Report on
"Information geometry in portfolio theory"
by Ting-Kam Leonard Wong

The scope of this paper is to survey the recent development in the intersection between the Information Geometry and path-wise analysis in financial mathematics, particularly, known as in the field of Stochastic Portfolio Theory. For it the author provides a good coverage of papers such as [22] [43] [45] [47] [53] [54] in the recent years. Also, the author provides some simpler proofs for results in the references and leads the readers to comprehensive understanding of the subject matter (Theorems 1-5) mostly in the discrete-time, financial modeling. The author also poses an open question towards the end for the continuous-time set up and application of Stochastic Analysis. The reviewer recommends this paper for the Springer book series for Geometric Structure of Information (GSI).

Here are some minor points :

1. In the statement of Proposition 1, the phrase "such that" is repeated twice in one sentence. Probably the author wants to modify it to avoid readers' confusions.

2. In Proposition 2 perhaps it is better to emphasize that it uses the notation of λ-escort.

3. (23) It is better to say that it is the limit as t goes to 0 for the little o notation.

4. In Definition 4 m is not defined well. For example, is it allowed to use $m := \inf\{t : \mu(t) = \mu(0)\}$, that is, if $\mu(t) \neq \mu(0)$ for every $t = 0, 1, 2, \ldots$, is it allowed to use $m = \infty$ in Definition 4 and hence in the following Theorem 4?

5. (45) in the formula
$$g\Big(x + \frac{\delta}{g'(x)}\Big) - g(\nu)$$
$g(\nu)$ must be $g(x)$.

6. Lemma 3 (44) the statement does not specify the domain of the ordinary differential equation. In the end of the proof of Lemma 3, the ordinary differential equation is derived under the implicit assumption $g'(x) > 0$. In the set of $\{x : g'(x) = 0\}$, we have $g'(x) = g''(x) = g'''(x) = 0$. The result does not change the conclusion of Theorem 5.

7. The use of the abbreviated name "AM-GM inequality" might not be so common, and so, it is better to rephrase with the full name.

8. In Theorem 8 insert the space after (iii).