \left[p(s,p|N)(\delta(s=2)+\delta(s=3))\right] dp}{\int \sum_s \left[p(s,p|N)(\delta(s=6))\right] dp}, \tag{8}$$

$$\approx 185, \tag{9}$$

In other words, it's **185** times more likely that my theory is correct when compared with Inq's lunacy.

I can also evaluate the probability that there are s members of *any* nationality. The probability for that is unity minus the probability that none has (high school maths),

$$P(s|N) = \frac{1}{\Delta x} \sum_{x=20}^{94} 1 - (1 - p(s|N,p))^x, \tag{10}$$

where I sum over the nuistance parameter and you can solve the missing posterior from Eq. 1 and product rule.

If you take the above minus one, then you get the probability that there can't be given number of swedes (or members of any other country). In plain English it's the probabiliy that Inquirer is full of shit, as a number of observed swedes on SC (Fig. 2).

Although the above is unnecessarily conservative since we're well-justified to focus on the Swedish group (Inq/Sensy were suspicious for other reasons than being Swedish and for much longer than 6 Swedes have been observed on the forum), it still rules out 6 Swedes on SC at above 95% probability.