

Accepted Manuscript

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PII: S0377-2217(13)00745-5
DOI: <http://dx.doi.org/10.1016/j.ejor.2013.09.009>
Reference: EOR 11877

To appear in: *European Journal of Operational Research*

Received Date: 31 December 2012

Accepted Date: 9 September 2013

Please cite this article as: Kerstens, K., de Woestyne, I.V., Comparing Malmquist and Hicks-Moorsteen Productivity Indices: Exploring the Impact of Unbalanced vs. Balanced Panel Data, *European Journal of Operational Research* (2013), doi: <http://dx.doi.org/10.1016/j.ejor.2013.09.009>

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Comparing Malmquist and Hicks-Moorsteen
Productivity Indices:
Exploring the Impact of
Unbalanced vs. Balanced Panel Data*

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27 December 2012

Revised 28 July 2013

Abstract

We explore the effect of balancing unbalanced panel data when estimating primal productivity indices using non-parametric frontier estimators. First, we list a series of pseudo-solutions aimed at making an unbalanced panel balanced. Then, we discuss some intermediate solutions (e.g., balancing 2-years by 2 years). Furthermore, we link this problem with a variety of literatures on infeasibilities, statistical inference of non-parametric frontier estimators, and the index theory literature focusing on the dynamics of entry and exit in industries. We then empirically illustrate these issues comparing both Malmquist and Hicks-Moorsteen productivity indices on two data sets. In particular, we test for the differences in distribution when comparing balanced and unbalanced results for a given index and when comparing Malmquist and Hicks-Moorsteen productivity indices for a given type of data set. The latter tests are crucial in answering the question to which extent the Malmquist index can approximate the Hicks-Moorsteen index that has a Total Factor Productivity (TFP) interpretation. Finally, we draw up a list of remaining issues that could benefit from further exploration.

*We are grateful for generous comments offered by three referees. The usual disclaimer applies.

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