

REFERENCES

- ABDULAI, S., DONKOH, S. A., & SIENSO, G. (2011). Technical efficiency of groundnut production in West Mamprusi District of Northern Ghana. *Journal of Agriculture and Biological Sciences*, 2(4), 071-077. <http://udsspace.uds.edu.gh/jspui/handle/123456789/2083>
- ABDULAI, S., NKEGBE, P. K., & DONKOH, S. A. (2013). Technical efficiency of maize production in Northern Ghana. *African Journal of Agricultural Research*, 8(43), 5251-5259. <https://doi.org/10.5897/AJAR2013.7753>.
- ABDULAI, S., NKEGBE, P. K., & DONKOH, S. A. (2017). Assessing economic efficiency of maize production in Northern Ghana. *Ghana Journal of Development Studies*, 14(1), 123-145. <http://dx.doi.org/10.4314/gjds.v14i1.7>.
- ABDULAI, S., NKEGBE, P. K., & DONKOH, S. A. (2018). Assessing the technical efficiency of maize production in northern Ghana: The data envelopment analysis approach. *Cogent Food & Agriculture*, 4(1), 1512390. <https://doi.org/10.1080/23311932.2018.1512390>.
- AHMADU, J., & ALUFOHAI, G. O. (2012). Estimation of Technical Efficiency of Irrigated Rice Farmers in Niger State, Nigeria. *American-Eurasian Journal of Agricultural and Environmental Sciences*, 12(12): 1610-1616. <http://dx.doi.org/10.5829/idosi.aejaes.2012.12.12.1918>.
- AKPALU, W., ALNAA, S. E., & AGLOBITSE, P. B. (2012). Access to microfinance and intra household business decision making: Implication for efficiency of female owned enterprises in Ghana. *The Journal of Socio-Economics*, 41(2012) 513-518. <http://dx.doi.org/10.1016/j.soccec.2012.04.020>.
- ANANG, B. T., BÄCKMAN S., & REZITIS, A. (2017). Production technology and technical efficiency: irrigated and rain-fed rice farms. *Eurasian Economic Review*, 7(1): 795-113. <http://dx.doi.org/10.1007/s40822-016-0060-y>
- ANANG, B. T., BÄCKMAN, S., & SIPILÄINEN, T. (2016). Agricultural microcredit and technical efficiency: The case of smallholder rice farmers in Northern Ghana. *Journal of Agriculture and Rural Development in the Tropics and Subtropics*, 117(2), 189-202. <https://www.jarts.info/index.php/jarts/article/view/2016061350415/882>.
- ASANTE, B. O., ENNIN, S. A., OSEI-ADU, J., ASUMADU, H., ADEGBIDI, A., SAHO, M., & NANTOUME H. (2018). Performance of integrated crop-small ruminant production systems in West Africa. *Agroforestry Systems* 1-11. <http://dx.doi.org/10.1007/s10457-018-0196-8>.
- ASANTE, B. O., VILLANO, R. A., & BATTESE, G. E. (2014). The effect of the adoption of yam miniset technology on the technical efficiency of yam farmers in the forest-savanna transition zone of Ghana. *African Journal of Agricultural and Resource Economics*, 9(311-2016-5576), 75-90. <http://www.afjare.org/vol-9-no-2.php>.
- BANKER, R. D., & NATARAJAN, R. (2008). Evaluating contextual variables affecting productivity using data envelopment analysis. *Operations research*, 56(1), 48-58. <https://www.jstor.org/stable/pdf/25147166.pdf>.
- BANKER, R., NATARAJAN, R., & ZHANG, D. (2019). Two-stage estimation of the impact of contextual variables in stochastic frontier production function models using Data Envelopment Analysis: Second stage OLS versus bootstrap approaches, *European Journal of Operational Research*, 278(2) 368-384. <https://doi.org/10.1016/j.ejor.2018.10.050>.
- CAZALS, C., FLORENS, J. P., & SIMAR, L. (2002). Nonparametric frontier estimation: a robust approach, *Journal of Econometrics*, 106(1), 1-25. [http://www.sciencedirect.com/science/article/pii/S03044076\(01\)00080-X](http://www.sciencedirect.com/science/article/pii/S03044076(01)00080-X).
- CHAKURI, D. (2018). Technical Efficiency Analysis of Groundnut Production in Ghana: A Bayesian Approach (MPhil dissertation, University of Ghana). <http://ugspace.ug.edu.gh/handle/123456789/29132>.
- CHAMBERLIN, J. (2007). Defining Smallholder Agriculture in Ghana: Who are smallholders, what do they do and how are they linked with markets? Ghana Strategy Support Program (GSSP). Background Paper No. GSSP0006, available at http://www.ifpri.org/sites/default/files/publications/gssp_wp06.pdf. Accessed 3 June 2020.
- CHORTAREAS, G. E., GIRARDONE, C., & VENTOURI, A. (2013). Financial freedom and bank efficiency: Evidence from the European Union. *Journal of Banking and Finance*, 37(4), 1223-1231. <http://dx.doi.org/10.1016/j.jbankfin.2012.11.015>.
- COELLI, T., RAHMAN, S., & THIRTLE, C. (2002). Technical, allocative, cost and scale efficiencies in Bangladesh rice production: a non-parametric approach. *Journal of Agricultural Economics*, 53(3), 607-626. <https://doi.org/10.1111/j.1477-9552.2002.tb00040.x>.
- DANSO-ABBEAM, G., DAHAMANI, A. M., & BAWA, G. A. (2015). Resource-use-efficiency among smallholder groundnut farmers in Northern Region, Ghana. *Journal of Experimental Agriculture International*, 290-304. DOI: <https://doi.org/10.9734/AJEA/2015/14924>.
- DANSO-ABBEAM, G., EHIAKPOR, D. S., & AIDOO, R. (2018). Agricultural extension and its effects on farm productivity and income: insight from Northern Ghana. *Agriculture and Food Security*, 7(1), 1-10. <https://doi.org/10.1186/s40066-018-0225-x>.
- DASSA, A. R., LEMU, B. E., MOHAMMAD, J. H., & DADI, K. B. (2019). Vegetable Production Efficiency of Smallholders' Farmer in West Shewa Zone of Oromia National Regional State, Ethiopia. *American International Journal of Agricultural Studies*, 2(1), 39-51. <https://doi.org/10.46545/aijas.v2i1.112>.
- DIAO, X. (2010). Economic importance of agriculture for sustainable development and poverty reduction: Findings from a case study of Ghana. Global Forum on Agriculture, 29-30 November 2010. Policies for Agricultural Development, Poverty Reduction and Food Security, OECD Headquarters, Paris. Available at <http://www.oecd.org/agriculture/agricultural-policies/46341169.pdf>. Accessed 5 July 2020.
- FØRSUND, F., & SARAFLOU, N. (2005). The tale of two research communities: the diffusion of research on

- productive efficiency. *International Journal of Production Economics*, 98, 17-40. <http://hdl.handle.net/10419/63168>.
- FRAGKIADAKIS, G., DOUMPOS, M., ZOPOUNIDIS, C., & GERMAIN, C. (2016). Operational and economic efficiency analysis of public hospitals in Greece. *Annals of Operations Research*, 247(2): 787-806. <https://doi.org/10.1007/s10479-014-1710-7>.
- HOFF, A. (2007). Second stage DEA: Comparison of approaches for modelling the DEA score. *European Journal of Operational Research*, 181(2007) 425-435. <https://doi.org/10.1016/j.ejor.2006.05.019>.
- ISSER. (2006). The State of the Ghanaian Economy 2005. Institute of Statistical, Social and Economic Research (ISSER). Legon, Accra: University of Ghana.
- JOHNSON, A. L., & TIMO KUOSMANEN, T. (2012). One-stage and two-stage DEA estimation of the effects of contextual variables. *European Journal of Operational Research*, 220(2012): 559-570. <https://doi.org/10.1016/j.ejor.2012.01.023>.
- KUTLAR, A., KABASAKAL, A., & SARIKAYA, M. (2013). Determination of the efficiency of the world railway companies by method of DEA and comparison of their efficiency by Tobit analysis. *Quality and Quantity*, 47(6): 3575-3602. <https://doi.org/10.1007/s11135-012-9741-0>.
- MCDONALD, J. (2009). Using Least Squares and Tobit in second stage DEA efficiency analyses. *European Journal of Operational Research*, 197, 792-798. <https://doi.org/10.1016/j.ejor.2008.07.039>.
- NKEGBE, P. K. (2018). Credit access and technical efficiency of smallholder farmers in Northern Ghana: Double bootstrap DEA approach. *Agricultural Finance Review*, 78(5), 626-639. <https://doi.org/10.1108/AFR-03-2018-0018>.
- ONUMAH, E. E., BRÜMMER, B., & HÖRSTGENSCHWARK G, 2010. Elements which delimitate technical efficiency of fish farms in Ghana. *Journal of the World Aquaculture Society*, 41(4), 506-518. <https://onlinelibrary.wiley.com/doi/pdf/10.1111/j.1749-7345.2010.00391.x>.
- RAHMAN, K. M. M., MIA M. I., & ALAM M. A. (2012). Farm-Size-Specific Technical Efficiency: A Stochastic Frontier Analysis for Rice Growers in Bangladesh. *Bangladesh Journal of Agricultural Economics*, XXXV 1&2 (2012), 131-142. <https://ageconsearch.umn.edu/record/196769/files/Rahman%20et%20al.pdf>.
- SHAHEEN, S., SIAL M. H., SARWAR G., & MUNIR R. (2011). Nexus between human capital and technical efficiency of cauliflower growers in Soon valley, Punjab: a panel data analysis. *International Journal of Humanities and Social Science*, 1(14), 129-135. https://nanopdf.com/download/5b00901b4844d_pdf#.
- SIMAR, L., & WILSON, P. W. (1998). Sensitivity analysis of efficiency scores: how to bootstrap in nonparametric frontier models. *Management Science*, 44 (1): 49-61. <https://www.jstor.org/stable/pdf/2634426.pdf>.
- SIMAR, L., & WILSON, P. W. (2000). A General Methodology for Bootstrapping in Non-parametric Frontier Models. *Journal of Applied Statistics*, 27(6): 779-802. <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.469.4286&rep=rep1&type=pdf>.
- SIMAR, L., & WILSON, P. W. (2007). Estimation and inference in two-stage, semi-parametric models of production processes. *Journal of Econometrics*, 136 (1), 31-64. https://dial.uclouvain.be/pr/boreal/object/boreal%3A122906/datastream/PDF_01/view.
- SIMAR, L., & WILSON, P. W. (2011). Two-stage DEA: caveat emptor. *Journal of Productivity Analysis*, 36(2), 205. <https://www.jstor.org/stable/pdf/23883838.pdf>.
- URDIALES, M. P., LANSINK, A. O., & WALL, A. (2016). Eco-efficiency among dairy farmers: the importance of socio-economic characteristics and farmer attitudes. *Environmental and Resource Economics*, 64(4): 559-574. <https://link.springer.com/article/10.1007/s10640-015-9885-1>.
- VARASANI, J. V., SHIYANI, R. L., DHANDHALYA, M. G., & TARAPARA, V. D. (2017). Technical Efficiency of Groundnut Production in Saurashtra Region of Gujarat – A Translog Stochastic Frontier Approach. *Indian Journal of Economics and Development*, 13(3), 500-506. <http://dx.doi.org/10.5958/2322-0430.2017.00207.4>.
- YOU, H., & ZHANG, X. (2016). Ecoefficiency of Intensive Agricultural Production and Its Influencing Factors in China: An Application of DEA-Tobit Analysis. *Discrete Dynamics in Nature and Society*, 2016, 1-14. <http://dx.doi.org/10.1155/2016/4786090>.