

## 基于CAR-DEA方法的环境效率评价研究

卞亦文<sup>1</sup>, 孙瑜峰<sup>1</sup>

1. 上海大学悉尼工商学院, 上海, 201800

## Environmental efficiency evaluation based on CAR-DEA approach

BIAN Yiwen<sup>1</sup>, Sun Yufeng<sup>1</sup>

1. Sydney Institute of Language & Commerce, Shanghai University, Shanghai 201800, China

- 摘要
- 参考文献
- 相关文章

[Download: PDF \(183KB\)](#) | [HTML \(1KB\)](#) | [Export: BibTeX or EndNote \(RIS\)](#) | [Supporting Info](#)

摘要 现有环境效率评价的DEA方法没有考虑多维偏好约束问题, 即不同决策单元对不同期望产出和不期望产出的偏好不同. 以地区为例, 不同地区对GDP、废水和废气赋予的权重偏好各不相同. 在这种情况下, 由于各决策单元的偏好约束不同, 形成多维偏好约束集, 在传统DEA模型中容易出现无可行解现象. 针对这一问题, 基于CAR-DEA方法, 结合保证域理论, 提出一种解决多维偏好约束集问题的环境效率评价模型. 采用中国工业系统的环境效率评价实例对提出的方法进行了分析和说明.

关键词: [数据包络分析](#) [不期望产出](#) [保证域](#) [CAR-DEA](#)

Abstract: The existing environmental efficiency evaluation DEA models have not considered the issue that different decision making units (DMUs) may impose different preferences on different outputs (desirable and undesirable outputs), e.g., different DMUs may value GDP (desirable output), waste water discharge and waste gas emissions differently. This paper aims at addressing this problem. We present a DEA model incorporating desirable outputs and undesirable outputs, which can increase desirable outputs and decrease undesirable outputs simultaneously. To restrict DMUs' different preferences on outputs, we then extend the model by incorporating multiple sets AR constraints based on Context-Dependent Assurance Regions DEA approach (CAR-DEA) in recent DEA literature. An application of 30 regions in China with real data set is used to illustrate the proposed approach.

Keywords: [data envelopment analysis](#), [undesirable outputs](#), [assurance region](#), [CAR-DEA](#)

通讯作者 卞亦文

引用本文:


卞亦文, 孙瑜峰. 基于CAR-DEA方法的环境效率评价研究[J]. 运筹学学报, 2012, V16(2): 41-50


BIAN Yi-Wen, Sun-Yu-Feng. Environmental efficiency evaluation based on CAR-DEA approach[J]. OR TRANSACTIONS, 2012, V16(2): 41-50


链接本文:


[http://202.120.127.195/shu\\_ycxxb/CN/](http://202.120.127.195/shu_ycxxb/CN/) 或 [http://202.120.127.195/shu\\_ycxxb/CN/Y2012/V16/I2/41](http://202.120.127.195/shu_ycxxb/CN/Y2012/V16/I2/41)

[1] Zhang B, Bi J, Fan Z, et al. Eco-efficiency analysis of industrial system in China: A data envelopment analysis approach [J]. Ecological Economics, 2008, 68: 306-316.

[2] Charnes A, Cooper W W, Rhodes E. Measuring the efficiency of decision making units [J]. European Journal of Operational Research, 1978, 2: 429-444. 

[3] Banker R D, Charnes A, Cooper W W. Some models for estimating technical and scale inefficiencies in data envelopment analysis [J]. Management Science, 1984, 30: 1078-1092. 

[4] Zhou P, Ang B W, Poh K L. A survey of data envelopment analysis in energy and environment studies [J]. European Journal of Operational Research, 2008, 189: 1-18. 












[5] Fare R, Grosskopf S, Lovell C A K, et al. Multilateral productivity comparisons when some outputs are undesirable: a nonparametric approach [J]. The Review of Economics and Statistics, 1989, 71: 90-98. 

### Service

- ▶ [把本文推荐给朋友](#)
- ▶ [加入我的书架](#)
- ▶ [加入引用管理器](#)
- ▶ [Email Alert](#)
- ▶ [RSS](#)

### 作者相关文章

- ▶ [卞亦文](#)
- ▶ [孙瑜峰](#)

- [6] Scheel H. Undesirable outputs in efficiency valuations [J]. *European Journal of Operational Research*, 2001, 132: 400-410. 
- [7] Seiford L M, Zhu J. Modeling undesirable factors in efficiency evaluation [J]. *European Journal of Operational Research*, 2002, 142: 16-20. 
- [8] Fare R, Grosskopf S. Modeling undesirable factors in efficiency evaluation: Comment [J]. *European Journal of Operational Research*, 2004, 157: 242-245. 
- [9] Vencheh A H, Matin R K, Kajani M T. Undesirable factors in efficiency measurement [J]. *Applied Mathematics and Computation*, 2005, 163: 547-552. 
- [10] Thompson R G, Langemeier L N, Lee C T, et al. The role of multiplier bounds in efficiency analysis with application to Kansas farming [J]. *Journal of Econometrics*, 1990, 46: 93-108. 
- [11] Zhu J. DEA/AR analysis of the 1988-1989 performance of the Nanjing Textile Cooperation [J]. *Annals of Operations Research*, 1996, 66: 311-335. 
- [12] Cook W D, Zhu J. CAR-DEA: Context-Dependent Assurance Regions in DEA [J]. *Operations Research*, 2008, 56: 69-78. 
- [13] Liang L, Li Y, Li S. Increasing the discriminatory power of DEA in the presence of the undesirable outputs and large dimensionality of data sets with PCA [J]. *Expert Systems with Applications*, 2009, 36: 5895-5899. 
- [14] Chung Y H, Fare R, Grosskopf S. Productivity and undesirable outputs: A directional distance function approach [J]. *Journal of Environmental Management*, 1997, 51: 229-240. 
- [15] Kordrostami S, Amirteimoori A. Un-desirable factors in multi-component performance measurement [J]. *Applied Mathematics and Computation*, 2005, 171: 721-729. 
- [16] Hua Z, Bian Y. Performance measurement for network DEA with undesirable factors [J]. *International Journal of Management and Decision Making*, 2008, 9: 141-152. 

没有找到本文相关文献