

Review of Manuscript: "Power-law and log-normal distributions in firm size displacement data" by A. Ishikawa

The author studied firm size distribution and growth rate distribution using large-scale dataset for income, profit, and sales of firms. In this study author propose to group the quantities for firms into two categories: one is quantities calculated using subtraction, such as income and profit, the other is quantity obtained without using subtraction, such as sales. Pdfs for income and profit are characterized by the log-normal distribution and the power-law tail. The author proved that this functional form is derived theoretically from the detailed balance and the "tent-shape" form empirically known for the growth rate distribution.

The obtained relation was valid for entire region of profit data. Although growth rate distribution for income and profit are characterized by the tent-shape, the distribution for sales is characterized by the wide tail. The author suggested that the wide tail is due to the no-subtraction nature of data by analyzing sales displacement data. Interestingly enough, the growth rate distribution of the sales displacement does not show the wide tail.

A referee would like to recommend this paper for publication in the Economics: The Open-Access, Open-Assessment E-Journal. It is however desired for the author to correspond the following minor revisions;

1. line 3 from the bottom in page 1
"the threshold of which is denoted by x_{th} "

which -> pdf?

2. line 6 from the top in page 2
"in massive amount of digitalized economic data"

digitalized -> digitized?

3. line 10 from the bottom in page 2
"By employing sales, profits and income data of firms, we confirm this suggestion."

suggestion -> proposition?

4. line 8 from the bottom in page 3
"In this section, we review the derivation of Pareto's law and the log-normal distribution from the detailed balance and (Non-)Gibrat's law by employing sales, profits and income data of Japanese firms."
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"In this section, we review the derivation of Pareto's law and the log-normal distribution from the detailed balance and (Non-)Gibrat's law, and confirm the laws by employing data for sales, profits and income data of Japanese firms."

5. line 2 from the top in page 3

"We exclude the negative data, because they are exclusive as profits data."

why is the negative profit exclusive?

6. Eq.(8)

$$R^{-1} P_{1R}(x_2, R^{-1}) \rightarrow R^{-1} P_{2R}(x_2, R^{-1})$$

7. Eq.(11)

$$G'(1)P(x) = xP'(x) \rightarrow G'(1)P(x) = -xP'(x)$$

8. line 5 from bottom in page 4

"This threshold is coincident with the threshold in the Pareto's law."

Why do those thresholds coincide? Is there any theoretical reasoning?

9. caption of Figure 9, Figure 10, Figure 11, and Figure 16

It seems like that the usage of term "cumulative number distribution of ..."

is unfamiliar.

cumulative number distribution of ... \rightarrow cumulative number plot of ...

10. line 1 to 7 from the top in page 5

"In Fig. 9 for the pdf of income, ..."

"In Fig. 10 for the pdf of sales, ..."

"In Fig. 11 for the pdf of profits, ..."

These three plots corresponds to cumulative probability densities except for

normalization factor.

the pdf \rightarrow the cumulative number plot of ...

11. Fig.13

Label of vertical axis

Probability Profit Distribution of Firms \rightarrow Probability Density Function

12. Fig.6, 7, 8, and 14

Label of vertical axis

Probability Density Distribution \rightarrow Probability Density Function