Table 1

Definitions of Monetary Services Indexes, User Costs, and Related Indexes

Index	Formula
A. Monetary Services Indexes and User Costs	
Total expenditure on monetary assets	$y_t = \sum_{i=1}^{n} \pi_{it}^{real} m_{it}^{nom}$
Nominal Törnqvist-Theil monetary services index	$MSI_t^{nom} = MSI_{t-1}^{nom} \prod_{i=1}^{n} \left(\frac{m_{it}^{nom}}{m_{i,t-1}^{nom}} \right)^{\overline{w}_{it}}$, where $\overline{w}_{it} = \left(w_{it} + w_{i,t-1}\right)/2$
Real dual user cost index (This index is dual to the nominal Törnqvist-Theil monetary services index, that is, MSI_t^{nom} and Π_t^{real} satisfy the Fisher weak factor reversal criterion.)	$\Pi_t^{real} = \Pi_{t-1}^{real} \left(\frac{y_t / y_{t-1}}{MSI_t^{nom} / MSI_{t-1}^{nom}} \right)$
Currency equivalent index [a]	$CE_t = \left(\frac{1 + R_t}{R_t} \right) \sum_{i=1}^{n} \pi_{it}^{real} m_{it}^{nom}$
Simple sum index	$SS_t = \sum_{i=1}^{n} m_{it}^{nom}$
B. Divisia Second Moments and Related Indexes [b]	
Real Törnqvist-Theil user cost index (This index is not dual to the nominal Törnqvist-Theil monetary services index.)	$UC_t^{real} = UC_{t-1}^{real} \prod_{i=1}^{n} \left(\frac{\pi_{it}^{real}}{\pi_{i,t-1}^{real}} \right)^{\overline{w}_{it}}$
Törnqvist-Theil expenditure share index[c]	$S_t = S_{t-1} \prod_{i-1}^{n} \left(\frac{w_{it}}{w_{i,t-1}} \right)^{\overline{w}_{it}}$
Divisia quantity–growth rate variance	$K_t = \sum_{i=1}^{n} \overline{w}_{it} \left[\Delta \log\left(m_{it}^{nom}\right) - \Delta \log\left(MSI_t^{nom}\right) \right]^2$
Divisia user cost–growth rate variance	$J_t = \sum_{i=1}^{n} \overline{w}_{it} \left[\Delta \log\left(\pi_{it}^{real}\right) - \Delta \log\left(UC_t^{real}\right) \right]^2$
Divisia expenditure-share growth-rate variance	$\Psi_t = \sum_{i=1}^{n} \overline{w}_{it} \left[\Delta \log\left(w_{it}\right) - \Delta \log\left(S_t\right) \right]^2$

Covariance of Divisia quantity growth rate and user-cost growth rate [c]	$\Gamma_t = \frac{(\Psi_t - K_t - J_t)}{2}$

[a] The standard formula is $CE_t = \sum_{i=1}^{n} \frac{R_t - r_{it}}{R_t} m_{it}^{nom}$ (Rotemberg, Driscoll, and Poterba, 1995). We use the modified formula shown above for technical reasons that are discussed in the section of this paper titled "Unilateral Sub-Indexes."

[b] For discussions of these indexes, see Theil (1967); Barnett and Serletis (1990); Barnett, Jones, and Nesmith (1996); and Anderson, Jones, and Nesmith (1997).

[c] This covariance also may be written as (Theil, 1967)

$$\Gamma_t = \sum_{i=1}^{n} \overline{w}_{it} \left[\Delta log\left(\pi_{it}^{real}\right) - \Delta log\left(UC_t^{real}\right) \right] * \left[\Delta log\left(m_{it}^{nom}\right) - \Delta log\left(MSI_t^{nom}\right) \right].$$