

## FACTOR DEMANDS OF LOUISIANA RICE PRODUCERS: AN ECONOMETRIC INVESTIGATION: REPLY

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Baffes presents three criticisms of our recent article (McLean-Meynsse and Okunade, December 1988 *SJAE*) on factor demands of Louisiana rice producers. He argues that (1) "it looks" as if we have estimated a mixture of Generalized Leontief (GL) and Translog (TL) functional forms; (2) our estimates of factor demand elasticities indicate the implied functional form is not flexible at all; and (3) it is unclear why we explored the 3SLS in our initial estimation. According to Baffes, these criticisms make our conclusions "wrong and thus misleading when related to policy matters." In what follows, we address each of his criticisms in turn to demonstrate how Baffes' emphatic conclusion about our analysis is grossly misplaced.

First, Baffes objects to our joint system estimation of the GL parent cost function and four of the five explicitly measured factor cost share equations (with Hicks symmetry  $\beta_{ij} = \beta_{ji}$ ,  $i \neq j$  imposed). Agreeably, estimability of a multi-factor TL system (with linear homogeneity in input prices condition) requires the dropping of one factor share equation. However, we found similar estimability condition to hold for our rice production data using the GL specification as the divisia price and quantity indexes we utilized in estimation were derived by first constructing factor shares (McLean-Meynsse and Okunade, p. 130) and then expressing the data in input-output ratios (p. 131).

Assume for the moment (as Baffes claims) that we estimated a hybrid of TL and GL; call it TL-GL. Granted that each of TL and GL is generalized flexible, the transitivity condition requires their admixture (that is, TL-GL) to at least inherit the flexibility properties of its nested forms. Thus, by duality theory, we expect the TL-GL cost function to provide an adequate representation of the underlying

technology of rice producers. More specifically, several of the theoretical properties of the GL and TL are similar; both are Diewert flexible, are amenable to the single-step Taylor-series numerical optimization method for differential equations, and have the same approximate separability conditions (Thompson, pp. 171-173). Therefore, the TL-GL functional form can be expected to inherit these theoretical properties at the mean point of expansion. While the TL-GL mixed functional form has not yet been explicitly investigated (in our paper or elsewhere), mixtures of functional forms and their nested degenerates can be derived under specific parametric conditions (Chalfant and Gallant, p. 214). Pollack et al. (p. 602) recently derived the CES-Translog, a hybrid of CES and TL, and found it to be significantly superior to the CES and TL using eight test data sets. Therefore, the GL-TL mixture would tend to be more flexible than either of its nested (GL, TL) forms.

Second, Baffes' "cursory inspection" of our reported elasticities (McLean-Meynsse and Okunade, Table 1, p. 132) reveals that  $\sum_i \eta_{ij} = \sum_j \eta_{ij} = 0$  and  $\eta_{ij} = \eta_{ji}$ . He takes this to imply a functional form that is not at all flexible. We disagree by arguing in two dimensions. First, it is customary to estimate the GL system with the symmetry restriction imposed; as recognized by Baffes himself. Therefore, we see no legitimate basis for his criticism of the  $\eta_{ij} = \eta_{ji}$  symmetry condition. Second, Baffes missed one very salient point in footnote "c" of our Table 1, namely, that the elasticity estimates involving the miscellaneous inputs category are implied values, having been derived under the homogeneity of degree one in input prices condition. With these implied estimates for the miscellaneous inputs category, the condition  $\sum_i \eta_{ij} = \sum_j \eta_{ij} = 0$  must hold.

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Third, Baffes is unclear as to why we experimented with the 3SLS procedure in our initial estimation. It is not uncommon to investigate and present limited discussions on feasible alternative estimation procedures that were attempted to preserve parameter invariance (Berndt and Wood, p. 261). More importantly, we explicitly stated in our paper (p. 131) that the reported estimates were derived through an iterative 3SLS procedure, which is equivalent to Zellner's SURE.

The purpose of this rejoinder is to show that: (1) we did not estimate a mixture of GL and TL, and even if we assume for the moment that we did, the mixed GL-TL functional form is both flexible and consistent with the mean value theorem; (2) Baffes missed a very cru-

cial footnote to our Table 1, leading him to the erroneous remark that we estimated an inflexible functional form; and (3) the parameter estimates we reported were obtained from an iterative 3SLS procedure. Thus, there is no logical basis to concur with any of the criticisms of our paper by Baffes. Specifically, our reported empirical results remain tenable as we already documented that the fitted GL cost function and factor demands are well behaved and, hence, by Shephard duality correspond to that of a smooth underlying producer technology (p. 131, column 2). In conclusion, the inconsistency between our theoretical model and empirical results alleged by Baffes is unwarranted and is, at best, illusionary.

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