

market as  $\sum q_{ht}p'_{ha}$  and  $\sum q_{hb}p'_{ha}$  in  $t$  and  $b$ , respectively. Then the following INE can be compiled in ELINT:

$$\frac{\sum (q_{ht}p'_{ha}) \frac{p_{ht}}{p_{ha}} / \sum q_{ht}p'_{ha}}{\sum (q_{hb}p'_{ha}) \frac{p_{hb}}{p_{ha}} / \sum q_{hb}p'_{ha}} \times \frac{\sum (q_{ht}p'_{ha})}{\sum (q_{hb}p'_{ha})} = \frac{\sum (q_{ht}p'_{ha}) \frac{p_{ht}}{p_{ha}}}{\sum (q_{hb}p'_{ha}) \frac{p_{hb}}{p_{ha}}} \quad (3)$$

with  $t=0, 1, \dots, T$  and  $U(E_a)$  as reference collective of (3). This is the Third Fundamental Equation of ELINT,  $F_3^1$ .

### 5. SOME ALGEBRAIC PROPERTIES OF FUNDAMENTALS $F_2$ AND $F_3$ : A COMPARISON

As already established, the appropriate type of collective to model a multi-commodity market with stable  $q$ -structure is a  $C_a$ -type collective.

Such collectives characteristically display a distribution whose whole mass is concentrated in the point of the average price and thus there is no possibility for change in the distribution's form over time. Consequently, the index number formulae in an  $F_2$  equation, particularly the price INF, has no other possibility than to express the Fisherian properties of: (i) identity, (ii) proportionality, and (iii) mean value.

If the market doesn't meet the condition of  $q$ -stability, then a feasible alternative is to turn to an  $E_a$ -type utility collective for modeling the market. However, that type of collectives presents a flexible distribution with changing form over time. Consequently,  $E_a$ -collectives fail to express the properties characteristic of  $C_a$ -collectives. But remarkably, and to the surprise of Fisherians like, e.g., Balk (1985, p. 87), the requirement for transitivity still holds in indices of  $E_a$ -collectives. This strange behavior of indices referring to that type of collectives can be illustrated on a simple numerical example.

For three successive years the prices of commodities  $A$  and  $B$  have remained the same: 1, 1, 1 and 3, 3, 3 while the corresponding quantities changed: 1, 2, 3 and

<sup>1</sup> The price index formula in this equation may be referred hereafter as the "elementary utility unit price index formula" which is a far more adequate denotation than the "Paasche price index formula". Besides, as it is seen from the appearance of  $F_3$ , constant prices can appear not only in the volume index formula but in the price index formula as well – a fact that has been overlooked by writers on national accounting issues. We shall return to the matter in section 6 (see equation 7a), and in section 8.