Discussion

of

"The Role of Monetary Aggregates in the Policy Analysis of the Swiss National Bank" by Gebhard Kirchgässner and Jürgen Wolters

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In this interesting paper, Gebhard Kirchgässner and Jürgen Wolters present econometric results on the stability of money demand and the relationship between money and inflation in Switzerland. The authors then use these results to forecast an inflation rate of 2.5% for 2010, followed by a decrease in the next two years. This sharply contrasts with SNB consensus forecasts, which point to very low inflation (0.4%) in 2010, followed by a slight increase[1]. The information from monetary aggregates thus seems to provide a rather different message from the suite of models used to establish the SNB consensus forecasts.

This discussion focuses on the assessment of the authors' analysis from the point of view of the use of monetary aggregates for monetary policy analysis. Given space constraints, I focus on the perceived weaknesses of the paper. I first discuss the sample choice, then the money demand analysis, and finally the way policy-relevant information should be extracted from monetary aggregates. Accounting for these weaknesses leads to forecasts which are in line with SNB consensus forecasts, in contrast to the authors' forecasts.

First, the authors restrict their estimation to the 1983–2009 period. After the beginning of the floating exchange rate regime in the early 1970s, Switzerland has experienced two inflationary episodes, one in the early 1980s and one in the early 1990s; both episodes have been preceded by strong money growth. The main value added of money is to predict medium-term substantial inflation

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1 See the June 2009 SNB Monetary Policy Report, corresponding to the data used by authors (with last observations in 2009 Q1). SNB forecasts are point forecasts computed at a constant interest rate, in contrast to the cumulative and unconditional forecasts of the paper. However there should be no significant difference at a one-year horizon, and the authors' forecasts display an opposite evolution in subsequent years, i.e. decreasing instead of increasing inflation rates.

fluctuations. For a study which aims at understanding the relationship between money and inflation, starting in 1983 in fact disregards half of the interesting observations. There is a related tendency nowadays to estimate or calibrate models based primarily on the recent low inflation period. However, if we cannot explain past inflationary episodes with current models, the latter are of not much use for policymakers who want to avoid drifting away from price stability. Restricting the sample in this way also significantly alters the results, as discussed below.

Second, in their money demand estimation, the authors find a unit income elasticity for M3. They further strongly reject a unit income elasticity for M2 and characterize M2 movements in early 2009, when monetary aggregates started to grow fast, as unusual. I will consider now these three claims.

A unit income elasticity for M3 is different from the 1.3 estimate found by Jordan, Peytrignet and Rich (2001), which affects the measure of excess money. M3 estimated income elasticity is very sensitive to the sample used; Swiss and euro area studies have found very different values.[2] An issue is that M3 includes time deposits (i.e. bond substitutes) which are sensitive to financial market developments. In contrast, aggregates like M2 which are meant to represent assets yielding transaction services have a closer and more stable link with GDP.[3]

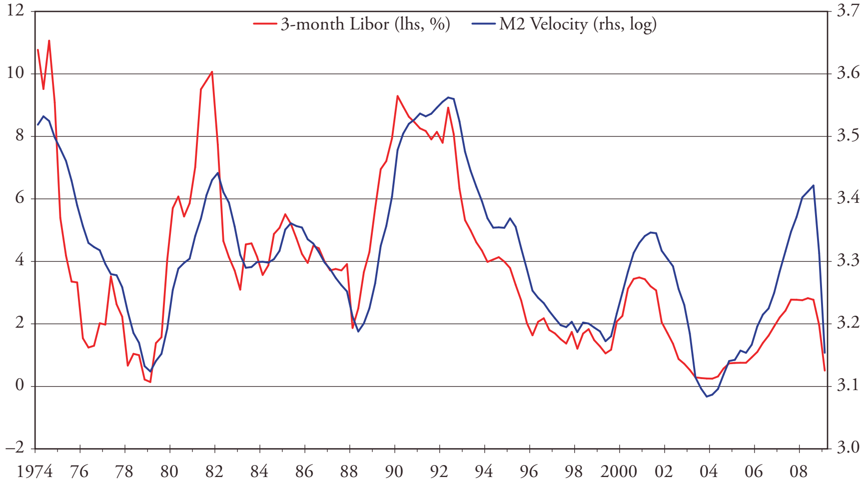
The authors strongly reject a unit income elasticity for M2, based on the 1983–2008 sample. However, expanding the sample to include the 1970s yields a unit income elasticity and a lower interest rate elasticity than what the authors find. Moreover Figure 1 shows that M2 velocity, i.e. where the unit income elasticity has been imposed, closely matches the short-term interest rate, irrespective of whether the sample starts in the 1970s or 1980s.[4] A unit instead of lower income elasticity has important consequences for the measure of excess money and the assessment of recent money growth: as can be seen from Figure 1, and in contrast to what the authors claim, the latest increases in M2 are not unusual and can be explained by the decrease in interest rate.

2 Some examples are provided in Reynard (2006).

3 See Reynard (2007), where such transaction aggregates are shown to yield consistent estimates in the US (M2–), euro area (M2), and Switzerland (M2). M1 is an incomplete aggregate, in the sense that only part of transaction accounts are included; e.g. it misses savings accounts with inertial and low interest rates close to sight deposit rates and from which households can withdraw substantial amounts on demand for transactions.

4 A unit income elasticity corresponds to the prediction of the Baumol theory if we assume that it is the number of cash flows to be managed that doubles whenever real GDP doubles, not their average size (Lucas, 2000).

Figure 1: Money Demand



The authors' results are due to the fact that their sample is dominated by a disinflation episode. As money and income are trending upward while interest rate is trending downward during a disinflation episode, the increase in money can be econometrically attributed to a falling interest rate or rising income, depending on the exact sample and higher-frequency fluctuations. This can thus lead to the lower income and higher interest rate elasticity that the authors find. The data however fits very well with a unit income elasticity.

Finally, the paper displays results on the relationship between money and inflation. The authors' specified link is given by their equation (3). A natural question is whether such a specification, relating future inflation to money growth and the error term of a money demand equation, is useful to extract the information of money for subsequent inflation. From theory we should expect that when the money level increases (faster than steady state), output rises above its "potential" (given rigidities), and eventually the price level adjusts proportionally to the initial increase in money level. The following data representation sheds light on some key empirical stylized facts and on some problems with the empirical analysis presented by the authors.

Figure 2: Money, Output and Prices

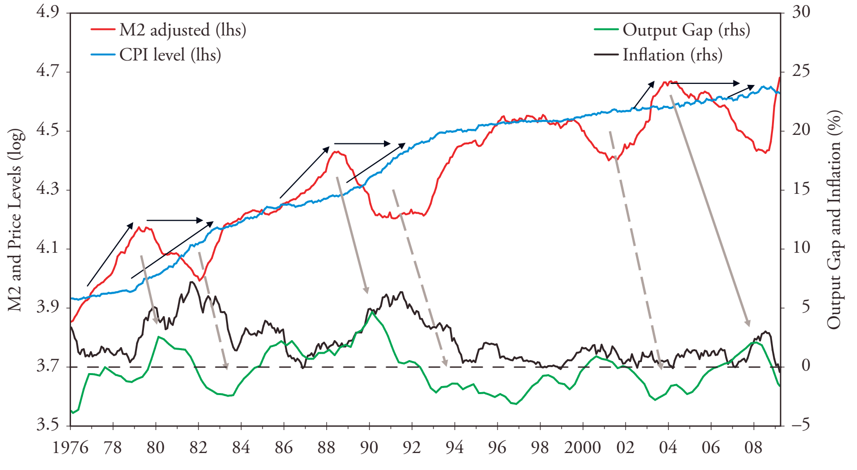


Figure 2 presents the level of M2 adjusted for equilibrium velocity and potential output,[5] the CPI, the output gap and the inflation rate. When the money level increases above the price level, signaling excess liquidity, as in the late 1970s, late 1980s, and to a smaller extend around 2004, output increases above its potential after a lag (see plain gray downwards arrows), and then the price level increases faster until it reaches the previous money level peak (see upper-part black arrows). These increases in the money level are thus followed by proportional increases in the price level after some initial rigidities.

However, money level decreases are not followed by corresponding decreases in the price level, but only by declining output (see dashed gray downwards arrows) and decreasing inflation rates (i.e. the price level is increasing slower). This clearly points to nominal rigidities. As a consequence, when the money level is below the price level, the inflation rate decreases irrespective of money movements. Thus

5 The potential output adjustment accounts for the fact that money movements that are offset by corresponding potential output movements are not inflationary. The equilibrium velocity adjustment is a low-frequency adjustment occurring in disinflation or accelerating inflation episodes, thus e.g. there was no adjustment over the past 15 years. The money level is scaled by the constant of a long-run money demand equation; there is thus an implicit steady-state level of real balances.

in this case, increases in the money level (e.g. in 1993) are not followed by corresponding increases in the price level or higher inflation.

This non-linearity points to misspecification of a linear equation relating money levels and growth rates to inflation such as the one used by the authors. Money growth rates are not useful to assess medium-term inflation perspectives, as even high money growth rates are associated with subsequent *decreasing* inflation rates when the money level is below the price level. The sign and position of the money level relative to the price level are thus crucial in assessing subsequent inflation developments.

Another issue is that major money movements associated with changes in inflationary environments need to be accounted for. In a disinflation episode, which dominates the sample, the money level increases as inflation and interest rates decrease, reflecting the decrease in opportunity cost. As this increase in equilibrium money level has no consequence for subsequent inflation, estimated coefficients of the influence of money on inflation are biased downwards,[6] especially for interest-rate sensitive monetary aggregates. To account for these equilibrium velocity shifts, m^* in Figure 2 has been adjusted for low-frequency changes in interest rate, especially during the 1990s disinflation.

The last shortcoming of the money/inflation analysis is the way excess money, and thus the monetary policy stance measure, is defined. The gap between m^* and p displayed on Figure 2 has a natural interpretation in terms of monetary policy stance, as it can be expressed as

$$m_t^* - p_t = (y_t - y_t^*) + \beta(i_t^* - i_t) + \varepsilon_t,$$

where β is the interest rate semi-elasticity of money demand. The money level (m^*) is above the price level (p) when either output is above potential (y^*), or interest rate is below equilibrium (i^*), or money is higher than what can be explained with interest rates or output (error term). Movements in a transaction aggregate like M2, irrespective of their origin regarding to the three terms of that equation, are closely related to subsequent inflation developments. The excess money measure used by the authors only accounts for the last term, i.e. the error term of a money demand equation. It thus does not account for the "interest rate channel" included in money movements: when interest rates decrease, the corresponding increase in money reflects the fact that firms' and households' financing has become less expensive. The substitutions between monetary and non-monetary assets that occur when interest rates move are thus useful to measure monetary policy stance.

6 See Reynard (2006).

A related issue occurs when M3 or broader aggregates are used instead of an aggregate based on transactions, like M2, to assess monetary policy stance. Such broader aggregates include time deposits with maturities up to several years and yields at or above policy interest rates; the amounts of those assets thus decrease with a decrease in policy rate, and vice versa, therefore offsetting the stance signal of standard money movements. The more of these non-monetary assets (like time deposits, bonds) are included in monetary aggregates, the smoother the aggregate as substitutions between monetary and non-monetary assets offset each other, and thus the least information they contain for monetary policy stance. Figure 3 displays the evolution of money, output and prices, as in Figure 2 but with M3 in addition to M2. The relationship between M3, output and prices is clearly looser than with M2. For example, in contrast to M2, there was no M3 excess liquidity in the late 1970s, thus missing an important expansionary signal before the strong pickup in economic activity and inflation in the early 1980s (see plain arrow); and in the late 1980s / early 1990s, M2 contracted earlier and much more strongly than M3, correctly signaling a subsequent prolonged period of economic slowdown and disinflation (see dashed arrow).

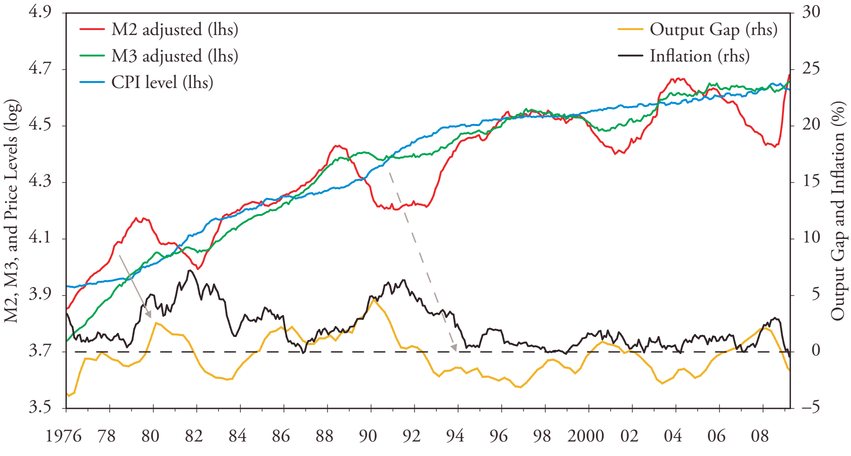
The econometric results found by the authors, implying that M3 has more information than M2, thus contrast with what can clearly been seen from a simple time series graph. Part of the issue with the econometric methodology, i.e. not accounting for non-linearity, can immediately be seen from the graph as mentioned above. Two additional problems, as discussed above, are changes in equilibrium velocity and stance measurement issues, which bias econometric results.

When these weaknesses are accounted for, inflation forecasts are in line with SNB consensus forecasts:[7] when the M2 excess money measure $(m^* - p)$ adjusted for equilibrium velocity is used to forecast inflation, 2010 forecasted inflation is very low, i.e. close to zero, reflecting the low money levels around 2007–2008, and forecasted inflation rates are slightly increasing thereafter as excess money turned positive at the end of the estimation period.

To conclude, this paper is a useful contribution to the econometric literature on Swiss monetary aggregates. However, a simple graphical time series representation displaying clear relationships between money, output and inflation points to some shortcomings in the authors' analysis. These weaknesses would need to be addressed for a better use of monetary aggregates in assessing monetary policy stance.

7 Given space constraints, these alternative results are not displayed here.

Figure 3: M2 & M3, Output and Prices



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