

Master thesis in physics and economics: Are administrations too big?

Ludvig Lizana[†] and Rikard Eriksson[‡],

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If you give 100 SEK to charity or research foundations, you want as much as possible to go their core activities, right? However, out of every 100 SEK note, as much as 15-25 SEK gets consumed by administration. Where does the money go, and is there a limit for how large administrations can grow without consuming too much resources from their core activities? Perhaps insights from bacterial genetics can give us guidance.

Bacteria have about 1,000-10,000 genes. Although all genes are crucial for the bacteria's life, all cannot be active at the same time. To make sure that the bacteria is working properly – that is turning the right genes on and off at the right time – the bacteria use so-called transcription factor proteins. Connecting to large organisations, these transcription factors are the administrators that help the bacteria with their core activity: running the genes.

But there is a problem. The number of transcription factors grow as the square of the number of genes. So adding a new gene (as bacteria do all the time to increase their competitive advantage), leads to a lot of extra administration that costs a lot of energy, some researchers even speculate that this limits how many genes the bacteria can have.

But what about firms and organisations? How large are their administrations? Are the administrations in some cases even using more resources than their core activities?

As a master student in this project, you will use a data-driven approach to look into these questions. You will have the opportunity to work with a unique data set on the job structure of firms and workplaces in Sweden. To carry out this project successfully, you should have basic programming skills in either matlab, python, javascript, C++, etc.

For any questions, please contact either Ludvig or Rikard.

[†]Institutionen för fysik,
Integrated Science Lab (IceLab)
Umeå Universitet
ludvig.lizana@umu.se

[‡]Department of Geogra-
phy and Economic History,
Umeå Universitet,
rikard.eriksson@umu.se

