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A simple way to capture transaction balances

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Abstract

We try to capture transaction balances within a quantity theoretic framework. We apply it to different euro area countries and the euro area as a whole and find that, overall, only one third of currency holdings are held for transaction purposes.

Keywords: Currency; Cash; Transaction balances; Inflation

JEL classification: C32; E43; E47

1. Introduction

The stock of currency used for domestic transactions is not directly known as some portion is held for hoarding purposes or outside the currency area (Rogoff, 1998, Snellman et al., 2000). In this paper, we present one simple indirect method to capture the stock of currency held for domestic transaction purposes, separating it from other motives of holding cash. This is of interest, especially to central banks, as domestic aggregate demand and price developments might be closely related to the development of currency used for domestic transactions. The method tries to find the share of currency within general money holdings that optimises a simple bivariate inflation equation for forecasting inflation. We exemplify the method with euro area data.

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2. A best-fit approach

According to quantity theoretical considerations, domestic price developments should be closely related to monetary developments at home. Accordingly, the amount and development of currency used for domestic transactions should be narrowly connected with domestic price developments, implying, in turn, that inflation developments might be informative for determining the share of currency used for domestic transactions. One natural candidate for overall domestic transaction balances is narrow M1 which usually consists of currency in circulation outside the banking system and overnight deposits. Unfortunately, the stock of cash used for transactions within the currency area is not known as some portion is probably held outside the country (e.g. Köhler et al., 2004; Porter and Judson, 1996) and some portion of domestically held currency is not held for (official) transaction purposes (e.g. Rogoff, 1998, Snellman et al., 2000).

Having all these in mind, we determine the average amount of currency held for domestic transaction balances by a grid search with quarterly euro area data from 1980 to 2000.[1] Consider the forecasts of inflation using the following linear bivariate model[2]

$$\pi_{t+i} = \alpha + \beta(L)\pi_t + \gamma(L)\cdot(od_t + \theta\cdot cu_t) + \chi time_t + \varepsilon_{t+1}, \tag{1}$$

where $\pi_t = ln(p_t/p_{t-1})$ is the annualized quarterly inflation rate measured by the Harmonised Index of Consumer Prices (HICP) or the GDP deflator, respectively, *cu* are nominal cash balances, *od* are overnight deposits, $\beta(L)$ and $\gamma(L)$ are polynomials in the lag operator L, time is a deterministic time trend, i is the forecast horizon and ε is the white-noise residual. To capture domestic transaction balances we use the parameter θ. Its unknown value measures the constant proportion of currency used for domestic transactions. It is added to overnight deposits to establish the total available transaction balances at home.[3] All that is initially known about θ is that $0 \le \theta \le 1$. For $\theta = 0$, cash is irrelevant for domestic transactions; for $\theta = 1$, all cash is used for transactions within the euro area. An attempt is made to establish the value $\theta = \theta^*$ for which Eq. (1) yields the best fit. For this purpose, we let θ move in steps of 0.01 between 0 and 1 and determine the maximum of the log likelihood function (LL).[4] The domestic portion θ^* is determined from the maximum of LL. $(1-\theta^*)$ is equivalent to the share of cash balances used for other motives.[5]

Chart 1 shows the log likelihood function for the euro area as a whole. It reaches its maximum at $\theta^* = 0.35$. This means that 35% of the euro area currencies are held for transaction

[1] We exclude the years after 2001 due to the approaching cash changeover to the euro and the adjustments which took place since 2002.

[2] This methodology to assess the potential leading indicators for inflation was applied to the euro area by Nicoletti Altimari (2001). However, he does not consider currency in circulation.

[3] As we are mainly interested in estimating transaction balances in cash we add the total of overnight deposits. These only include holdings of euro area residents at euro area banks, i.e. no holdings abroad. Moreover, there are no indications (at least in the sample considered) that overnight deposits are used for other purposes than official transactions (e.g. underground activities or hoarding).

[4] LL is defined as $\mathrm{LL} = \frac{N}{2} + \left(\frac{N}{2}\right)\log(2\pi) + \left(\frac{N}{2}\right)\log\left(\frac{\mathrm{SSR}}{N}\right)$, where N is the number of observations and SSR the sum of squared residuals.

[5] In estimating Eq. (1) we relate the levels of π and *cu* which are both $I(1)$ over the sample period considered. This is in line with trying to establish a long-run (cointegration) relationship.